

August 10, 2022

DTC File No: J22-02110

Okanagan Gondola Development
Highway 97 & Bailey Road
Vernon, BC
C/O Ridge North America

Attention: Sean Wilson, Development Manager

**Re: Addendum to April 8 Letter with Regard to Sewage Dispersal for
Okanagan Gondola Development
Bailey Road, Vernon, BC**

This letter has been prepared in response to a request from RDNO planning department for additional information regarding capacity and type of treatment for a sewage system. As mentioned in the initial letter dated April 8, 2022, DeansTech Consulting Ltd. (DTC) was retained by Okanagan Gondola Development, property owner, to comment on the feasibility for sewage dispersal to ground for the above noted project. We understand that the owner, plans to build a tourist gondola on the property and there will be three stations. The main base station will be located near the lower end of the property, the mid station will be located in the upper south portion of the property and the top station will be located in the northwest part of the property. The property is located with-in the North Okanagan Regional District boundary. We understand there will be washrooms for visitors and employees at each of the station locations. We also understand there will be food amenities available at the stations.

With regard to food amenities, we understand there may be a 200 person capacity restaurant and a possible event venue. Average daily design effluent flow for a 200 person restaurant could range from 6,000 litres (1,320 Ig) to 18,000 litres (3,900 Ig). There are generally three levels of treatment available to ROWP's for design purposes. Type 1 effluent is represented by typical septic tank effluent by use of a two chamber septic tank with an effluent filter on the outlet end of the tank, or some combination of septic tanks designed to achieve Type 1 level of treatment. Type 2 treatment implements the use of a septic tank in series with a treatment unit, which usually consists of an aeration type unit that produces an effluent that meets Type 2 quality. Type 3 effluent implements the use of Type 2 quality effluent with some form of disinfection, for example a UV bulb, prior to discharge of the effluent to ground. Alternately, chlorine can be used as a disinfectant, but it requires additional consideration prior to discharge to the ground.

Some of the treatment systems that are used on a regular basis in the Okanagan are Advantex Wastewater Systems, which produce a high quality effluent, PremierTech Ecoflo biofilter, which is a very simple low maintenance system that produces a good quality effluent and the Bionest Treatment System that uses fine bubble air diffusers to

DTC -

add oxygen to treat the effluent. The Bionest system also produces a high quality effluent. Any of the above treatment systems can produce both Type 2 and Type 3 effluent quality.

Any sewage system requires maintenance, usually annually, and with the standards of practice today a maintenance plan is developed for each sewage system that has been installed. There are numerous maintenance providers throughout the valley that can conduct maintenance on sewage systems that include different types of treatment.

Higher quality effluent types are generally used when the site situations are difficult with respect to the amount of area available for ground dispersal, the depth of receiving soils, the slope angle or the proximity to sensitive areas, or when landowners wish to use a better quality effluent for their particular project. Type 2 or 3 levels of treatment allow for a slight reduction in the area required for dispersal to ground because a cleaner effluent is being dispersed.

DTC has been involved with many projects throughout the valley and BC that have implemented treatment systems. In 2014 we developed a unique sewage treatment system for Eagle Pass Heli Ski lodge located near Revelstoke. This site had some challenges with steep slope and shallow soil profile over bedrock. The system included numerous settling tanks, a separate long flow tank for the kitchen flows, three Ecoflo biofilters and siphons that discharge treated effluent to three sand mounds located across the lower slopes of the property. Sand mounds are built above grade and add another level of treatment/filtering to the effluent. The system requires yearly maintenance, and it has been functioning without issue since. The tanks require pumping of contents approximately every 5 years.

More recently we have been involved with the design of a sewage system for the park/museum in Okanagan Centre and were contracted directly from the District of Lake Country parks department. This site has its own challenges being located close to Okanagan Lake and having underlying soils with a fast percolation rate. DeansTech came up with a unique design for this site which implements the use of a long flow tank for the kitchen, and a Bionest treatment unit for the entire flow from the café washroom and the public washroom across from the beach. The treated effluent will be discharged to a large seepage bed located below the surface of the play field. The dispersal field has a layer of wood chips in the base to help reduce nitrate concentrations found in domestic sewage. We have a monitoring system setup so that annual samples can be obtained to ensure the system is functioning as planned. Again, this system will require yearly maintenance that can be done by district staff.

Many testpits were excavated during the initial site visit in March 2022. The soil types observed on the property during the initial testpit investigation are considered suitable for ground dispersal of treated sewage wastewater.

As mentioned in the April letter, the soil types have an estimated soil permeability in the range of 550 to 2000 mm/day, which is equivalent to a 4 to 15 minute percolation rate. This percolation rate is considered ideal for dispersal of effluent to ground. There appears to be sufficient soil depth in the areas of interest to allow for dispersal to ground that meets the standards of practice.

There is no intention of using above ground spray irrigation as a method of effluent dispersal on this site. The design of the sewage systems for the project would likely involve collection and treatment of effluent to Type 2 levels of quality and dispersal to ground in suitable locations. For this type of operation, we would likely have collection and treatment systems at each of the stations. The restaurant flow could be split into a few collection systems so that the effluent could be dispersed at different locations to avoid point loading an area with higher volumes. Dispersal of effluent over a wider area allows for greater potential for infiltration to the underlying soils without the risk of mounding or breakout to surface.

It is our opinion, based on the site inspection and our knowledge of sewage system that the site has sufficient space for dispersal to ground of treated effluent for the proposed operation.

Use of this report is subject to the attached General Conditions. The reader's attention is specifically drawn to these conditions, as it is essential that they be followed for the proper use and interpretation of this report.

We trust this report meets with your approval. Should you have any questions or comments, please contact the undersigned.

Yours truly,
DEANSTECH CONSULTING LTD.

Prepared by,



Richard Deans, C. Tech, ROWP # 0340
Groundwater Technician
Attachments: General Conditions

DTC -

This report incorporates and is subject to these “General Conditions”.

1. USE OF REPORT AND OWNERSHIP

This sewage dispersal report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary assessment. This report and the recommendations contained in it are intended for the sole use of DeansTech’s client. DeansTech does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than DeansTech’s client unless otherwise authorized in writing by DeansTech. Any unauthorized use of the report is at the sole risk of the user. This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of DeansTech. Additional copies of the report, if required, may be obtained upon request.

2. NATURE AND EXACTNESS OF DATA

Some data reviewed during this assessment was produced by others and has been relied upon by DeansTech to form opinions of the site. The accuracy of the data reviewed has not been confirmed. Some data was collected from sources readily available to the public. Other data and information was obtained from the client for use in this report.

3. LOGS OF TEST HOLES AND WATER WELL RECORDS

The test hole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples carried out by others. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance, which requires precise definition of soil or rock zone transition elevations, may require further investigation and review.

4. STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from the information reviewed. Stratigraphy is known only at the location of the drill hole/testpit or other drill holes/testpits in the area. Actual geology and stratigraphy between drill holes/testpits and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. DeansTech does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

5. SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

6. WATER QUALITY

Water quality information was based on the results of water samples obtained from the well(s). The chemical analysis results can vary from season to season and at different depths within a well.

7. STANDARD OF CARE

Services performed by DeansTech for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions in the jurisdiction in which the services are provided. Technical judgment has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

