



Fairmont Creek 2017 Annual Dike Inspection Report

Background

Fairmont Creek experienced a significant debris flow event on July 15, 2012 which deposited approximately 65,000 m³ of debris in the creek channel, over the debris fan and along subdivision roadways and drainage ditches. Disaster Financial Assistance funds were used to reconstruct the previously existing section of dike and protected bank just below Marble Canyon. This work was completed by April 2013. In addition to reconstructing the creek channel and protecting the bank, a series of nine grade controls were constructed along this section. The engineering consultant for this work was Kerr Wood Leidal and the contractor was Max Helmer Construction.

After the 2012 debris flow, Emergency Management BC (EMBC) funds were obtained to have a debris flow hazard and risk assessment completed on Fairmont Creek. Clarke Geoscience was retained for the assessment. It was completed in January 2013 and included a series of recommendations that could be implemented to help mitigate debris flow risk.

On June 20, 2013, Fairmont Creek experienced another debris flow event caused by a significant rain event on saturated soils. The magnitude of this event was approximately 6,000 m³ and the material was mostly contained in the channel and the golf course pond. The golf course pond, a few sites along the creek channel and material impacting the time share condominiums were cleaned out and repaired through EMBC Emergency Response funding. The newly constructed bank protection was not damaged in the event but six of the nine grade controls were significantly damaged or completely destroyed.

The RDEK commissioned an overview inspection of Fairmont Creek following the 2013 event. The inspection and report was funded through EMBC, and was completed by Clarke Geoscience. The inspection was attended by Dwain Boyer, Deputy Inspector of Dikes for the Kootenay Region and Jim Maletta, RDEK Engineering Technician. The inspection occurred on July 29, 2013 and confirmed the findings of the January 2013 Debris Flow Hazard and Risk Assessment, which states that unlimited material available for mobilization exists in the Fairmont Creek watershed and can mobilize given the right conditions.

In 2014, the RDEK was awarded funding through the Building Canada Fund Flood Protection Program for Phase 1 of the Fairmont Creek Debris Flow Mitigation Project. Engineering for this work was completed in Fall of 2014 and construction was completed in early May 2015. The project included widening the creek through the golf course to the pond in order to increase storage capacity. The banks were sloped appropriately and armoured and berms were constructed on both sides of the creek to further contain material in the event of a debris flow. The engineering consultant for this work was Urban Systems and the contractor was Max Helmer Construction.

In 2016, the RDEK was awarded additional funding through the EMBC Flood Protection Program in order to complete Phases 2 and 3 of the Fairmont Creek Debris Flow Mitigation Project. Phase 3 consists of the installation of a weather station at the ski hill and was completed in November. The weather station will be used to develop an early warning system for the community. Phase 2 involve the construction of two large sediment basins containing several large riprap weirs upstream of the Fairmont Hot Springs Resort. Construction was started in September 2017 and will be completed in the Summer and Fall of 2018. The construction start up was delayed by three weeks in September due to the wildfire backcountry ban and because of this delay, the work could not be completed in 2017. The engineering consultant for this work is Northwest Hydraulic Consultants and the contractor is Ironclad Earthworks.

May 4, 2017 Fairmont Creek Dike Inspection

The inspection was completed on May 4, 2017 and was conducted by Kara Zandbergen, RDEK Engineering Technician. All sections of the dike were found to be in good condition. On May 12, 2017, a small amount of debris came down Fairmont Creek to the debris trap pond.

The photos below show the works beginning at the debris pond at the downstream extent of the system and continuing upstream. All photos were taken on May 4, 2017.



Photo 1: Downstream extent of the dike and bank protection works at the entrance to the debris pond.



Photo 2: Looking upstream from the pedestrian bridge on the previous photo.



Photo 3: Cart Path Bridge at the upstream end of the golf course section of the channel.



Photo 4: Right bank berm. Picture taken from the cart path bridge.



Photo 5: Widened channel. Picture taken from the cart path bridge.



Photo 6: Left bank berm. Picture taken from the cart bridge.



Photo 7: Upstream extent of the DFA works and bank protection.

Upstream Conditions

The section of Fairmont Creek immediately above the bank protection works is experiencing minor bank erosion that could be caused by water surges from flushing the Fairmont Hot Springs Resort (FHSR) large swimming pool into Fairmont Creek. The volume of water released is significant over a short period of time and could be weakening the bank structure that could result in added material generated in a debris flow.

Downstream Conditions

The Ministry of Transportation and Infrastructure (MoTI) has increased the culvert capacity at two locations along Fairmont Creek:

1. At the creek crossing of Columbia River Road
2. At the creek crossing of Fairmont Creek Road

Both locations have had larger and twinned culverts installed. All culverts were in proper working order at the time of inspection.

May 12, 2017 Fairmont Creek Dike Debris

On May 12, 2017, a small amount of debris came down Fairmont Creek to the debris trap pond. An estimated 1,200 m³ of debris material was deposited in the pond and additional debris was along the creek bed. Removal of the debris is planned for 2018 following completion of the Fairmont Creek Debris Flow Project Phase 2 works.

The photos below show the works beginning at the debris pond at the downstream extent of the system and continuing upstream. All photos were taken on May 12, 2017.



Photo 8: Entrance to the debris pond.



Photo 9: Entrance to the debris pond. Photo taken from the other side of the pond than the previous photo.



Photo 10: Looking upstream from the pedestrian bridge.



Photo 11: The widened section of creek below the cart path.



Photo 12: Upstream extent of the DFA works and bank protection. When comparing with Photo 7, the bank erosion, damage to the grade control structures and debris deposition is very apparent.

Maintenance

The debris from May 12, 2017 is scheduled to be removed after the Phase 2 construction has been completed. After the construction is complete, the RDEK will also begin the process of establishing a legal right of way for the Fairmont Creek dike system.