3rd Year Royal Military College Civil Engineering students apply their skills at 19 Wing Comox

By Lt Cote 17 Jul 14

19 WING COMOX, BC — Photo of the Royal Military College of Canada (RMCC) Civil Engineering students and the 19 Wing Construction Engineering (CE) support staff.

The RMCC Civil Engineering class of 2015 visited 19 Wing Comox from 3 – 10 May 2014 as part of their third year Civil Engineering course. Their purpose was to apply theoretical principles learned in class and develop possible solutions to real life engineering problems. Each of the engineering problems given in detail below had a different approach. 19 Wing Comox CE afforded opportunity to the RMCC Civil Engineering class to assess four of their ongoing engineering problems. These problems included:

1) Queen's Ditch Flooding Control;

    a. The Queen's Ditch is a 3km long drainage system extending from 19 Wing to Kye Bay, where it discharges into the Georgia Strait. It is frequently referred to in the area as "the ditch that nobody wants" due to its many complications. The ditch entails many legal implications due to the elevation of the surrounding farmer's fields, residential areas and its habitation by Coho salmon and beaver; which means the Department of Fisheries and Oceans have a stake in any remediation measures taken.

b. A detailed topographical survey of the Queen's Ditch was provided to 19 Wing CE and after the investigation it was confirmed that local flooding was mainly caused by absent gradient and growing vegetation on the entire length of the ditch embankments.

2) Air Force Beach Shoreline Stability and Erosion Control;

a. This 2 km section of the scarp along Kye Bay is located on the east side of 19 Wing and stretches from Kye Bay Road to the north side of Tee Pee Park. The area is subjected to erosion where surface water is being moved over the ridge and where tidal activity affects the base of the slope; which borders the Strait of Georgia. This has caused the ground at the top of the bluff to slowly slide away and will eventually lead to the loss of DND land and property. The area of interest extends approximately 800m north along the ridge from the first of the airfield drainage ditches that discharge at the bluff, where several landslides have occurred in the past.

b. The RMCC group conducted a site reconnaissance, reviewed geotechnical reports on previous assessments, used available data to estimate the overland flow and seepage rates, and determined flow patterns. A recommendation for dealing with the runoff and seepage was selected, and a preliminary design for the selected solution was prepared by the students. The investigation determined that the erosion of the bluff is caused by three primary sources; surface runoff, seepage and undercutting due to wind and wave erosion.

3) New Wing Storage Facility Design;

a. 19 Wing currently has a requirement identified to construct a storage facility in order to adequately provide sufficient storage for the entire Wing. This problem afforded the RMCC team the opportunity to RECCE the ground and design their own storage building based on the requirements provided by CE.

b. The student design consisted of three large bays, and ten small storage bays. Their first task was to do a ground assessment and determined a suitable area on Wing for the facility. The group designed the facility such that it could easily be doubled/mirrored if needed and decided upon a masonry structure with interior W-Shape columns and beams. It was approximately 386.5m² in size containing ten, 3m x 6m bays and three, 7.3m x 9.1m bays with a ROM of $500,000. The loading analysis was conducted for the structure and the appropriate columns and beams were selected and depicted using Revit software.

4) Water Treatment Supply and Distribution;

a. 19 Wing's water is supplied by two drilled wells located away from the MOB which replenish two potable water reservoirs located within the confines of the Wing. CE raised concerns for the safety of personnel and security of the Wing, indicating the potential risks associated by the use of chlorine gas in the water treatment system and the non DND use of land adjacent to well sites.

b. RMCC students determined that chlorine gas was an appropriate process to decontaminated water. However the wells, located outside DND land, could be contaminated from nearby runoff from adjacent properties. Recommendations were given to mitigate and improve the security of the well sites.

Photo 2 and 3 show the group surveying the Queen's Ditch by canoe to get at the deep areas.

In conclusion, the RMCC Civil Engineering class of 2015 visit at 19 Wing was a great way for the third year civil engineering students to apply the knowledge and skills they have learned analyzing real-life engineering problems. The recommendations given by the students have provided 19 Wing with useful analysis that can be used for future planning in order to help mitigate on-going engineering issues at 19 Wing.