Q. **Volume II, Tab 7 – Rehabilitate Shoreline Protection, Cat Arm**

Hydro outlines that the Alternative #2: Rock Armour Rehabilitation is the preferred method and the least cost option. The proposed rock armour will be developed in a manner which differs from what was utilized in 2005. How was the method of 2005 decided on? What reviews and analysis did Hydro rely upon when choosing the rock armour pattern/method in 2005?

A. As outlined in *Section 3.1 Previous Design*, set out on page A7 of the report at Tab 7, Volume II, the 2005 rock armour rehabilitation design was developed by AMEC.

Erosion along this section of roadway embankment was first recognized in 2004. Hydro then engaged AMEC to assess the damage, investigate the alternatives and design the shoreline protection measure to be implemented along the section of roadway.

AMEC's design criteria and recommendations were derived from the Hudson Formula[1], which is commonly utilized to generate preliminary values for the size of the stone to be utilized in armour stone protection layers. This formula considers various factors such as slope angle, thickness of armour layer, and wave height/action.

[1] Traditional rock armour design predominately utilizes the Hudson Formula (1958). It was developed to be used as a preliminary design to determine the mass of rock armour needed for shoreline protection. The Hudson Formula was presented in the Shoreline Protection Manual Volume II produced by the US Army Corps of Engineers in 1984. Hudson's Formula considers various factors such as slope angle, thickness of armour layer, and wave height/action to generate the required armour size.

As no local wave data was available for Cat Arm, wave characteristics considered during the design phase were derived from wind and wave modelling completed by AMEC. To complete this, modelling data was obtained from the nearest meteorological data centers located in La Scie and St. Anthony.