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Attention: Mr. Bill Neusch

Date: May 23, 2011

Mr. Neusch,

Based upon the testing performed on Monday, April 4, 2011 at KARCO Engineering, LLC., the as-tested configuration of the M50 Shallow Foundation Bollard three bollard array has received an impact rating of P1 at the M50 test level, based on the ASTM F 2656-07 standard test method. The M50 test level is evaluated using a 6,800 kg test vehicle traveling at a nominal velocity of 80 km/h. The P1 penetration rating is given when penetration beyond the protected side of the barrier is less than 1.0 m at the lower leading edge of the test vehicle's cargo bed.

The M50 Shallow Foundation Bollard completely disabled the test vehicle causing severe damage to the drivetrain and occupant compartment. Maximum penetration recorded was 0.98 m on the passenger's side of the vehicle when measured dynamically.

The M50 Shallow Foundation Bollard sustained damage to the center bollard and foundation as a result of the impact. The impacted bollard bent in the direction of vehicle travel a total of 12.7° and the concrete foundation cracked.

Complete information relating to the test can be found in report number TR-P31046-01-A and CD serial number 2011-1938 from KARCO Engineering, LLC., including test conditions, test vehicle information, and manufacturer drawings. Also included are any discrepancies/differences from the manufacturer supplied drawings and the as-tested test article.

Sincerely yours,

Frank D. Richardson
President
KARCO Engineering, LLC.