



Analytical Resources, Incorporated

Analytical Chemists and Consultants

Client: Earth Science Products

Project No.: NG09

Client Project: Treatability Test

Case Narrative

1. A sample of soil and a proprietary soil amendment were received for testing. The initial, untreated soil was homogenized and sampled for cation exchange capacity and hydraulic conductivity testing. A solution of 4 oz of soil amendment per gallon of tap water was prepared and used to treat the soil. The remainder of the amendment was used as influent in the hydraulic conductivity test.
2. The hydraulic conductivity test was run according to ASTM D5084. a portion of the untreated soil was compacted and set up in a flexible wall permeameter. The test was run until a steady state flow was achieved. At this point, the influent was changed over to the soil amendment. The test was continued for several days until steady state flow was again achieved.
3. The initial untreated site soil was submitted for cation exchange capacity testing. A second aliquot of site soil was treated with about 20 ml of the amendment and some additional water. The slurry was thoroughly mixed, with all clay balls being broken up with a spoon during the mixing. The soil slurry was then allowed to air dry. It was broken up in a damp state and submitted for cation exchange capacity testing.
4. The treatment of the soil caused an increase in the hydraulic conductivity of the soil from $2.40E-06$ cm/s to $5.85E-06$ cm/s; a doubling of the rate of flow for this sample.
5. The cation exchange capacity increased from an initial 5.58 meq/100g of soil to 8.33 meq/100g of soil; an increase of about 50%.
6. The data is provided in summary tables and plots.
7. There were no other noted anomalies in samples or methods on this project.

Approved by: *David Long*
Title: Geotechnical Division Manager

Date: *8/28/08*