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## Low-level river crossings and erosion repair of the access road for general ease of access and secure transportation of the Lunar Laser Ranger and Radio Telescope equipment to the Matjiesfontein Space Geodesy Observatory

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The Matjiesfontein Space Geodesy Observatory will be home to large and sensitive high-tech instruments which ought to be carefully transported to the observatory. The access road to and on the site itself intercepts five drainage channels and there are currently no existing structures to allow for safe and reliable passage. Three low-level river crossings were designed to withstand 1:20 year floods in order to grant access to heavy vehicle traffic for delivering the instruments securely and for hauling material during construction. Seasonal runoff is further responsible for a fair amount of erosion to the road itself, causing damage to an extent such that access to the site per normal light vehicle is practically impossible. Recommendations are made for the repair of the road that would also allow access to regular staff once the observatory is in operation. The problem is receiving further attention currently with the aim of implementing a final gravel road design with special consideration to sufficient side drainage. In addition to the Lunar Laser Ranger, two 34m diameter NASA Radio Telescope antennas will also require cautious transportation to the site. Appropriate foundations will need to be designed to ensure exceptional stability of the structures, as they need to point accurately at distant celestial objects, survive high wind speeds and resist any seismic activity. The antennas will be used for conducting geodetic Very Long Baseline Interferometry (VLBI) experiments, among others. This is the only long distance technique in earth observation to present the absolute orientation of the earth in an inertial coordinate system to high accuracy (Clark, 2003). The instruments would also have to be undisturbed in the case of disastrous events such as possible landslides, flooding etc. These events will be analyzed and the optimum locations on site will be determined and identified for installing each of the structures.

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