Analisis Kestabilan Lereng dan Potensi Longsor Kawasan Pertambangan Andesit di Desa Cipinang, Kabupaten Bogor, Provinsi Jawa Barat = Slope Stability Analysis and Landslide Potential of Andesite Mining Area in Cipinang Village, Bogor Regency, West Java Province

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Abstrak

Desa Cipinang, Kecamatan Rumpin, Kabupaten Bogor merupakan salah satu desa yang rawan longsor. Upaya pencegahan longsor telah dilakukan dengan memasang tiang pancang namun tidak efisien dalam mencegah terjadinya longsor. Penelitian ini bertujuan untuk memperoleh informasi kondisi geomorfologi, geologi teknik, karakteristik massa batuan dan tanah, kondisi kestabilan lereng, potensi longsor, penyebab longsor dan rencana penguatan lereng yang tepat. Metode yang digunakan meliputi pemetaan geomorfologi dan geologi teknik, scanline, uji sifat fisik dan mekanika tanah, analisis kinematik, Rock Mass Rating (RMR), Slope Mass Rating (SMR) dan analisis kesetimbangan batas menggunakan metode Morgenstern – Price. Hasil pemetaan geomorfologi menunjukkan daerah penelitian terdiri dari Satuan Dataran Rendah Pedalaman Vulkanik Agak Landai dan Satuan Perbukitan Rendah Vulkanik Curam. Geologi teknik terdiri dari Satuan Pasir dan Satuan Andesit. Karakteristik massa batuan menunjukkan nilai RMR 79 (Kelas II) hingga 87 (Kelas I). Perhitungan SMR menunjukkan rentang nilai 41 (leren stabil sebagian) – 79,25 (lereng stabil). Analisis kesetimbangan batas menunjukkan bahwa lereng 5 dalam kondisi kritis dengan nilai FK 1,131. Ketidakstabilan lereng disebabkan oleh kehadiran bidang diskontinuitas pada massa batuan dan geometri lereng. Lereng lainnya seperti Lereng 3 dengan FK 3,117, Lereng 4 dengan FK 1,751 dan Lereng 6 dengan FK 2,063 tergolong lereng yang stabil. Berdasarkan nilai SMR, saran penguatan lereng batuan yang dapat dilakukan berupa pembuatan paritan pada kaki lereng dan pemasangan jala kawat, jangkar kabel baja, beton semprot atau pembuatan paritan pada kaki lereng dan beton gigi, titik baut batuan. Sedangkan penguatan lereng tanah dapat dilakukan dengan mengubahan geometri lereng dan mengendalikan air permukaan.

.....Cipinang Village, Rumpin District, Bogor Regency is one of the villages that are prone to landslides. Prevention efforts by installing piles are inefficient in preventing landslides. This study aims to obtain information on geomorphology and engineering geological conditions, characteristics of rock and soil masses, slope stability conditions, landslide potential, landslide causes, and appropriate slope strengthening plans applied in the research area. The methods used include geomorphological mapping, engineering geological mapping, scanline, soil physical and mechanical properties tests, kinematic analysis, Rock Mass Rating (RMR), Slope Mass Rating (SMR), and limit equilibrium analysis using the Morgenstern – Price method. The results of geomorphological mapping divide the study area into the Somewhat Gentle Volcanic Inland Lowland Unit and the Steep Volcanic Low Hill Unit. The engineering geological units of the research area divide into Sand Units and Andesite Units. Rock mass identification results show that value of RMR is 79 (Class II) - 83 (Class I). SMR calculations show a range of values of 41 (partially stable slope) – 74 (stable slope). The limit equilibrium analysis showed that Slope 5 in critical condition with an FK value of 1,131. This slope instability is caused by the presence of discontinuity of rock mass and the geometry of the

slopes. The other slopes such as Slope 3 with an FK value of 3,117, Slope 4 with an FK value of 1,751, and Slope 6 with an FK value of 2,063 are classified as stable slopes. Based on the SMR value obtained, suggestions for strengthening rock slopes that can be done are the manufacture of trenches at the foot of the slope and wire mesh, the manufacture of steel cable anchors, the manufacture of spray concrete, or the manufacture of trenches on the foot of the slope and the concrete of the teeth, the manufacture of rock bolt points. Meanwhile, soil slope strengthening can be done by changing the geometry of the slope and controlling surface water.