

EVALUASI KAPASITAS DAN EFEKTIVITAS ARAH ALIRAN DRAINASE

(Studi Kasus : Jln.Bengkalis – Gg. Kebun Kapas II – Gg. Cikmas Ayu Kel.

Rimbas Sekampung Kec. Bengkalis)

Nama Mahasiswa : Wahyu Wardana

NIM : 4204221529

Pembimbing 1 : Ir. Zulkarnain, ST.,MT

Pembimbing 2 : Hamidatul Aminah, ST., MT

ABSTRAK

Drainase merupakan salah satu prasarana penting pada kawasan permukiman yang berfungsi mengalirkan limpasan air hujan agar tidak menimbulkan genangan. Penelitian ini bertujuan untuk mengetahui kondisi eksisting sistem jaringan drainase, menghitung besarnya debit limpasan air hujan, mengevaluasi kapasitas saluran drainase eksisting dalam menampung debit limpasan, serta mengidentifikasi arah aliran drainase menuju saluran utama atau outlet di Desa Rimbas Sekampung, Kecamatan Bengkalis. Penelitian dilakukan melalui survei lapangan untuk memperoleh data dimensi, elevasi, dan kondisi fisik saluran. Analisis hidrologi menggunakan Metode Rasional, sedangkan analisis kapasitas saluran menggunakan Persamaan Manning. Pemetaan jaringan dan identifikasi arah aliran dilakukan dengan bantuan ArcGIS. Hasil penelitian menunjukkan bahwa sistem drainase terdiri atas saluran primer dan sekunder yang secara umum masih berfungsi, tetapi pada beberapa ruas ditemukan sedimentasi, sampah, vegetasi, kemiringan dasar yang kurang baik, serta belum tersedianya saluran permanen. Debit rencana yang diperoleh untuk kala ulang 2, 5, 10, 25, dan 50 tahun berturut-turut sebesar 4,46; 6,07; 7,13; 8,35; dan 9,46 m³/det. Kapasitas saluran primer sebesar 1,502326725 m³/det dan saluran sekunder sebesar 10,40198719 m³/det, sehingga kapasitas total mencapai 11,90431391 m³/det. Hasil perbandingan menunjukkan kapasitas total lebih besar daripada debit rencana pada seluruh kala ulang yang dianalisis. Arah aliran secara umum menuju saluran utama dan outlet, tetapi beberapa ruas mengalami aliran balik akibat kondisi elevasi, sedangkan Gang A1 dan Gang C2 belum memiliki saluran permanen. Oleh karena itu, diperlukan pemeliharaan rutin, perbaikan kemiringan, dan pembangunan saluran pada ruas yang belum tersedia untuk meningkatkan efektivitas sistem drainase. Hasil penelitian diharapkan menjadi dasar dalam menentukan prioritas penanganan dan pemeliharaan jaringan drainase.

Kata kunci: Arah Aliran, Debit Limpasan, Drainase, Kapasitas Saluran, Metode Rasional.

***Evaluation Of Drainage Capacity And Flow Direction
Effectiveness
(Case Study: Bengkalis Road – Kebun Kapas II Alley – Cikmas Ayu
Alley, Rimbas Sekampung Subdistrict, Bengkalis District)***

Student Name : Wahyu Wardana
Student Number : 4204221525
Supervisor 1 : Ir. Zulkarnain, ST., MT
Supervisor 2 : Hamidatul Aminah, ST., MT

ABSTRACT

Drainage is one of the important infrastructures in residential areas that functions to convey rainfall runoff and prevent water accumulation and flooding. This study aims to determine the existing condition of the drainage network, calculate rainfall runoff discharge, evaluate the capacity of existing drainage channels to accommodate runoff, and identify the direction of drainage flow toward the main channel or outlet in Rimbas Sekampung Village, Bengkalis District. Field surveys were conducted to obtain channel dimension, elevation, and physical condition data. Hydrological analysis was carried out using the Rational Method, while channel capacity was evaluated using the Manning Equation. Drainage network mapping and flow direction identification were supported by ArcGIS. The results show that the drainage system consists of primary and secondary channels that generally remain functional. However, several sections were found to have sedimentation, waste, vegetation, inadequate channel slopes, and the absence of permanent drainage channels. The design runoff discharges for return periods of 2, 5, 10, 25, and 50 years were 4.46, 6.07, 7.13, 8.35, and 9.46 m³/s, respectively. The capacity of the primary channels was 1.502326725 m³/s, while the secondary channels had a capacity of 10.40198719 m³/s, resulting in a total drainage capacity of 11.90431391 m³/s. The comparison indicates that the total drainage capacity is greater than the design runoff discharge for all analyzed return periods. The overall flow direction leads toward the main channel and outlet, although several sections experience backwater due to elevation conditions, while Gang A1 and Gang C2 do not yet have permanent drainage channels. Therefore, routine maintenance, channel slope improvement, and construction of drainage channels in sections without permanent facilities are required to improve the effectiveness of the drainage system. The results are expected to provide a basis for determining priorities for drainage system improvement and maintenance.

Keywords: *Drainage, Channel Capacity, Flow Direction, Rational Method, Runoff Discharge.*