

## **Jaringan Dan Pemetaan Saluran Drainase (Studi Kasus : Kelurahan Damon, Kecamatan Bengkalis)**

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### **ABSTRAK**

Kelurahan Damon di Kecamatan Bengkalis merupakan area permukiman padat yang rentan mengalami genangan akibat ketidakefektifan sistem drainase dan pengaruh fluktuasi muka air anak sungai. Penelitian ini bertujuan untuk mengevaluasi kapasitas daya tampung saluran drainase eksisting, efektivitas arah aliran, serta pemetaan spasial jaringan drainase berbasis Sistem Informasi Geografis (SIG). Metode analisis yang digunakan mencakup perhitungan debit limpasan hujan dan buangan domestik menggunakan Metode Rasional, analisis kapasitas saluran berbasis persamaan Manning, serta pemetaan topografi dan elevasi menggunakan ArcGIS skala 1 : 2.731. Hasil penelitian menunjukkan bahwa total akumulasi kapasitas daya tampung saluran utama (primer) pada Jalan Utama mencapai 6,67210 m<sup>3</sup>/detik, yang secara kuantitatif mampu menampung total beban limpasan dari saluran gang (sekunder) sebesar 1,06835 m<sup>3</sup>/detik. Namun, dari 37 saluran yang dievaluasi, terdapat 4 saluran (10,8%) yang dinyatakan tidak memadai. Evaluasi elevasi mengidentifikasi adanya nilai selisih elevasi negatif ( $\Delta E < 0$ ), seperti pada STA 0+000 s.d. STA 0+071 ( $\Delta E = -0,131$  m) dan Gang F ( $\Delta E = -0,53$  m s.d.  $-0,644$  m), yang memicu terjadinya aliran balik (*backwater*) menuju pemukiman. Selain itu, sepanjang 58 meter dari total 360 meter saluran utama masih berupa saluran tanah yang rentan terhadap sedimentasi. Solusi teknis yang direkomendasikan meliputi redesain kemiringan dasar saluran ( $\Delta E > 0$ ), pembuangan sedimentasi, peningkatan konstruksi saluran tanah menjadi beton permanen, serta pemasangan pintu air (*flap gate*) pada titik outlet guna mencegah luapan air sungai saat pasang.

**Kata Kunci:** Drainase, Kapasitas Saluran, *Backwater*, Elevasi, ArcGIS, Damon.

## ***Drainage Channel Network and Mapping (Case Study : Damon Urban Village, Bengkalis District)***

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### **ABSTRACT**

*Damon Urban Village in Bengkalis District is a densely populated residential zone prone to inundation due to an suboptimal drainage system and the influence of water level fluctuations in nearby tributaries. This study aims to evaluate the capacity of the existing drainage channels, the effectiveness of flow directions, and the spatial mapping of the drainage network using Geographic Information System (GIS). The analytical methods employed include the calculation of rainwater runoff and domestic wastewater discharges using the Rational Method, channel capacity evaluation based on Manning's equation, and topographic/elevation mapping utilizing ArcGIS at a scale of 1:2,731. The results indicate that the total accumulated capacity of the main (primary) channel along the Main Road reaches 6.67210 m<sup>3</sup>/s, which quantitatively exceeds the total runoff load from secondary alley channels amounting to 1.06835 m<sup>3</sup>/s. However, out of 37 evaluated channels, 4 channels (10.8%) were classified as inadequate. Elevation evaluation identified negative elevation differences ( $\Delta E < 0$ ), notably at STA 0+000 to STA 0+071 ( $\Delta E = -0.131$  m) and Alley F ( $\Delta E = -0.53$  m to  $-0.644$  m), which trigger backwater flow into residential areas. Furthermore, 58 meters of the total 360 meters of the primary channel remain unlined earthen channels susceptible to severe sedimentation. Recommended technical measures include slope redesign ( $\Delta E > 0$ ), sedimentation dredging, upgrading earthen channels to permanent concrete structures, and installing flap gates at the outlet point to prevent river backflow during high tides.*

**Keywords:** *Drainage, Channel Capacity, Backwater, Elevation, ArcGIS, Damon.*