ABSTRAK

Perkembangan kawasan perkotaan meningkatkan volume limbah domestik yang sering dibuang langsung ke sungai tanpa pengolahan, seperti di Kampung Ledhok Timoho pada aliran Sungai Gajah Wong. Kondisi ini mencemari air, merusak ekosistem, dan membahayakan kesehatan masyarakat. Salah satu solusi yang sesuai untuk permukiman padat adalah constructed wetland, teknologi pengolahan limbah yang hemat biaya, ramah lingkungan, dan minim energi. Sistem ini memerlukan unit pendukung, antara lain bak pengendap awal, Anaerobic Baffled Reactor (ABR), dan bak indikator, dengan tanaman Canna indica yang membantu menyisihkan polutan sekaligus mempercantik area. Penelitian ini bertujuan merancang dan menghitung dimensi unit Horizontal Subsurface Flow Constructed Wetland (HSSF-CW) dengan tanaman Canna indica sesuai karakteristik limbah domestik di Ledhok Timoho, menganalisis serta menyusun Rencana Anggaran Biaya (RAB), dan memvalidasi Standar Operasional Prosedur (SOP) agar pengelolaan dapat dilakukan masyarakat secara mandiri dan berkelanjutan. Perancangan dilakukan dengan pendekatan desentralisasi berbasis alam pada lahan kosong ±900 m². Sistem dirancang modular berbasis gravitasi, meliputi bak settler, ABR, wetland dengan Canna indica, bak indikator, dan klorinasi opsional. Dimensi tiap unit ditentukan melalui pedoman teknis dan dievaluasi terhadap baku mutu Permen LHK No. 68/2016, dengan penyesuaian bila diperlukan. Hasil penelitian menunjukkan bahwa sistem HSSF-CW dengan Canna indica di Kampung Ledhok Timoho efektif menurunkan BOD, COD, dan TSS sesuai baku mutu. Keberhasilan ini didukung pemilihan tanaman yang tepat, desain teknis yang baik, serta integrasi unit pengolahan. Teknologi ini terbukti efisien, ramah lingkungan, dan berbiaya rendah, sekaligus menyediakan ruang hijau yang memperindah lingkungan. Model ini dapat direplikasi di wilayah lain untuk mendukung sanitasi berbasis masyarakat yang berkelanjutan.

Kata kunci: *Canna indica*, constructed wetland, limbah domestik

ABSTRACT

Urban development has increased the volume of domestic wastewater, much of which is discharged directly into rivers without treatment, as seen in Kampung Ledhok Timoho along the Gajah Wong River. This situation pollutes water, damages ecosystems, and threatens public health. One suitable solution for densely populated areas is a constructed wetland, an affordable, eco-friendly, and low-energy wastewater treatment technology. The system requires supporting units such as a settling tank, an Anaerobic Baffled Reactor (ABR), and an indicator tank, with *Canna indica* plants that help remove pollutants while enhancing the landscape. This study aims to design and calculate the dimensions of a Horizontal Subsurface Flow Constructed Wetland (HSSF-CW) with *Canna indica* based on the characteristics of domestic wastewater in Ledhok Timoho, analyze and prepare a cost estimate (RAB) for its construction, and validate Standard Operating Procedures (SOPs) so the system can be managed independently and sustainably by the community. The design applies a decentralized, nature-based approach on an unused plot of approximately 900 m². The system is modular and gravity-driven, consisting of a settler, ABR, wetland with *Canna indica*, indicator tank, and optional chlorination. Unit dimensions were determined using technical guidelines and evaluated against Indonesian wastewater quality standards (Permen LHK No. 68/2016), with adjustments made as needed. Results show that the HSSF-CW with *Canna indica* in Kampung Ledhok Timoho effectively reduces BOD, COD, and TSS to meet regulatory limits. Success is attributed to appropriate plant selection, sound technical design, and integration of treatment units. This technology proves efficient, environmentally friendly, and low-cost, while also providing green space that improves local aesthetics. The model can be replicated in other areas to support sustainable, community-based sanitation solutions.

Keywords: *Canna indica*, constructed wetland, domestic wastewater