

ABSTRAK

Desa Kracak, Kecamatan Ajibarang, Kabupaten Banyumas, memperoleh pasokan air bersih dari program Pamsimas (Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat) serta sumur milik warga. Meskipun dua unit Pamsimas telah dibangun pada tahun 2018, cakupan layanan masih terbatas akibat ketiadaan dana operasional, kurangnya pemeliharaan rutin, serta belum adanya pengelola tetap. Penelitian ini merupakan jenis penelitian survei yang bertujuan untuk merancang sistem distribusi air bersih yang dapat memenuhi kebutuhan penduduk selama sepuluh tahun ke depan. Metode perencanaan mencakup proyeksi kebutuhan air bersih, perancangan dimensi reservoir, pemilihan spesifikasi pompa, perencanaan jaringan transmisi dan distribusi, serta analisis performa hidraulik menggunakan perangkat lunak WaterNet. Berdasarkan hasil penelitian, sistem dirancang untuk melayani 59 kepala keluarga atau 152 jiwa, dengan kebutuhan air harian sebesar $19,369 \text{ m}^3$ ($0,224 \text{ liter/detik}$). Air bersumber dari sumur bor sedalam 80 meter pada elevasi ± 120 meter di atas permukaan laut (mdpl), dan dipompa menggunakan pompa dengan total head minimal 41,658 meter melalui pipa HDPE berdiameter 2 inci sepanjang 390 meter menuju reservoir berukuran $3 \times 3 \times 2,75$ meter pada elevasi ± 149 mdpl. Selanjutnya, air didistribusikan ke rumah-rumah warga secara gravitasi melalui pipa HDPE sepanjang 3.700 meter. Simulasi awal menggunakan WaterNet menunjukkan bahwa sistem bekerja secara hidraulik, namun terjadi aliran laminar pada beberapa segmen pipa akibat dimensi yang terlalu besar. Redesain dengan pipa berdiameter 1 inci berhasil menghilangkan aliran laminar dan memastikan seluruh titik layanan terlayani secara optimal.

Kata kunci : Waternet, pipa, pamsimas, air bersih, Kracak

ABSTRACT

Kracak Village, located in Ajibarang Sub-district, Banyumas Regency, receives its clean water supply from the Pamsimas program (Community-Based Drinking Water and Sanitation) as well as from household-owned wells. Although two Pamsimas units were constructed in 2018, the service coverage remains limited due to the lack of operational funding, inadequate routine maintenance, and the absence of permanent management. This research is a survey-based study aimed at designing a clean water distribution system that can meet the needs of the population over the next ten years. The planning method includes projecting clean water demand, designing reservoir dimensions, selecting pump specifications, planning the transmission and distribution network, and analyzing hydraulic performance using WaterNet software. Based on the results, the system is designed to serve 59 households or 152 people, with a daily water demand of 19.369 m³ (0.224 liters/second). Water is sourced from an 80-meter-deep borehole located at an elevation of approximately 120 meters above sea level and pumped using a pump with a minimum total head of 41.658 meters through a 2-inch HDPE pipe over a distance of 390 meters to a reservoir measuring 3 × 3 × 2.75 meters at an elevation of around 149 meters above sea level. From there, water is distributed to homes by gravity through a 3,700-meter-long HDPE pipe network. Initial simulations using WaterNet showed that the system operates hydraulically; however, laminar flow occurred in several pipe segments due to oversized pipe diameters. A redesign using 1-inch diameter pipes successfully eliminated laminar flow and ensured optimal service to all distribution points.

Keyword : Waternet, pipe, pamsimas, clean water, Kracak