PLANNING OF WATER SUPPLY NETWORK, TRAFFIC ANALYSIS AND DESIGN, AND CONSTRUCTION MANAGEMENT IN RUMAH SAKIT IBU DAN ANAK, KECAMATAN SEBERUANG KABUPATEN KAPUAS HULU KALIMANTAN BARAT

Final Project Report

As one of the requirements for obtaining a bachelor's degree from

Universitas Atma Jaya Yogyakarta

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Abstract

The mother and child hospital project in Seberuang district, Kapuas Hulu, West Kalimantan has approximately 10000 m^2 area. The planning for the project is then divided into three phases, those phases are the water planning phase, transportation planning phase, and construction management phase. Each phase will connect one and the other, making each phase of the planning affect one and the other. The main guide for the hospital planning will be the SNI to ensure that the project's planning will be executed correctly and efficiently.

In the water planning phase, the main objective is to solve the hospital's clean water demand, the piping system, and the pump power to ensure that the clean water could reach all the fixtures without any problem. Besides the clean water, there is also plumbing and the drainage system, to assist this planning some approaches and methods are taken, such as the approach using the *Hazen-Williams* equation for the pump power calculation, *Mononobe* method to calculate average daily rainfall. All the calculations and data are also based on the SNI 8153-2015 about the structure plumbing system, and SNI 03-7065-2002 regarding the procedure for plumbing system planning. Using the mentioned approach and method, the value of water use at peak hour is obtained to be 1.5552 m^3/minute, and the power the pump needs to generate is 6.8 kW. As for the transportation planning, it will revolve around how to determine the parking capacity and road capacity. In order to determine the road capacity, first, it is necessary to do a survey of the traffic volume of the road. The data from the survey will then be processed using the manual method and with the guide from the MKJI in order to find the road capacity. In the MKJI according to the type of vehicle, the total volume will need to be calculated this is necessary in order to find the actual total volume With the result the road's degree off calculation can be determined, and the degree of saturation is the comparison between the actual volume and road capacity, it is then determined that the road's level of service is B. During parking space calculation first the available parking space is calculated then, the result will then be compared with the result of the parking space requirement (KRP) according to Dirjen Perhubungan Darat (1996). Since the available parking space of the hospital doesn't meet the requirement, an additional area is used to fulfill the remaining parking area requirement.

The construction management phase covers the cost and time calculation for the project. Started with assembling the Work Breakdown Structure (WBS) of the project, followed by the Bill Of Quantity (BOQ) according to the WBS. Using the Activity Unit Price Analysis (AHSP) for West Kalimantan for 2021, the cost of the BOQ is calculated. Then the duration, scheduling, and S Curve of the project can be determined. With all the data calculated, the total cost of the project is determined to be Rp 32.726.633.498,28 with the cost to be Rp 6.020.239,19/m^2 and the project duration is 331 days.

Keyword: Hospital, Drainage, Head Loss, MKJI, Parking Space, RAB, S Curve

STATEMENT

We, the undersigned,

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I solemnly declare that the Final Project with the title:

PLANNING OF WATER SUPPLY NETWORK, TRAFFIC ANALYSIS AND DESIGN, AND CONSTRUCTION MANAGEMENT IN RUMAH SAKIT IBU DAN ANAK, KECAMATAN SEBERUANG KABUPATEN KAPUAS HULU KALIMANTAN BARAT

Is an original work and is not the result of plagiarism from the work of others, We, the undersigned, contribute to this Final Project in equal proportion. Thus, we make this statement as a complement to this final project document.

Yogyakarta, June 27, 2022

(Rafly Radyatama)

(Bima Wahyu Pratama)

(Zeno Roland Ridho)

VALIDATION SHEET

Final Project Report

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(Dr. Ir. Imam Basuki, M.T.)

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FOREWORD

First of all, Praise and respect the author to God Almighty for His blessings and mercy so that the author can complete the Final Project Report on Infrastructure Design II well. The purpose of preparing this final project report is to meet one of the requirements for completing higher education in the Bachelor (S-1) program at the Faculty of Engineering, International Civil Engineering Program, Atma Jaya University Yogyakarta. This final project broadly discusses the design of water in the form of drainage, piping, and infiltration wells, transportation planning, and construction management planning.

The Author realizes that without any help, guidance, and guidance from various parties, the compiler will experience problems. Therefore, on this occasion, the authors would like to express their gratitude to the parties who have helped prepare this Final Project Report, including:

1. Mr. Dr. Eng. Luky Handoko, S.T., M.Eng. as dean of the Faculty of Engineering, Atma Jaya University Yogyakarta
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5. Mr. Ir. Y. Lulie, M.T., as a lecturer in the field of transportation
6. Mr. Ir. Peter F. Kaming, M.Eng., Ph.D. as a lecturer in the field of construction management.
7. To our family, and friends who have helped either directly or indirectly

The Author realizes that there are still many shortcomings in the preparation of this report, therefore, suggestions and input from readers are needed so that they can be input to the author so that in the future it can be even better. Finally, the author hopes that hammering the writing of the final project report for the Design of Infrastructure II can help parties in need and can add knowledge in the field of civil engineering. Thank you.

Yogyakarta, June 27, 2022

Author's

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LIST OF ABBREVIATIONS AND SYMBOLS

A	= Wet Cross-Sectional Area (m)
A	= Drainage Area (km)
Atadah	= Area of Tadah Field (m2)
Atotal	= Total Area of pedestal and well wall (m)
B	= Channel Base Width (m)
C	= Road Section Capacity (smp/hour)
C	= Hazen-Williams coefficient
C	= Rainwater Runoff Coefficient
C1	= Constant
C2	= Constant
Tsk	= Coefficient of Extinction
CMAA	= Construction Management Association of America
Cs	= Coefisen Slope
Ctadah	= Runoff Coefficient of the Tadah Field
Cv	= Coefficient of Variation
D	= Pipe Diameter (m)
DS	= Degree of Saturation
EMP	= Passenger Car Equivalent
g	= Acceleration of Gravity
h	= Water Height (m)
H	= Head Total (m)
h1	= Minor Loss

Ha = Static Head

hf = Major Loss

hf = Pressure Loss / Head Loss (m)

HSPK = Unit Price of Principal Activity

Hsumur = Planned Well Height (m)

Hv = Head Velocity

HV = Heavy Vehicle

It = Rainfall Intensity for Long Rain t (mm/h)

k = Loss Coefficient

K = Soil Permeability Coefficient (m3/day)

Kh = Coefficient of Permeability of Soil on The Well Bed (m)

KP = Planning Criteria

KRP = Parking Space Requirement

Kv = Coefficient of Permeability of Soil on Well Walls (m3/day)

L = Pipe Length (m)

LV = Light Vehicle

MC = Motorcycle

MKJI = Manual Kapasitas Jalan Indonesia

n = Amount of Data

n = Manning coefficient

P = Circumference of the Wet Channel (m)

P = Pump Power (watts)

PP = Peraturan Pemerintah

Q	= Flow Discharge on line (m3/s)
Q	= Pump capacity (m3/s)
Qd	= Total Water Requirement Within One Day (m3/h)
Qh	= Average Effective Water Requirement Per Hour (m3/h)
Qh-max	= Peak hour requirement (m3/h)
Qm-max	= Peak requirement (m3/min)
Qp	= Peak Requirement (m3/min)
Qpu	= Filler Pump Capacity (m3/min)
Qs	= Service pipe capacity (m3/h)
R	= Finger - Hydraulic Finger (m)
R	= Average Daily Rainfall (L/m2/day)
R24	= Maximum Rainfall For 24 hours (mm)
RAB	= Budget Plan
RKS	= Work Plan and Terms
S	= Channel Tilt
s	= Distance (km)
s	= Standard Deviation
SMP	= Passenger Car Units
SNI	= Indonesian National Standard
SRP	= Units of Parking Space
t	= Length of Precipitation (hours)
T	= Average Water Usage Period Within One Time Day (hours)
te	= Effective Rain Duration (hours)

Tp = Peak Needs Timeframe (minutes)

Tpu = Working TimeFrame of Filler Pump (minutes)

UBAP = Load Unit plumbing tool

Act = Statute

v = Speed (km/s)

V = Flow Rate of Water in The Channel (m/s)

Vab = Volume of Flood Contribution to Be Accommodated by Infiltration Wells (m3)

VE = Effective volume of roof tank (m3)

Vp = Peak volume

Vrsp = Volume of Pervasive Rainwater (m3)

Xi = Maximum Daily Rainfall in a Given Year

$\tilde{x}$ = Average Rainfall

ρ = Density of Water