FEU ALABANG
COLLEGE OF ENGINEERING
CIVIL ENGINEERING DEPARTMENT

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS IN
CE0065 - ENGINEERING UTILITIES 2

PROPOSED TWO STOREY RESIDENTIAL BUILDING WITH ROOF DECK

DGLMO Inc.
Project Owner

PREPARED BY:

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SUBMITTED TO:

ENGR. NORIELE PAUL A. CRUZ
FACULTY-IN-CHARGE

OCTOBER 2024

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TYPE OF PROJECT

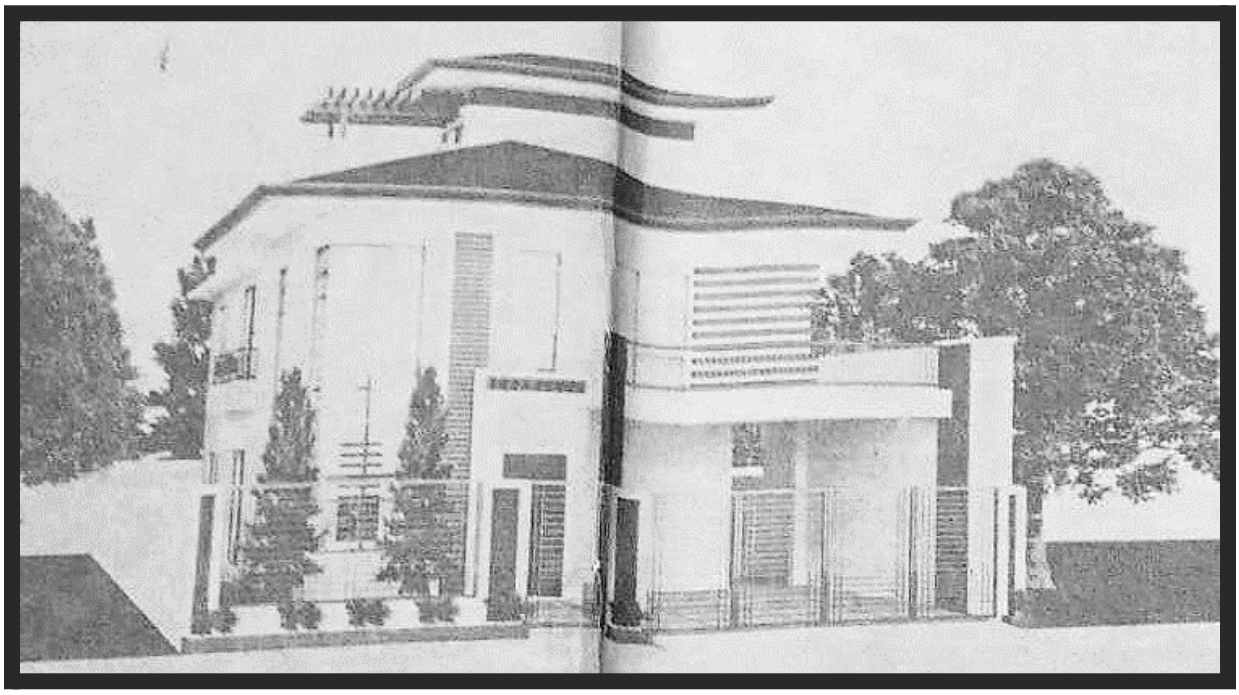
Building Design and Construction

- Architectural design and construction of commercial or residential buildings
- Renovation and retrofitting projects
- High-rise structures and skyscrapers

ON-GOING PROJECT

TWO-STOREY RESIDENTIAL BUILDING (WITH ROOF DECK)

LOCATION: SOUTHPOINT SUBD., BRGY. MALITLIT, SANTA ROSA CITY, LAGUNA



CHAPTER 1

Detailed Plans

Proposal for Plumbing System in Residential Construction

This proposal outlines the approach and considerations for the design and implementation of the plumbing system in a residential construction project. The plumbing system is critical to the functionality of the building, ensuring the safe and efficient distribution of water and disposal of wastewater. The following sections detail the scope of work, technical specifications, materials, and cost estimation that will be utilized to ensure the successful execution of the plumbing system.

Scope of Work:

The scope of this proposal includes the design, installation, and testing of the residential plumbing system, covering both water supply and waste systems. The work will encompass:

1. Cold and Hot Water Supply: Layout of water pipes for cold and hot water supply to bathrooms, kitchens, and utility areas.

2. Drainage System: Design of the wastewater drainage system, including waste pipes and vent systems.

3. Plumbing Fixtures: Installation of plumbing fixtures, including sinks, toilets, showers, and bathtubs.

4. Testing and Commissioning: Ensuring all plumbing installations meet regulatory standards and function correctly.

Quantity Surveying and Material Estimation:

A comprehensive review of the plumbing plan will allow for the accurate estimation of materials and labor. This will include:

1. Pipework: The quantity of piping required will be based on the blueprint dimensions, ensuring that there is no material waste while covering all the necessary areas.

2. Fittings and Fixtures: Detailed quantities of fittings (elbows, tees, valves) and fixtures (sinks, toilets, bathtubs) will be calculated, ensuring precise budgeting.

3. Labor: The labor required for installation, testing, and commissioning will be estimated in collaboration with skilled plumbers and tradespeople.

Cost Estimation:

Based on the quantity surveyor's analysis of the plumbing plan, a cost estimation will be provided for:

1. Materials: Breakdown of the cost of pipes, fittings, and fixtures.

2. Labor: Estimation of labor costs, including installation, inspections, and testing.

3. Contingencies: A contingency amount will be included to account for unexpected variations in material costs or design adjustments during the project.

CHAPTER 1

Detailed Plans

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATION

DIVISION 1

GENERAL CONDITION

The plans and specifications must control the techniques of construction and the types of materials to be utilized for the proposed project.

The plans, detailed drawings, and specifications will be viewed as completing each other, such that when anything is referenced or depicted in one but not in the other, it shall be treated as appearing on both. In the event of a disagreement between the two, the matter should be presented to the designing Architect/Engineer for settlement.

DIVISION 2

SITE WORK

2.1 SITE CLEARING - According to the blueprints, the site must be leveled and removed of debris, roots, and other perishable, undesirable, and disagreeable stuff to an appropriate sub-grade.

All such acceptable items must be removed from the construction site and disposed of in places designated by the Architect/Engineer in charge of the project.

2.2 STAKING OUT THE BUILDING LINES - Where the construction site is covered with any form of fill, all excavation for the foundation must be done to the grades stated on the plan. The footing excavation should be made deeper till the stratum for the soil's safe bearing capability is achieved.

2.3 BACKFILL - backfilling should consist of coarse or mixed aggregate sub-base materials crushed using a plate compactor or road roller, with the top backfill laid in layers not exceeding 15 cm in thickness and fully compacted.

DIVISION 3

PLUMBING WORKS

All fixtures and accessories are included to generate clean water and waste drainage. All plumbing fittings shown on the designs must be linked to the septic vault.

Fixtures:

1. Water closet
2. Lavatory

3. Soap holder
4. Floor drain
5. Paper holder

Technical Specifications:

To ensure compliance with building codes and standards, the following technical specifications will be adhered to:

1. Pipe Materials:

- Water Supply: PEX or copper piping for durability and corrosion resistance.

- Drainage System: PVC pipes for waste disposal, known for their ease of installation and resistance to chemical degradation.

2. Fittings and Connections:

All joints and connections will be leak-proof and pressure-tested to meet safety regulations. The installation of isolation valves at key points will ensure easy maintenance and repair.

3. Water Pressure:

The plumbing system will be designed to maintain adequate water pressure across all fixtures, factoring in pipe diameters, length, and water demand for proper flow rates.

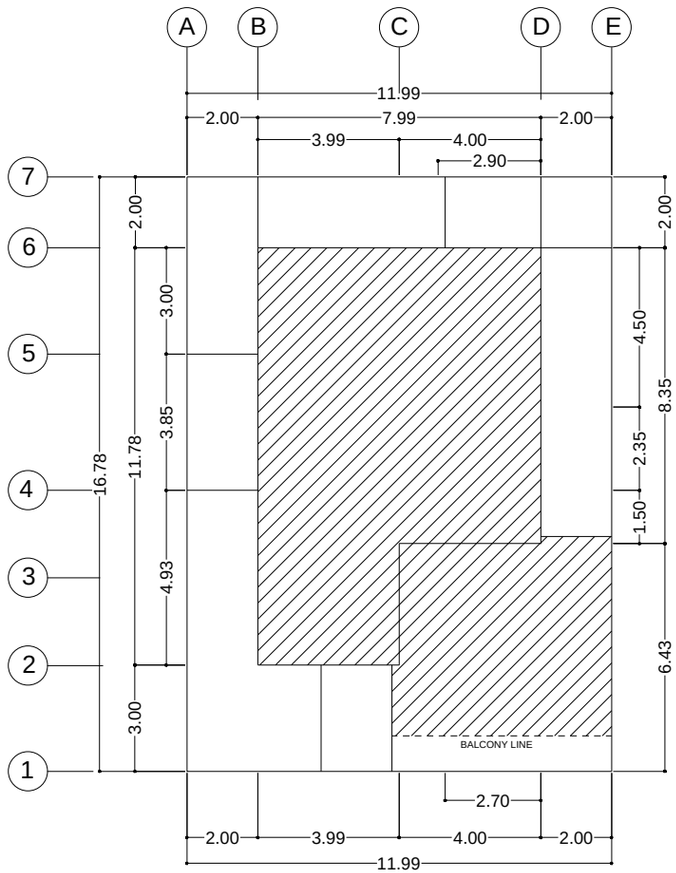
4. Fixture Installation:

All plumbing fixtures will comply with relevant water conservation standards, ensuring the house meets modern sustainability goals. Low-flow faucets and toilets will be used to optimize water usage.

CHAPTER 1

Detailed Plans

ARCHITECTURAL PLANS



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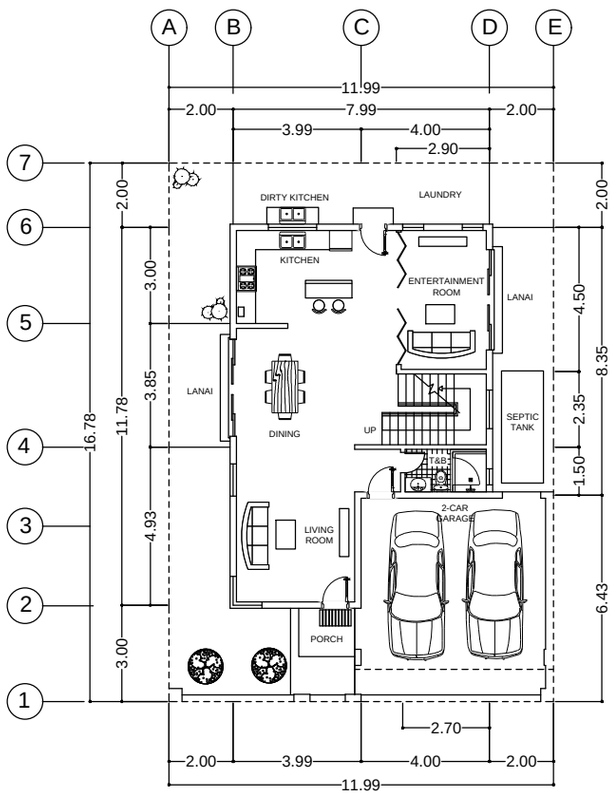
SITE DEVELOPMENT PLAN

SCALE 1:100 M

FAR EASTERN UNIVERSITY - ALABANG CAMPUS CIVIL ENGINEERING DEPARTMENT ACADEMIC YEAR 2024 - 2025 CE0065 - ENGINEERING UTILITIES 2	**PROJECT OWNER**: DGLMO INC.	**PROJECT**: PROPOSED TWO-STOREY RESIDENTIAL BUILDING WITH ROOF DECK, SOUTH POINT SUBDIVISION, BRGY. MALITLIT, SANTA ROSA CITY, LAGUNA	**ENGR. NORIELE PAUL A. CRUZ** FACULTY-IN-CHARGE **SUBMISSION DATE**: OCTOBER 19, 2024	ACTIVITY AR-1



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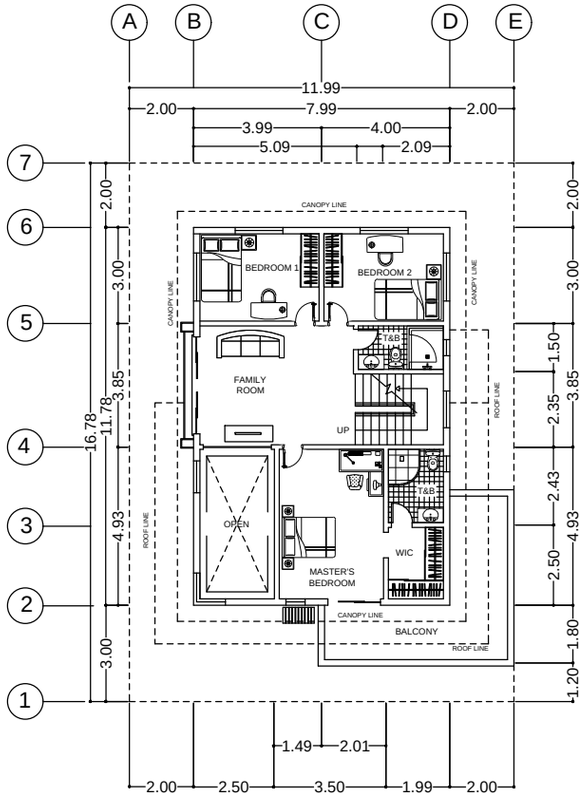
GROUND FLOOR PLAN

SCALE 1:100 M



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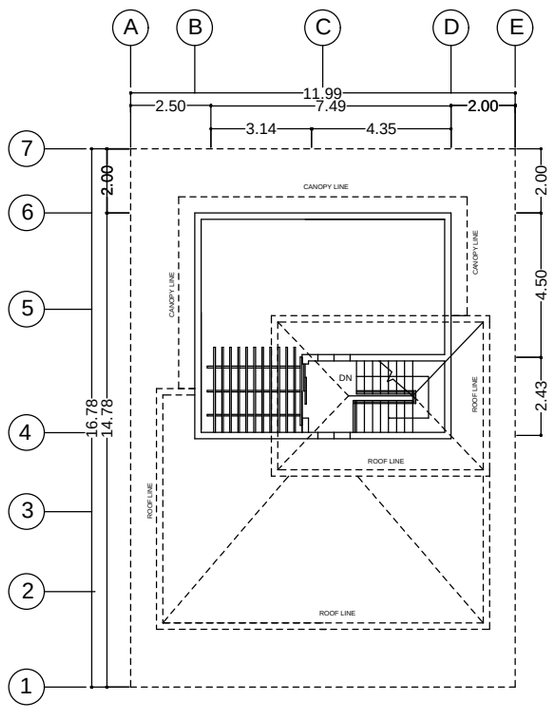
SECOND FLOOR PLAN

SCALE 1:100 M



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ROOF DECK PLAN

SCALE 1:100 M

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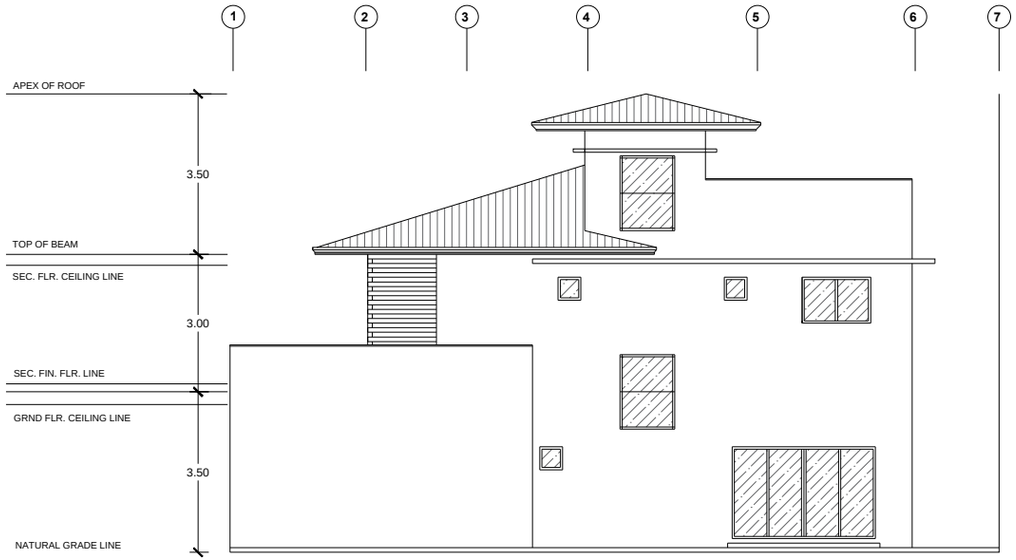

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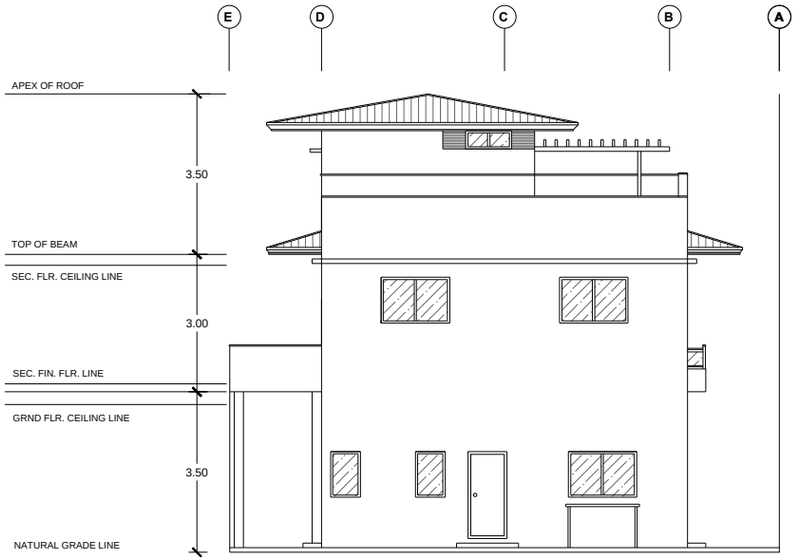
RIGHT ELEVATION

SCALE 1:100M



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REAR ELEVATION

SCALE 1:100M

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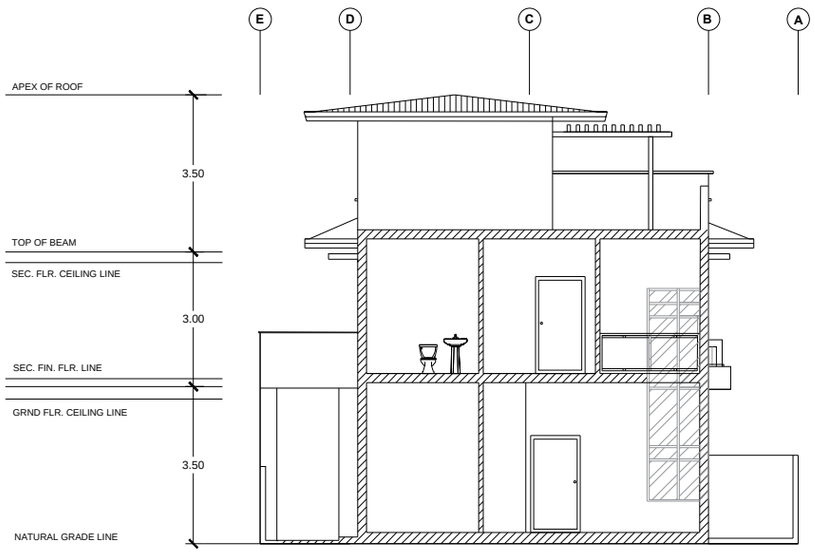

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SECTION THRU - AA

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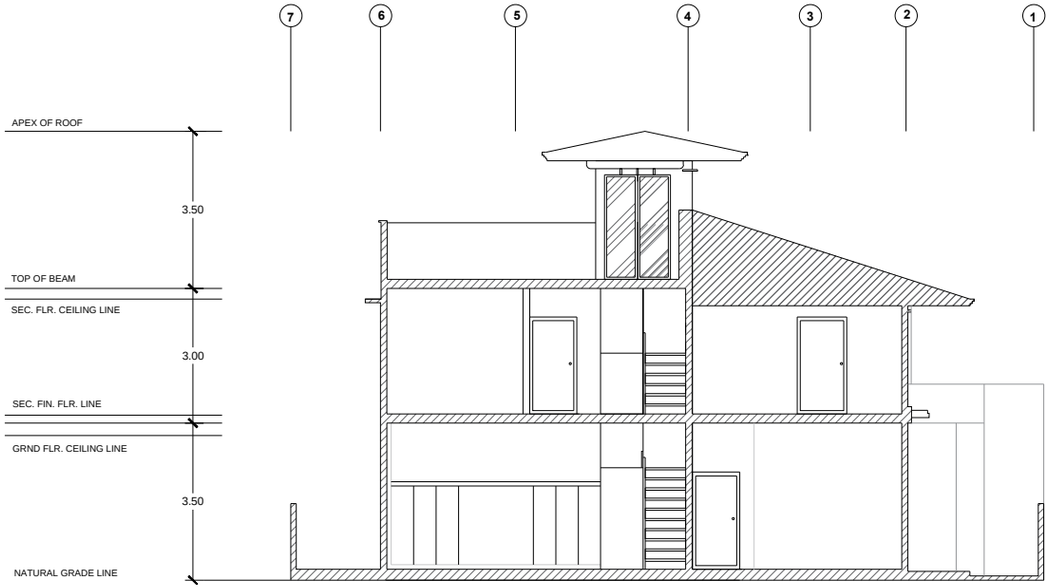

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SECTION THRU - BB

SCALE 1:100M

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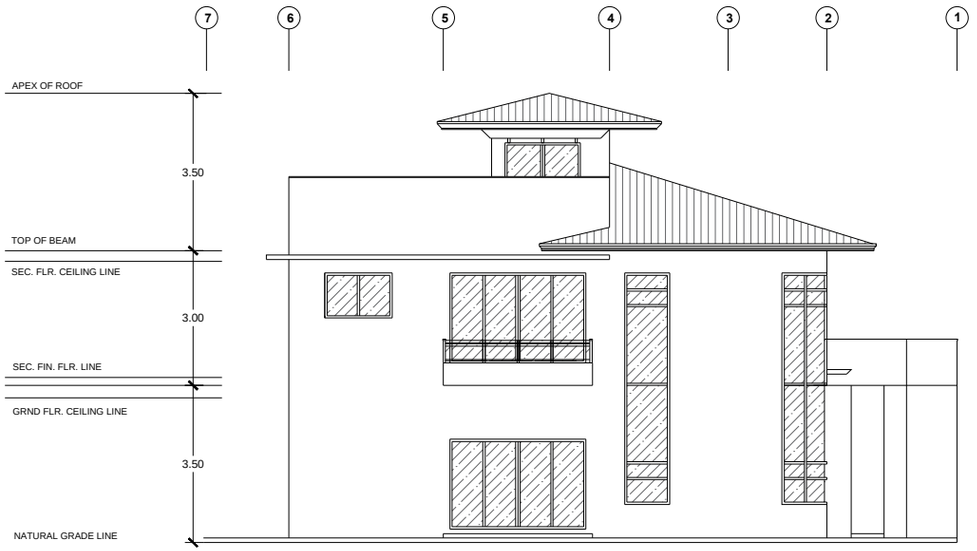
FRONT ELEVATION

SCALE 1:100M



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LEFT ELEVATION

SCALE 1:100M

FAR EASTERN UNIVERSITY - ALABANG CAMPUS
CIVIL ENGINEERING DEPARTMENT
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CE0065 - ENGINEERING UTILITIES 2

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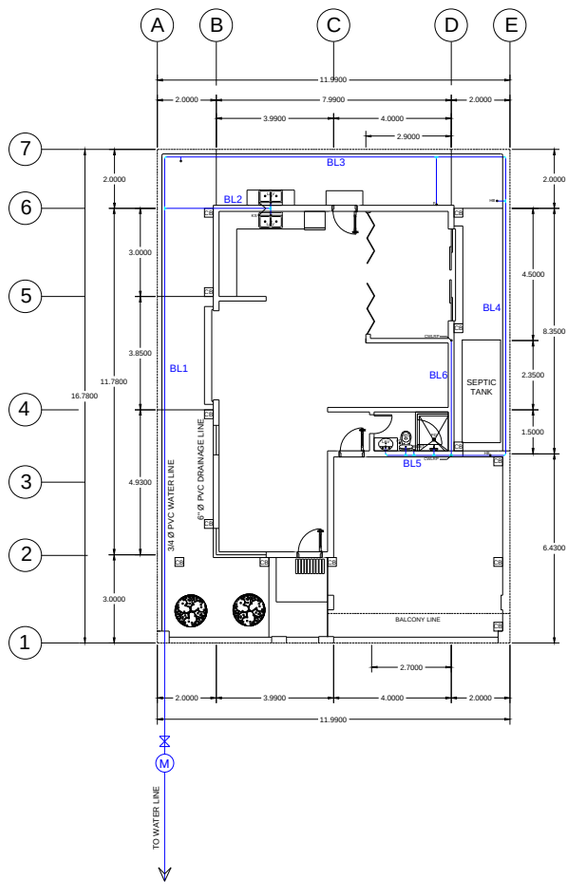
ACTIVITY

AR-3

CHAPTER 1

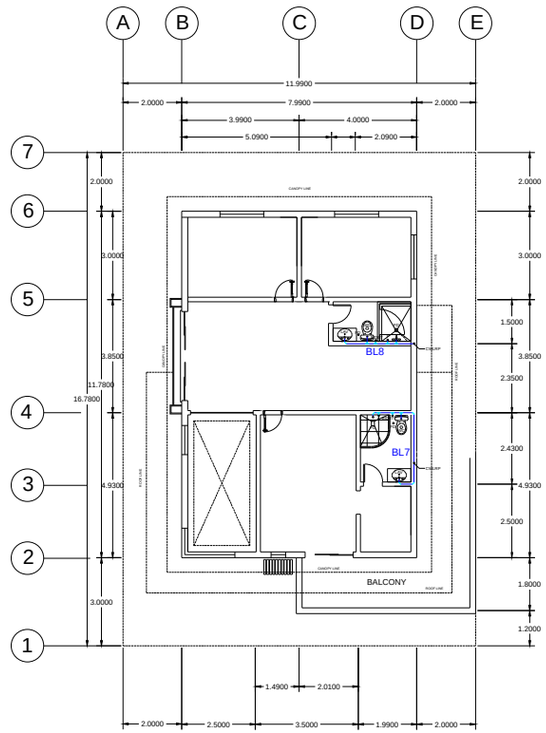
Detailed Plans

PLUMBING PLANS



GROUND FLOOR PLUMBING LAYOUT

SCALE 1:100 M



SECOND FLOOR PLUMBING LAYOUT

SCALE 1:100 M

PLUMBING NOTES

1. ALL SANITARY WORKS HEREIN SHALL BE EXECUTED ACCORDING TO THE PROVISION OF THE NATIONAL BUILDING CODE OF THE PHILIPPINES, THE NATIONAL PLUMBING CODE OF THE PHILIPPINES, AND ITS IMPLEMENTING RULES AND REGULATIONS.
2. COORDINATE DRAWING WITH OTHER RELATED DRAWINGS AND SPECIFICATION, THE ARCHITECT AND / OR ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY FOUND THEREIN, HIS / HER DECISION SHALL BE FINAL.
3. ALL PIPES SHALL BE INSTALLED AS INDICATED, ANY RELOCATION REQUIRED FOR PROPER EXECUTION OF OTHER SHALL BE PRIOR APPROVAL OF THE ARCHITECT AND / OR ENGINEER.
4. PROPOSED SANITARY UTILITIES SHALL CONFORM TO THE LOCATION, DEPTH, AND INVERT ELEVATION OF EXISTING PIPES AND STRUCTURES AS VERIFIED BY THE CONTRACTOR.
5. ALL SLOPES FOR HORIZONTAL PIPES SHALL HAVE A MINIMUM SLOPE OF 1% UNLESS OTHERWISE NOTED.
6. SIZE OF WATER SUPPLIES PIPES TO FIXTURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION.
7. ALL FIXTURES SHALL BE VENTED, UNLESS OTHERWISE NOTED.
8. THE WORK THROUGHOUT SHALL BE EXECUTED IN THE BEST AND MOST THROUGH MANNER KNOWN TO THE TRADE AND TO THE SATISFACTION OF THE ARCHITECT AND / OR THE ENGINEER.
9. THE CONTRACTOR SHALL VERIFY ALL EXISTING UTILITIES AT SITE AND COORDINATE THE WORK WITH THE SEWER EFFLUENT DISPOSAL AND WATER LINE SERVICE CONNECTION POINT.
10. REFER TO THE TECHNICAL SPECIFICATION FOR DETAILED MATERIAL AND EQUIPMENT SPECIFICATIONS.

LEGEND:

WC	WATER CLOSET
LAV	LAVATORY
KS	KITCHEN SINK
	WATER METER
	GATE VALVE
HB	HOSE BIBB
DS	DOWNSPOUT
CO	CLEAN-OUT PIPE
CB	CATCH BASIN
F	FAUCET
ST	SEPTIC TANK
FD	FLOOR DRAIN
VSTR	VENT STACK
	THROUGH ROOF
SLRP	SEWER LINE
	RISER PIPE
CWLRP	COLD WATER LINE
	RISER PIPE

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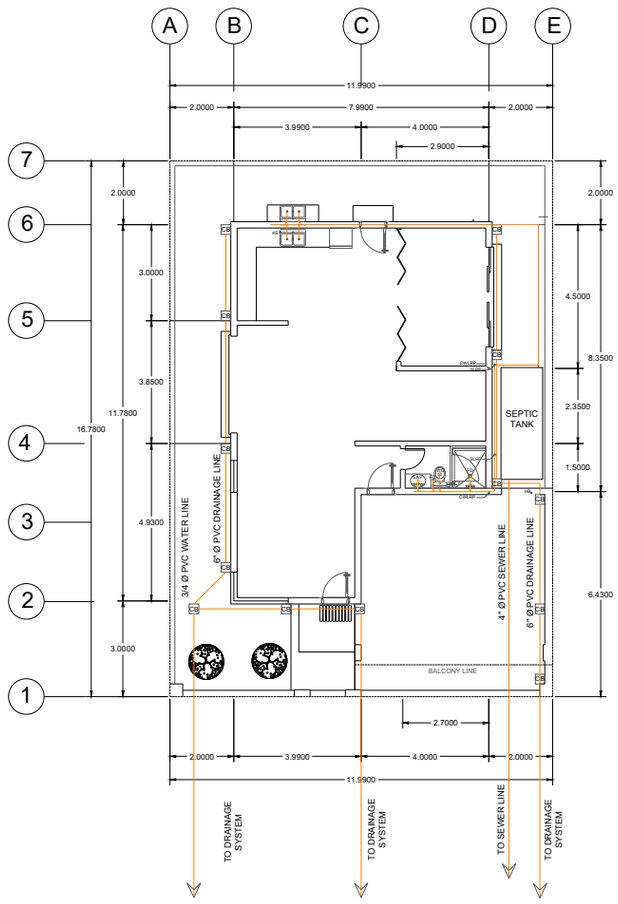

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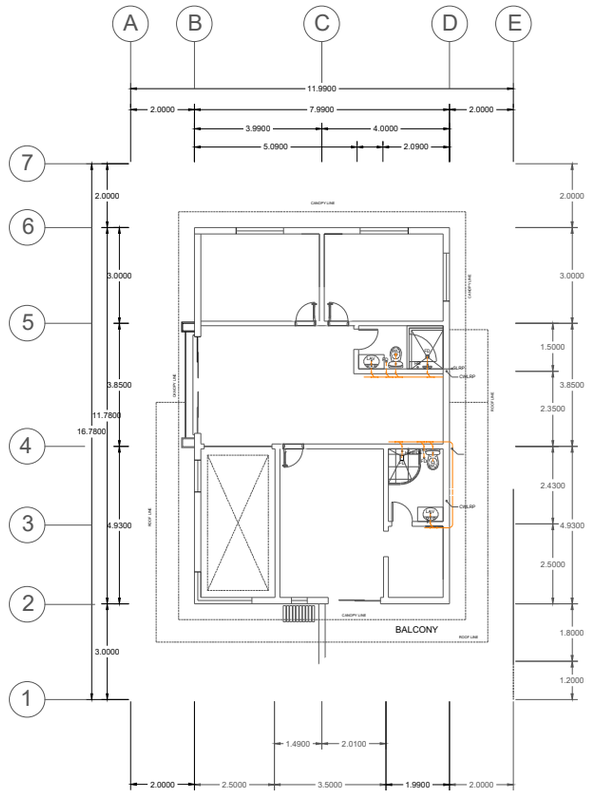
GROUND FLOOR PLUMBING LAYOUT

SCALE 1:100 M



P - 1 | 2 | 3

SECOND FLOOR PLUMBING LAYOUT

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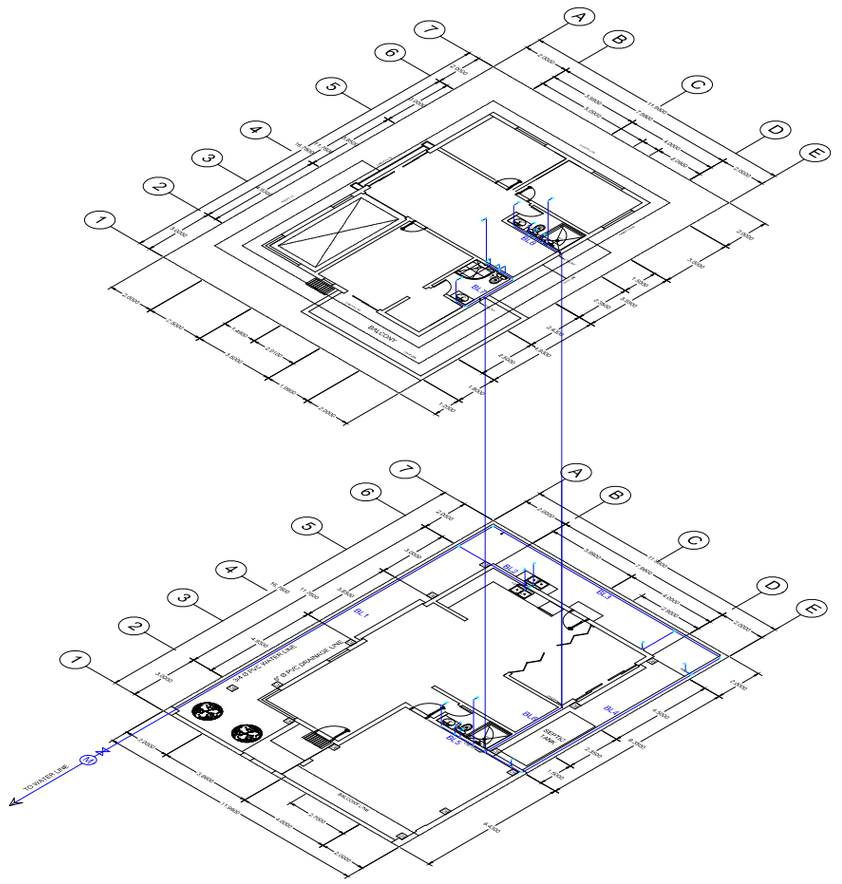

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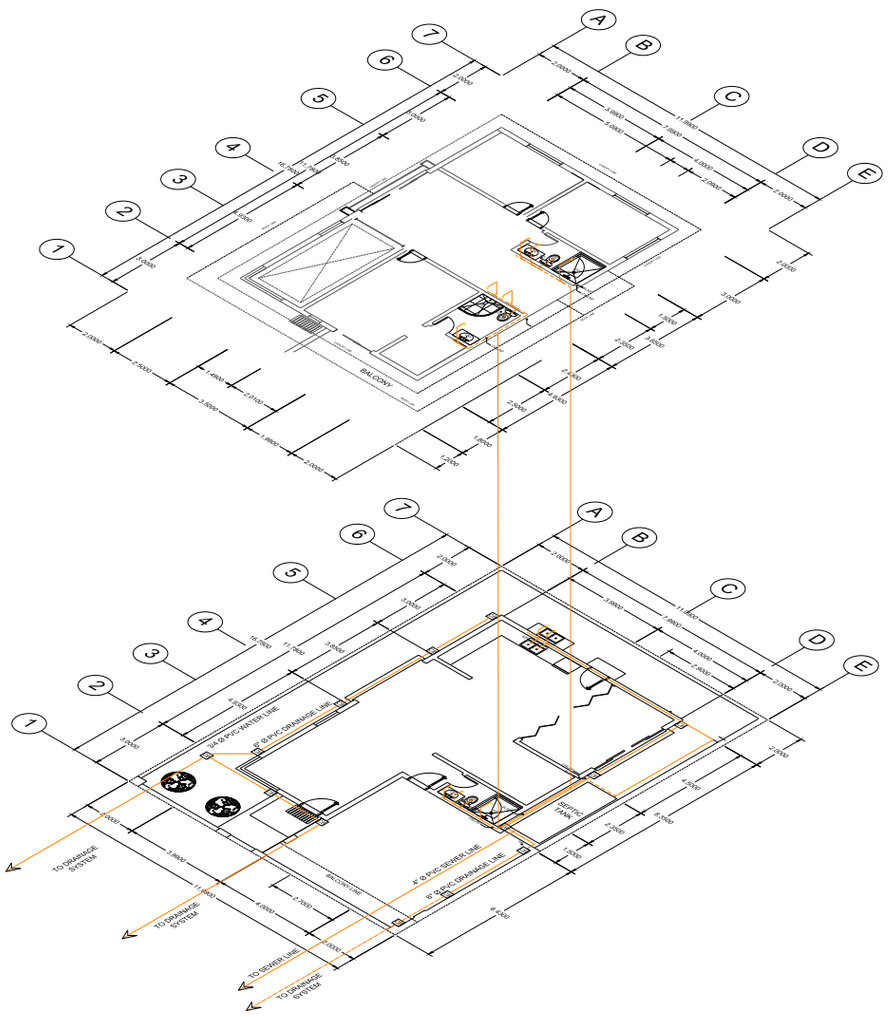

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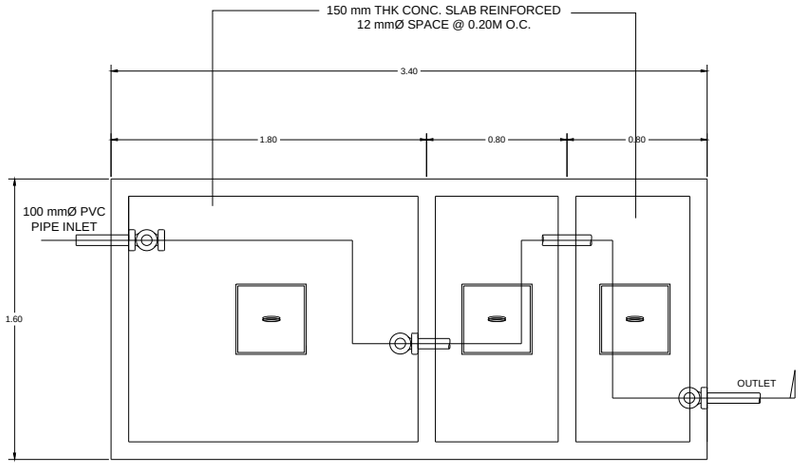

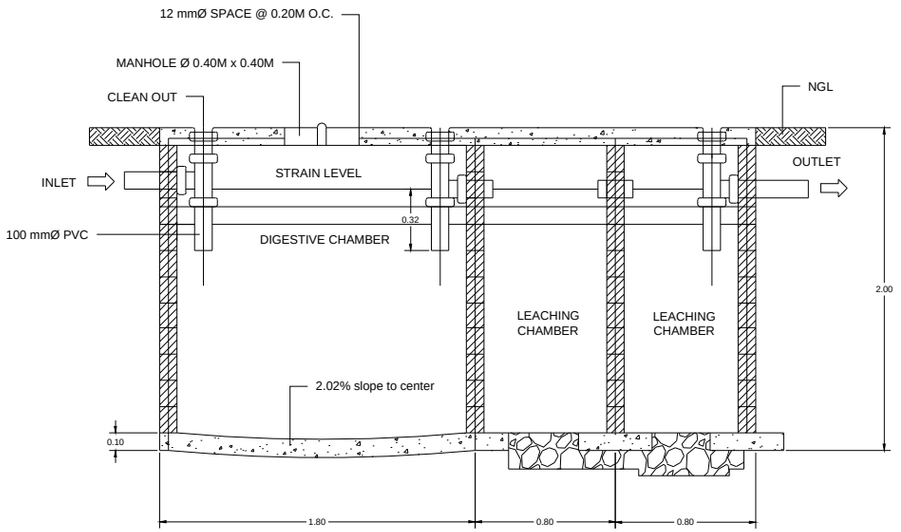

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SEPTIC TANK DETAIL

SCALE 1:40 M

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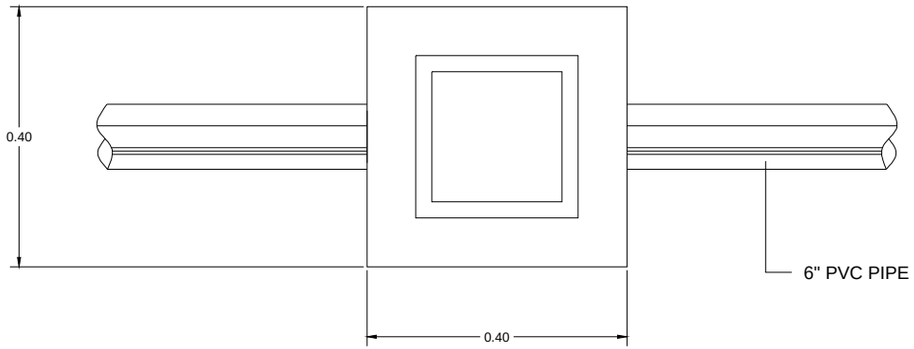
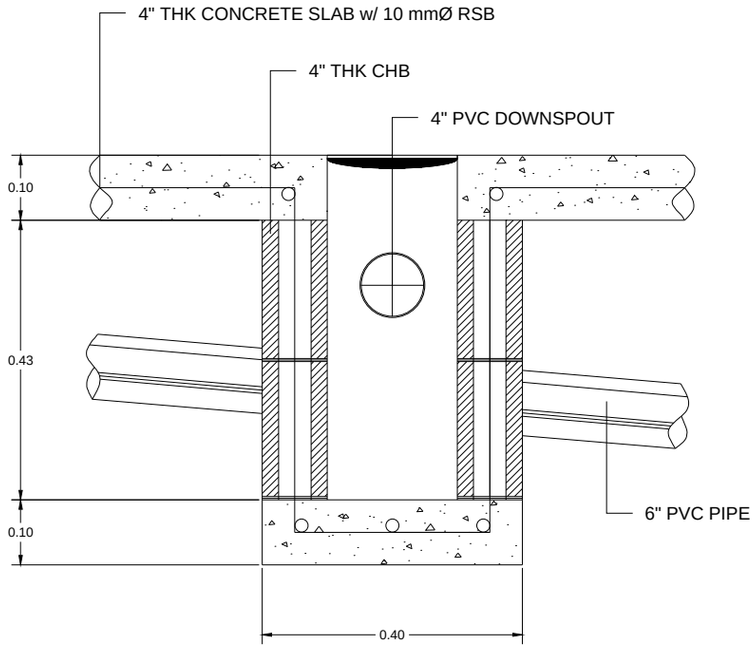


PLAN



SECTION

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CATCH BASIN DETAIL

SCALE 1:100 M

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CHAPTER 1

Estimation

BILL OF QUANTITIES

CHAPTER 2 BILL OF QUANTITIES

Item No.	Description	Quantity	Unit	Material Cost	Labor Cost	Estimated Direct Cost	Mark-Ups			VAT	Total Indirect Cost	Total Cost	Unit Cost
							OCM (9%)	Profit (8%)	OCM + Profit				
	I. TOTAL PROJECT COST												
	A. PLUMBING WORKS												
	GROUND FLOOR												
1	Drainage System												
	6" Ø PVC PIPE	14	pc/s	₱655.00	₱3,281.19	₱3,936.19	₱354.26	₱314.90	₱669.15	₱552.64	₱1,221.79	₱5,157.99	₱368.43
	6" Ø PVC Elbow 90°	4	pc/s	₱96.00	₱937.48	₱1,033.48	₱93.01	₱82.68	₱175.69	₱145.10	₱320.79	₱1,354.28	₱338.57
	6" Ø PVC Elbow 45°	1	pc/s	₱96.00	₱234.37	₱330.37	₱29.73	₱26.43	₱56.16	₱46.38	₱102.55	₱432.92	₱432.92
	6" Ø PVC Wye	1	pc/s	₱97.00	₱234.37	₱331.37	₱29.82	₱26.51	₱56.33	₱46.52	₱102.86	₱434.23	₱434.23
2	Sewerline System												
	4" Ø PVC PIPE	13	pc/s	₱590.00	₱1,623.94	₱2,213.94	₱199.25	₱177.12	₱376.37	₱310.84	₱687.21	₱2,901.15	₱223.17
	4" Ø PVC Elbow 90°	4	pc/s	₱87.00	₱499.67	₱586.67	₱52.80	₱46.93	₱99.73	₱82.37	₱182.10	₱768.78	₱192.19
	4" Ø PVC Elbow 45°	6	pc/s	₱84.00	₱749.51	₱833.51	₱75.02	₱66.68	₱141.70	₱117.02	₱258.72	₱1,092.23	₱182.04
	4" Ø PVC Wye	4	pc/s	₱97.00	₱499.67	₱596.67	₱53.70	₱47.73	₱101.43	₱83.77	₱185.21	₱781.88	₱195.47
3	Waterline System												
	3/4 Ø PVC PIPE	13	pc/s	₱468.00	₱231.99	₱699.99	₱63.00	₱56.00	₱119.00	₱98.28	₱217.28	₱917.27	₱70.56
	3/4 Ø PVC Elbow 90°	4	pc/s	₱64.00	₱71.38	₱135.38	₱12.18	₱10.83	₱23.01	₱19.01	₱42.02	₱177.40	₱44.35
	3/4 Ø PVC Wye	8	pc/s	₱97.00	₱142.76	₱239.76	₱21.58	₱19.18	₱40.76	₱33.66	₱74.42	₱314.19	₱39.27
	SECOND FLOOR												
4	Sewerline System												
	4" Ø PVC PIPE	11	pc/s	₱590.00	₱1,374.10	₱1,964.10	₱176.77	₱157.13	₱333.90	₱275.76	₱609.66	₱2,573.76	₱233.98
	4" Ø PVC Elbow 90°	1	pc/s	₱87.00	₱124.92	₱211.92	₱19.07	₱16.95	₱36.03	₱29.75	₱65.78	₱277.70	₱277.70
	4" Ø PVC Elbow 45°	8	pc/s	₱84.00	₱999.35	₱1,083.35	₱97.50	₱86.67	₱184.17	₱152.10	₱336.27	₱1,419.62	₱177.45
	4" Ø PVC Wye	4	pc/s	₱97.00	₱499.67	₱596.67	₱53.70	₱47.73	₱101.43	₱83.77	₱185.21	₱781.88	₱195.47
5	Waterline System												
	3/4 Ø PVC PIPE	14	pc/s	₱468.00	₱249.84	₱717.84	₱64.61	₱57.43	₱122.03	₱100.78	₱222.82	₱940.65	₱67.19
	3/4 Ø PVC Elbow 90°	5	pc/s	₱64.00	₱89.23	₱153.23	₱13.79	₱12.26	₱26.05	₱21.51	₱47.56	₱200.79	₱40.16
	3/4 Ø PVC Wye	7	pc/s	₱97.00	₱124.92	₱221.92	₱19.97	₱17.75	₱37.73	₱31.16	₱68.88	₱290.80	₱41.54
	Lateral or Y	1	pc/s	₱900.00	₱17.85	₱917.85	₱82.61	₱73.43	₱156.03	₱128.87	₱284.90	₱1,202.74	₱1,202.74
	P-trap (kitchen sink & lavatory)	6	pcs	₱425.00	₱107.07	₱532.07	₱47.89	₱42.57	₱90.45	₱74.70	₱165.16	₱697.23	₱116.20
	P-trap (shower drain)	3	pcs	₱165.00	₱53.54	₱218.54	₱19.67	₱17.48	₱37.15	₱30.68	₱67.83	₱286.37	₱95.46
	STORM DRAIN & CONSTRUCTION OF CATCH BASIN												
7	6" PVC PIPE	14	pc/s	₱655.00	₱3,281.19	₱3,936.19	₱354.26	₱314.90	₱669.15	₱552.64	₱1,221.79	₱5,157.99	₱368.43
8	4" THK CHB	13	pc/s	₱12.00	₱15,466.10	₱15,478.10	₱1,393.03	₱1,238.25	₱2,631.28	₱2,173.13	₱4,804.40	₱20,282.50	₱1,560.19
9	4" PVC DOWNSPOUT	14	pc/s	₱289.00	₱1,748.86	₱2,037.86	₱183.41	₱163.03	₱346.44	₱286.12	₱632.55	₱2,670.41	₱190.74
10	10 mmØ RSB	13	pc/s	₱175.00	₱123.73	₱298.73	₱26.89	₱23.90	₱50.78	₱41.94	₱92.73	₱391.45	₱30.11
	CONSTRUCTION OF SEPTIC TANK												
11	100 mmØ PVC PIPE INLET	4	pc/s	₱96.00	₱937.48	₱1,033.48	₱93.01	₱82.68	₱175.69	₱145.10	₱320.79	₱1,354.28	₱338.57
12	100 mmØ PVC PIPE OUTLET	4	pc/s	₱96.00	₱937.48	₱1,033.48	₱93.01	₱82.68	₱175.69	₱145.10	₱320.79	₱1,354.28	₱338.57
13	MANHOLE Ø 0.40M x 0.40M	3	pc/s	₱11,092.00	₱703.11	₱11,795.11	₱1,061.56	₱943.61	₱2,005.17	₱1,656.03	₱3,661.20	₱15,456.32	₱5,152.11
14	12 mm⌀ SPACE @ 0.20M O.C.	1	pc/s	-	₱234.37	₱234.37	₱21.09	₱18.75	₱39.84	₱32.91	₱72.75	₱307.12	₱307.12
15	Cleanout 100 mmØ PVC	3	pc/s	₱67.00	₱703.11	₱770.11	₱69.31	₱61.61	₱130.92	₱108.12	₱239.04	₱1,009.16	₱336.39
	PLUMBING FIXTURES												
16	Water Closet	3	pc/s	₱27,229.00	₱3,426.34	₱30,655.34	₱2,758.98	₱2,452.43	₱5,211.41	₱4,304.01	₱9,515.42	₱40,170.75	₱13,390.25
17	Lavatory	3	pc/s	₱1,064.00	₱2,284.22	₱3,348.22	₱301.34	₱267.86	₱569.20	₱470.09	₱1,039.29	₱4,387.51	₱1,462.50
18	Floor Drain	10	pc/s	₱372.75	₱7,614.08	₱7,986.83	₱718.81	₱638.95	₱1,357.76	₱1,121.35	₱2,479.11	₱10,465.94	₱1,046.59
19	Kitchen Sink	2	pc/s	₱3,000.00	₱2,664.93	₱5,664.93	₱509.84	₱453.19	₱963.04	₱795.36	₱1,758.39	₱7,423.32	₱3,711.66
20	Faucet	8	pc/s	₱1,064.00	₱7,614.08	₱8,678.08	₱781.03	₱694.25	₱1,475.27	₱1,218.40	₱2,693.68	₱11,371.76	₱1,421.47
21	Septic Tank	1	pc/s	₱12,630.00	₱761.41	₱13,391.41	₱1,205.23	₱1,071.31	₱2,276.54	₱1,880.15	₱4,156.69	₱17,548.10	₱17,548.10

		Shower Head	3	pc/s	₱1,230.00	₱2,284.22	₱3,514.22	₱316.28	₱281.14	₱597.42	₱493.40	₱1,090.82	₱4,605.04	₱1,535.01
	TOTAL PROJECT COST												**₱166,959.78**	

	FAR EASTERN UNIVERSITY - ALABANG CAMPUS CIVIL ENGINEERING DEPARTMENT ACADEMIC YEAR 2023 - 2024 CE0065 - ENGINEERING UTILITIES 2	**Project Owner** **DGLMO Inc.**	**PROJECT:** PROPOSED TWO-STOREY RESIDENTIAL BUILDING WITH ROOD DECK, SOUTHPOINT SUBDIVISION, BRGY. MALITLIT, SANTA ROSA CITY, LAGUNA	**ENGR. NORIELE PAUL A. CRUZ** FACULTY-IN-CHARGE **SUBMISSION DATE: OCTOBER 19, 2024**	ACTIVITY **AC1**