



Plumbing installation

Level-II

Learning Guide-29

**Unit of Competence: Read plans and calculate
plumbing quantities**

**Module Title: Reading plans and calculating
plumbing quantities**

LG Code: EISPLI2 M07 LO5-LG-24

TTLM Code: EISPLI2 M07 TTLM 0919v1

LO5: Read and interpret job specifications



Instruction Sheet	Read and interpret job specifications LG - 24
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying purpose of plumbing job specification
- Obtaining details in plumbing job specification
- Reading plumbing job specifications in conjunction with plans

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Identify purpose of plumbing job specification
- Obtain details in plumbing job specification
- Read plumbing job specifications in conjunction with plans



Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2 and Sheet 3”.
4. Accomplish the “Self-check 1, Self-check 2 and Self-check 3 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet.
6. Do the “LAP test” (if you are ready).



Information Sheet-1	Identifying purpose of plumbing job specification
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1.1 Purpose of Plumber

Under general supervision, maintain the flow and drainage of water, air, and other gases by assembling, installing, and repairing pipes, fittings, and plumbing fixtures district wide. Maintain and provide for the safe condition and operation of all plumbing systems in district facilities.

Responsible for installing, repairing, and maintaining pipes, fixtures and other plumbing used for water distribution and waste water disposal in residential, commercial and industrial buildings. Work in a safe manner and keeps work area clean.

To reading plans and calculating plumbing quantities the plumber should identify purpose of the following plumbing job specification.

1.2 Plumbing job specification

1.2.1 Special Knowledge/Skills

To know and able to perform plumbing work some special knowledge and skill with its attitude needed as follows:

- Knowledge of plumbing repairs, maintenance, and installation techniques
- Knowledge of plumbing codes
- Ability to read and interpret blueprints, diagrams, schematics, and written reference material
- Ability to perform mathematical calculations
- Ability to diagnose and resolve problems
- Ability to use hand and power tools

1.2.2 Major duties

Plumbers' major duties are:

- Assemble, install, maintain, and pressure test all pipes, fittings, and fixtures of heating, water, drainage, sprinkler, and gas systems according to specifications and plumbing codes.



- Determine sources of plumbing malfunctions and complete repairs as indicated or according to work orders.
- Install and repair pipes, fittings, valves, fixtures, and plumbing system equipment, including sinks, commodes, water heaters, water softeners, etc.
- Repair dishwashers and kitchen equipment that incorporate gas or water consumption.
- Receive and complete work orders.
- Select material and hardware and make time and materials estimates.
- Maintain accurate records on material and labor used.
- Maintain inventory of district-owned tools, equipment, and materials.
- Inspect jobs upon completion and ensure areas are clean.
- Work with building principals and supervisors to complete projects.
- Detect needed repairs on buildings, grounds, and equipment following established inspection procedures.
- Respond to emergency calls as needed.

1.2.3 Safety

While working in plumbing work place follow safe practice as follows:

- Perform preventive maintenance on tools and equipment.
- Operate tools and equipment according to established safety procedures.
- Ensure that equipment is in safe operating condition.
- Follow established safety procedures and techniques to perform job duties including lifting, climbing, etc.
- Correct unsafe conditions in work area and report any conditions that are not correctable to supervisor immediately.

1.2.4 Working Conditions:

Mental Demands, physical demands and environmental factors are continual walking, standing, climbing, stooping, bending, kneeling, reaching, heavy lifting and carrying. Work in tiring and uncomfortable positions, around gas lines, around fumes and toxic chemicals, outside and inside.



Self-Check - 1	Written Test
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Direction: Choose True or False if the statement correct or incorrect about major duty of plumber.

1. Determine sources of plumbing malfunctions and complete repairs.
2. Make time and materials estimates
3. Perform preventive maintenance on tools and equipment.
4. Work in heavy lifting and carrying environment

Note: Satisfactory rating - 2 and 4 points

Unsatisfactory - below 2 and 4 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Name: _____ **Date:** _____

Answer sheet

1. _____ 2. _____ 3. _____ 4. _____



Information Sheet- 2	Obtaining details in plumbing job specification
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2.1 Details in plumbing job specification

Essential job specification:

- Install, repair and maintain plumbing systems and components.
- Review building plans and specifications to determine the layout of plumbing and materials.
- Identify required tools and special equipment.
- Select the type of size of pipe required.
- Locate and mark positions for connections and fixtures.
- Install supports and hangers for pipe, fixtures and equipment.
- Assemble and install valves and fittings.
- Install, repair and maintain water treatment equipment, piping and controls.
- Install, repair and maintain underground storm sanitary and water piping systems.
- Install, repair and maintain water heaters and conditioners.
- Install, repair and maintain plumbing fixtures, appliances and trim.
- Test pipe systems and fixtures for leaks.
- Ensure all installations, repairs and maintenance meet code requirements.
- Must be able to Arc weld.



Self-Check - 2	Written Test
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Directions: write correct or incorrect about job specification of plumber.

1. Select the type of size of pipe required.
2. Locate and mark positions for connections and fixtures.
3. Test pipe systems and fixtures for leaks.
4. Must be able to Arc weld.

Note: Satisfactory rating - 2 and 4 points

Unsatisfactory - below 2 and 4 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Name: _____

Date: _____

Answer sheet

1. _____ 2. _____ 3. _____ 4. _____

Information Sheet- 3	Reading plumbing job specifications in conjunction with plans
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3.1 Drawing plumbing plan

Plumbing plan:

It is the plan view drawing which shows the plumbing system and it is generally traced from the floor plan. The plan shows water supply lines, waste disposal lines and fixtures, especially this plan shows:-

- The size and types of all piping and fittings used in the system. .
- The location of plumbing equipment to be used.
- The location of bathroom, toilet, floor drains, roof drains and the like

3.1.1 Drawing plumbing plans for supply system

The Plumbing Plan (for supply system)

- The floor plan showing only the exterior and interior walls door and window, and features, which are related to plumbing plan.
- The symbols for all fixtures that are to be connected to the house plumbing system.
- Checked the code to determine clearance dimension and minimum space requirement for fixture.
- The building main for the water supply system connects the water supply piping to hose bibs and water tanker.
- The cold and hot water main including shut off valves where they are required.
- The cold and hot water branch pipe parallel where possible

- Indicate the size of each cold and hot water supply pipes to accommodate the capacity of water needed.
- Show the location of water heater and identify it
- Include a plumbing fixture schedule, symbols and notes

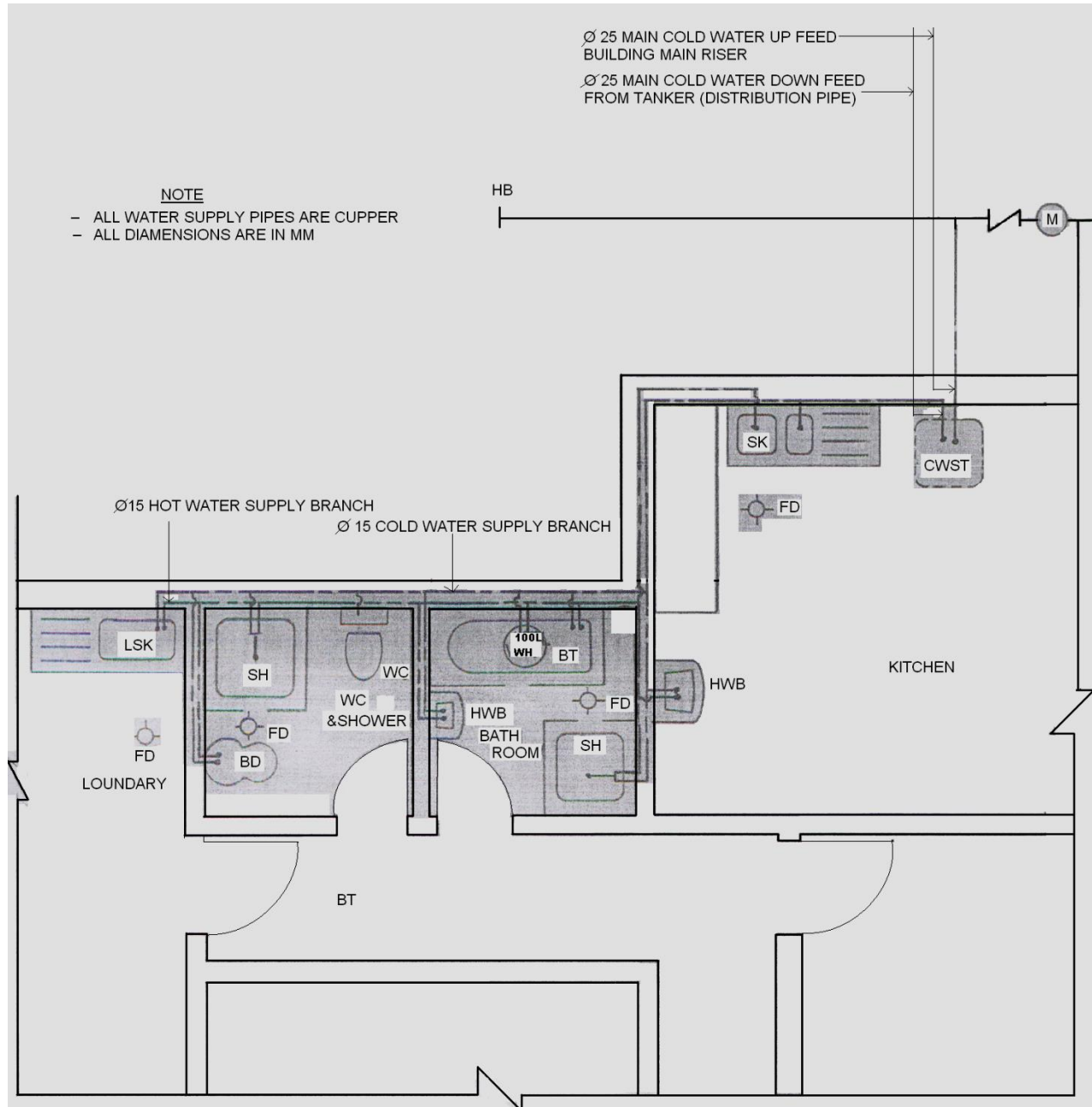
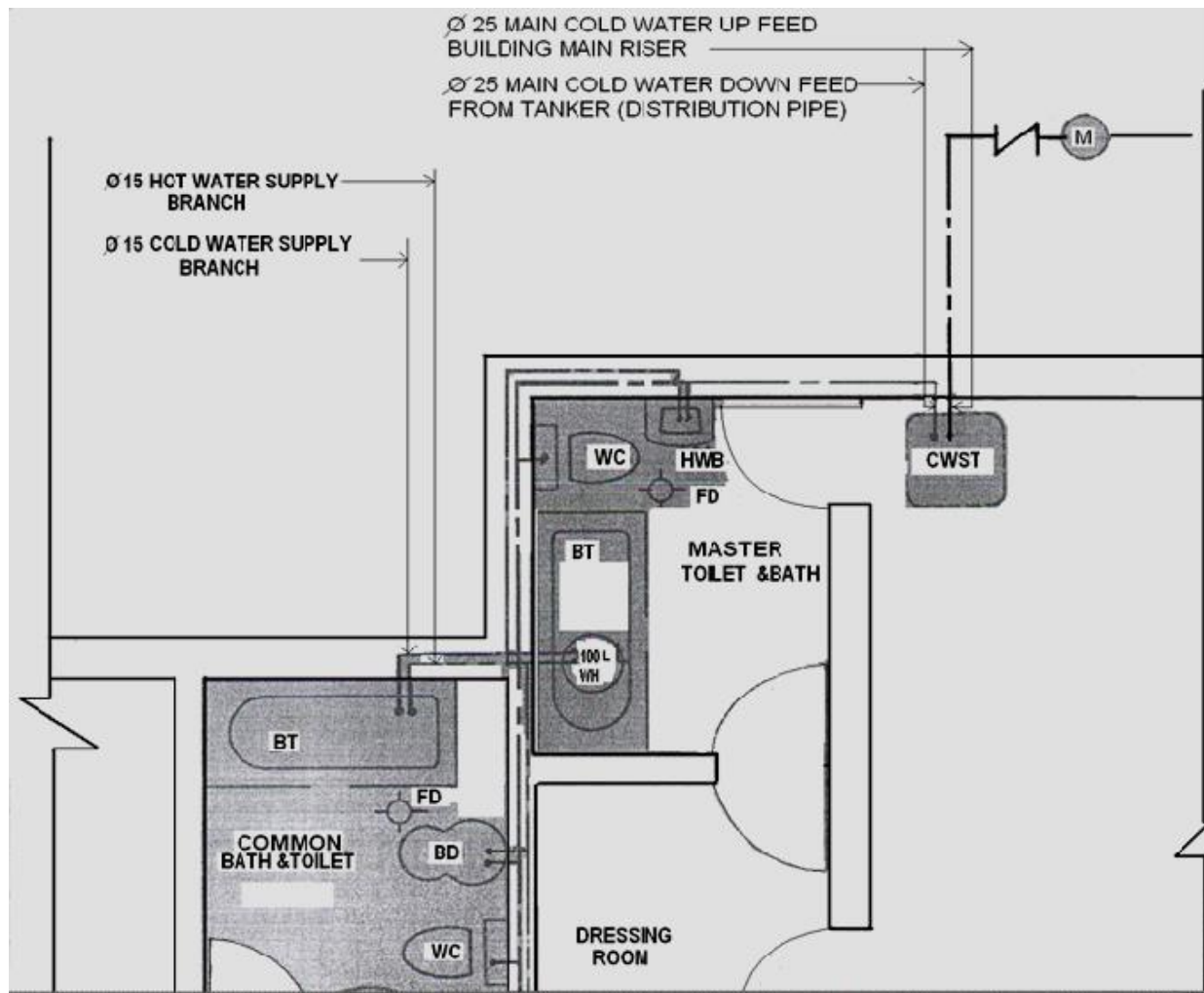


Figure - Plumbing plan for a given ground floor (supply system)



Plumbing plan for a given upper floor (supply system)

3.1.2 Drawing plumbing plans for sewerage system

The plumbing plan for disposal system includes:

- The Floor plan showing only the exterior & interior walls, door and window, and features which are related to plumbing plan.
- The symbols for all fixtures that are to be connected to the house plumbing system.
- The building manhole" soil stacks, vent stack and house drain.
- Connection of all fixtures and floor drains to the building drain showing all fitting and secondary vents that are used.
- Specify the type and size of pipes to be used (installed).

- Include a plumbing fixtures, schedules, symbols and notes (as shown on supply system.)

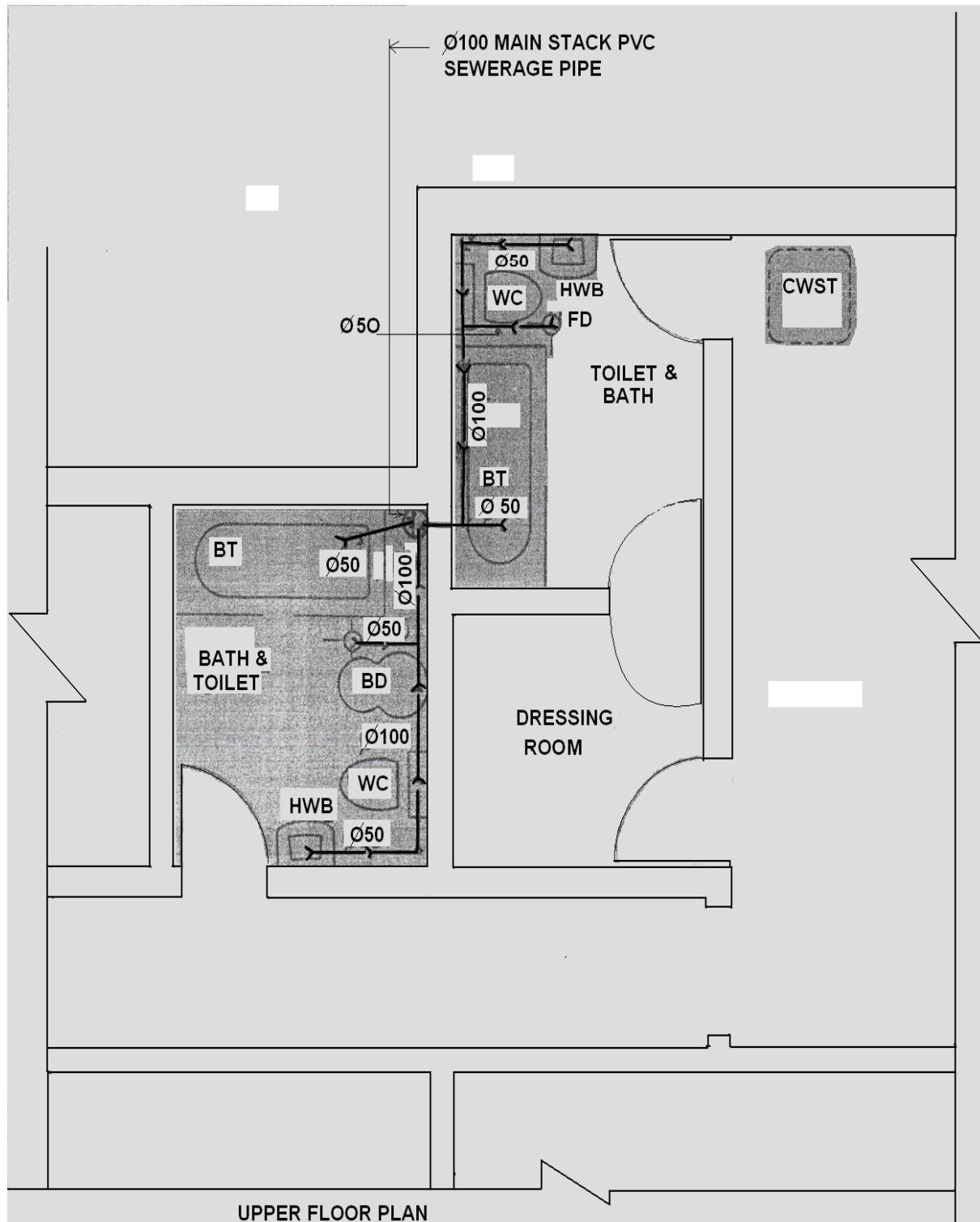


Figure - Plumbing plan for a given upper floor (sewerage system)



Drawing site plan of a sanitary system

Drawing site plan of supply and disposal system

- It is used to show how water is supplied to the building site, surface drainage, location of septic tank, cold water tank & public sewer line. and storm line & ditch layout.

Site plan of water supply system includes:-

- Municipality water line (city main), pipe size, type
- Location of water meter.
- Pipe line from the main municipal line to water tanker, size& type.
- Location, size, type, material & volume of elevated tanker.
- Layout of water supply line on the roof.
- Location of hose bibs (garden tap).
- Necessary notes.

Site plan of waste disposal system includes:-

- location of trapped gulley.
- Building drainpipe leading to manholes.
- Layout of sewerage pipe lines.
- Location of SVP (soil & vent pipe) on the roof.
- location, type, size, material of sewerage manholes.

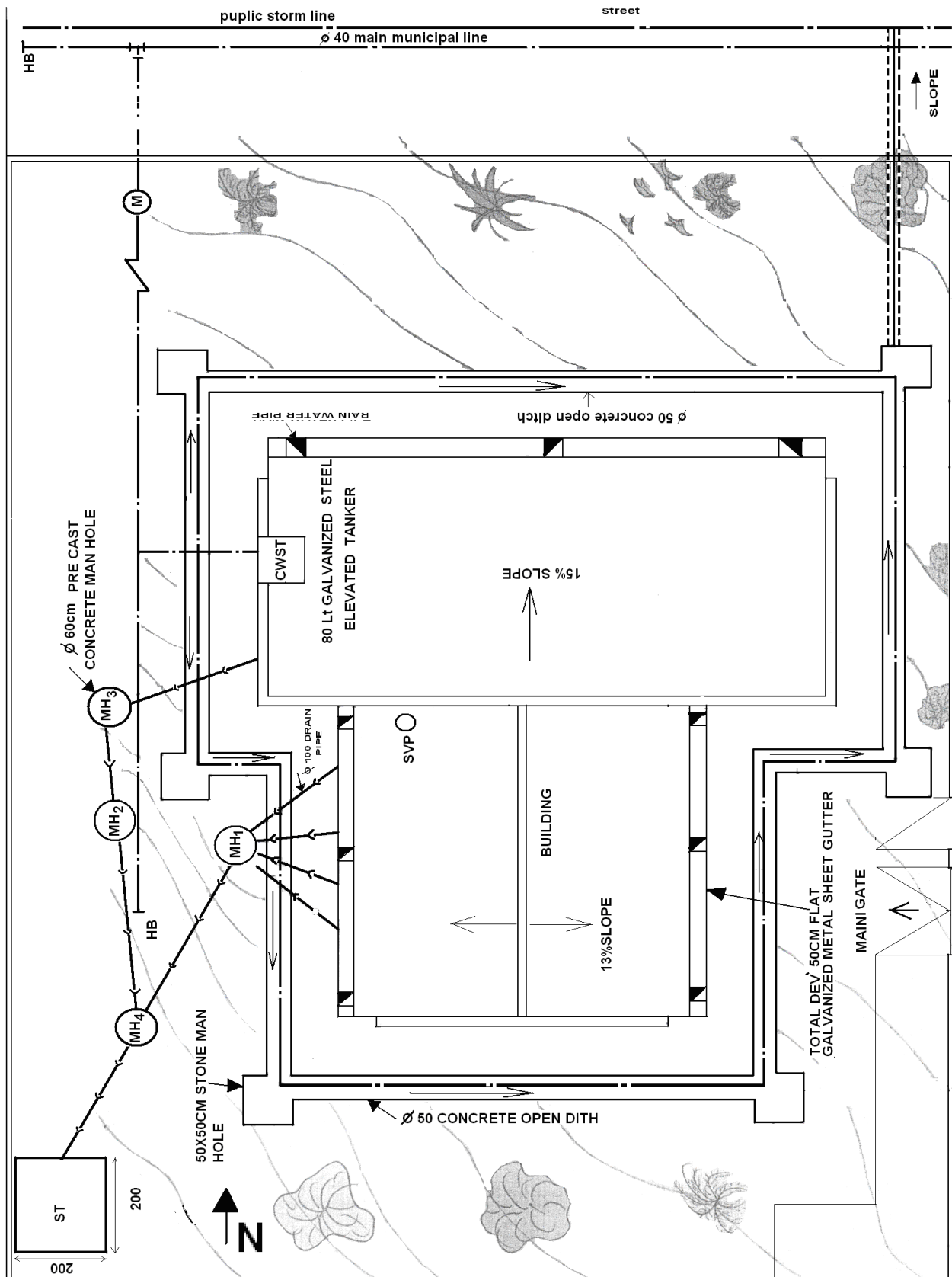


- Location, type, size & shape of septic tank at the recommended distance far from the building boundary of the owner.
- Layout of private or public sewer line.
- Main drain pipe coming through manholes & joined to septic tank
- Pipe sizes of house drain, sewer & city sewer.
- Necessary notes & dimension.

Besides these site plans of sanitary system shows:-

- Existing structures: - like property lines, pedestrian walk ways, streets, pavements, foot paths, garden, trees & other landscape features.
- Roof configuration: - e.g. - slope of roof location of down pipe, type of gutter material, size & location.
- Surface drainage:-e.g. ditch material, type, size slope of ditch, direction
- Of water flow, layout of ditch, location of main storm water line.
- All necessary dimensions: - e.g. - building dimension, property line dimension, front Yard, side yard & basic yard dimension
- North arrow, contour line, elevation of contour.
- Legend showing all symbols used on the site plan.

The following example shows the site plan of the given building





Self-Check - 3	Written Test
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Direction: write True or False concerning plumbing plan feature

1. Identify Size and types of all piping and fittings
2. Locate of plumbing equipment
3. Locate of fixtures
4. Position Height of fixture

Note: Satisfactory rating - 2 and 4 points

Unsatisfactory - below 2 and 4 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Name: _____

Date: _____

Answer sheet

1. _____ 2. _____ 3. _____ 4. _____



LAP Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1: Identify plumbing plan with its specification before demonstration day.

Task 2: Identify details in plumbing job specification

Task 3; Identify purpose of plumbing job specification

Task 4: Read plumbing job specifications in conjunction with plans

List of Reference Materials

- Seeley IH. (1998). *Building Quantities Explained* 5th Revised edition, Macmillan ISBN 978-0-333-71972-5
- Seeley IH. (1997). *Quantity Surveying Practice*, 2nd Revised Macmillan; ISBN 978-0-333-68907-3
- Lee S. Trench W. Willis A. (2005) *Elements of Quantity Surveying*. 10th Edition WileyBlackwell; ISBN 978-1-4051-2563-5
- Ashworth A. Hogg K. (2007). *Willis's Elements of Quantity Surveying* 12 Rev Ed edition Blackwell Publishing. ISBN 978-1-4051-4578-7
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