

# Common Mistakes in Sewerage and Sanitary Submissions to PUB





# Overview

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- Objective
- Recap on sewerage submission stages
- Sewerage/Sanitary submission requirements
- Common Mistakes during DC/DP stage
- Common Mistakes during Completion of Work stage
- Common Mistakes during Design Stage
- Guidelines & Requirements

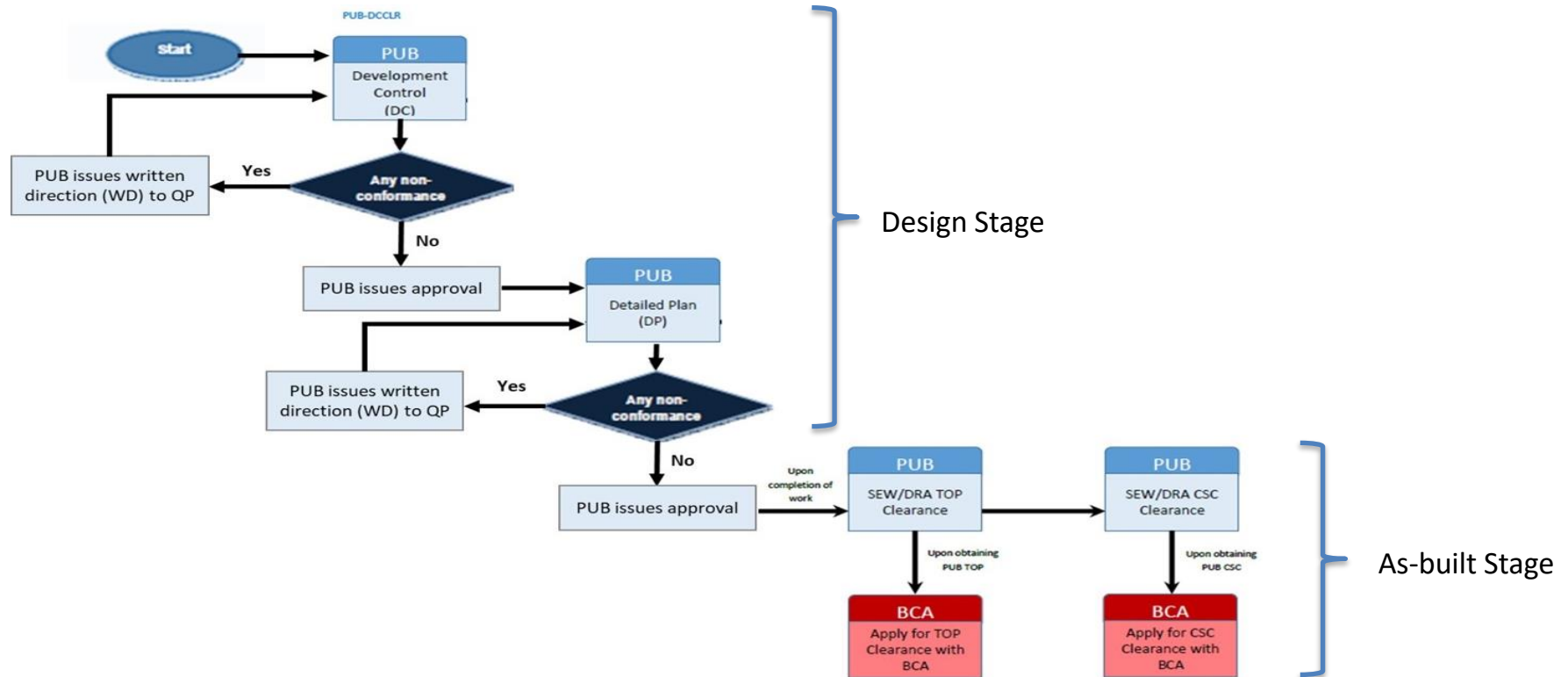
# Objective

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- To share on common mistakes made in submissions
- To improve the quality of submissions so as to reduce number of resubmissions

# Recap on sewerage submission stages

## Overview of Submission Process



## Common mistakes in Sewerage and Sanitary Submission to PUB

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### Good Practice – Have a cover letter

What does processing officer look out for in the cover letter?

1. The type of development &/or type of works involved
2. Additional information that the QP would like to highlight to the processing officer
  - Deviations from COPSSW and proposed mitigating measures,
  - Amendment to previously approved submission,
  - Modification made from last submission,
  - Follow up actions based on last written direction
3. Contact details of the QP or his/her associates
4. Officers involved in earlier consultations (if any)

## Common mistakes in Sewerage and Sanitary Submission to PUB

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General - Submission with wrong CORENET form

Causes delay in processing as the submission may be routed to wrong group of processing officers

So which form should be used?

| Type of Form/Submission                            |                             |                |
|--|-----------------------------|----------------|
| Application for Development Control Clearance (DC) | PUB-DCCLR                   | Design Stage   |
| Application for Detailed Plan Clearance (DP/BP)    | PUB-DPCLR                   |                |
| Application for Drainage TOP or CSC Clearance      | PUB-DRATOP<br>PUB-DD-CSIDRA | As-built Stage |
| Application for Sewerage TOP/CSC                   | PUB-BPU-COMPOFWORK          |                |

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# Sewerage submission requirements (DC)

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## Development Control (DC)

The DC submission shall be **complete**, which includes:

- 1) Development location plan, the layout plan(s), site boundary, road reserve line, road kerb,
- 2) Discharge calculations based on BS EN12056-2. Ejector discharges shall be **separated** from the gravity flow discharge.
- 3) Existing/proposed point of sewer connection serving the development

Legends used :

- 1) proposed sewers/ drain-lines in red,
- 2) existing sewers/drain-lines in blue,
- 3) to be abandoned/removed/grouted sewers in yellow.



# Sewerage submission requirements (DC) – Cont'd

## Development Control (DC)

The following info shall be provided and clearly indicated in the DC submission plans.

|  | Details to be provided  |
|--|---|
| Proposed sewers/manholes   | Length, gradient, size and levels (top level, invert levels, drop levels, etc.)<br><br>Sewer Setback Line<br><br>Construction method, such as pipe jacking/cut and cover. Type of bedding/piling.<br><br>Proposed pipe material of sewers |
| Existing sewers/manholes within/near the development site  | Sewer size(s) and GIS ID<br><br>Sewer Setback Line  |
| Proposed/existing drain-line from the last inspection chamber to the public manhole/sewer (for Y-junction) | Length, gradient, size and levels (top level, invert levels, drop levels, etc.)   |
| Proposed/existing drain-line within the development  | Length, gradient, size and levels (top level, invert levels, drop levels, etc.)   |
| Existing sewers/manholes within/near the development site to be removed/sealed/grouted                     | Sewers/manholes (size, GIS ID) to be removed/sealed/grouted.<br><br>Method of abandonment such as to be removed/sealed/grouted.   |

# Sewerage submission requirements (DC) – Cont'd

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## Development Control (DC)

If unable to comply with sewer setback, to indicate clearly in the DC plan the proposed mitigation measures such as :

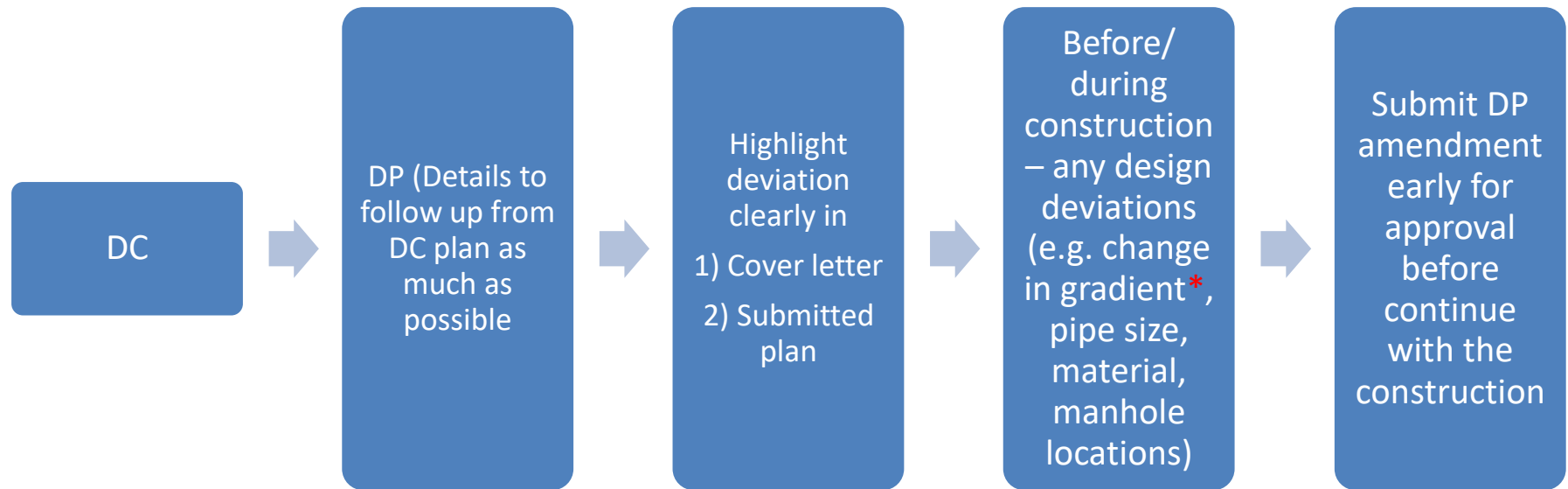
- RC trench
- Demountable structure
- Diversion of sewer
- Used water pumping system in all relevant plans (where applicable)
- QP's and Owner's endorsements (where applicable)

# Sewerage submission requirements (DP-Detailed Plan)

- **Sanitary\***
- **M&E**
- **Sewer**
- **RCT**

\*DP sanitary application is a lodgement process.

# Sewerage submission requirements (DP)



\*Even if flow velocity from the change in gradient still comply with COPSSW, DP amendment is still required, **no exceptions!**

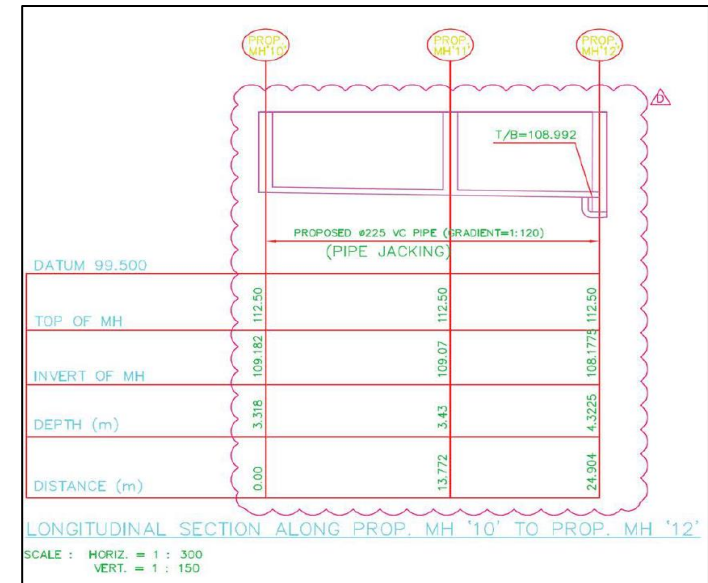
- QP should positively identify other utilities/services along the proposed sewer route during DP stage so that DP amendment could be avoided when there are insufficient clearances discovered later.

# Sewerage submission requirements (DP) – Cont'd

## Detailed Plan (DP-Sewer)

The DP submission shall be **complete**, which includes

- 1) the layout plan(s),
  - 2) longitudinal section plan(s),
  - 3) manhole details plan(s) (including manhole benching details) and a manhole schedule.
  - 4) Sewer Design Calculations
- SIP level is for **reference only**. QP should verify the manhole levels on site via proper site investigation instead of transferring the levels found in SIP into the DP submission plans. This would minimise the need for a DP amendment when the deviation in levels are only discovered during construction stage and in turn delay the project timeline.





# Sewerage submission requirements (DP) – Cont'd

## Detailed Plan (DP-Sewer)

The following info shall be provided and clearly indicated in the layout and longitudinal section plan(s).

|  | Details to be provided   |
|--|--|
| Proposed sewers/manholes   | Length, gradient, size and levels (top level, invert levels, drop levels, etc)<br><br>Construction method, such as pipe jacking/cut and cover. Type of bedding (type D for sewers constructed by cut and cover). Type of piling<br><br>Proposed pipe material of sewers<br><br>Setback from buildings/structures<br><br>Chainage in the longitudinal section plan(s) |
| Existing sewers/manholes within/near the development site  | Sewer size(s) and GIS ID<br><br>Setback from buildings/structures  |
| Proposed/existing drain-line from the last inspection chamber to the public manhole/sewer (for Y-junction) | Length, gradient, size and levels (top level, invert levels, drop levels, etc)   |
| Existing sewers/manholes within/near the development site to be removed/sealed/grouted                     | Sewers/manholes (size, GIS ID) to be removed/sealed/grouted<br><br>Method of abandonment such as to be removed/sealed/grouted  |

# Sewerage submission requirements (DP) – Cont'd

## Detailed Plan (DP-Sewer)

- The longitudinal section drawing(s) should include details of other utilities/services that would be crossing or running parallel to the proposed sewer(s).
- If unable to comply to sewer setback, to indicate clearly in the DP plan the proposed mitigation measures such as RC trench, demountable structure etc.
- PUB WRN standard drawings shall be referred to in the preparation of manhole details plan(s).
- Other relevant details or structures such as enhanced pipes, pipe-in-pipe, duty/standby sewer, box-out, details of sewer plugs, advanced sewer connection, left-in structures such as caisson, sheetpile, RC trench, thrust block, weir-over, abandoned/removed/grouted sewers etc.
- The sewer layout plan(s) **must tally** with the longitudinal section plan(s).
- QP's and Owner's endorsements (where applicable)

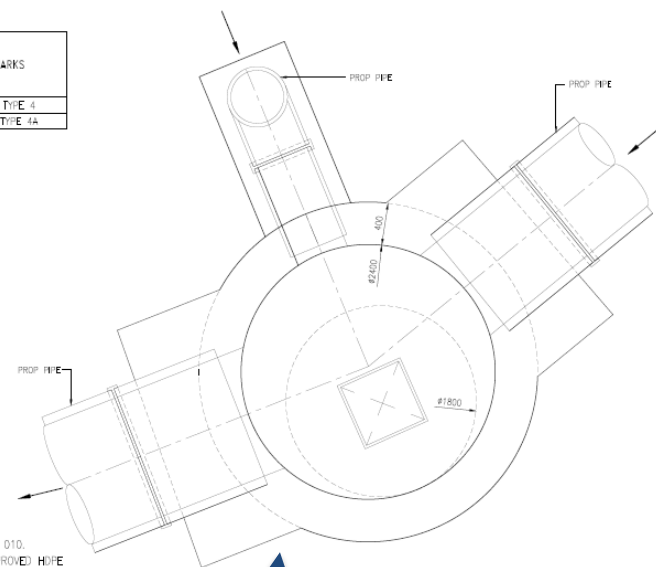
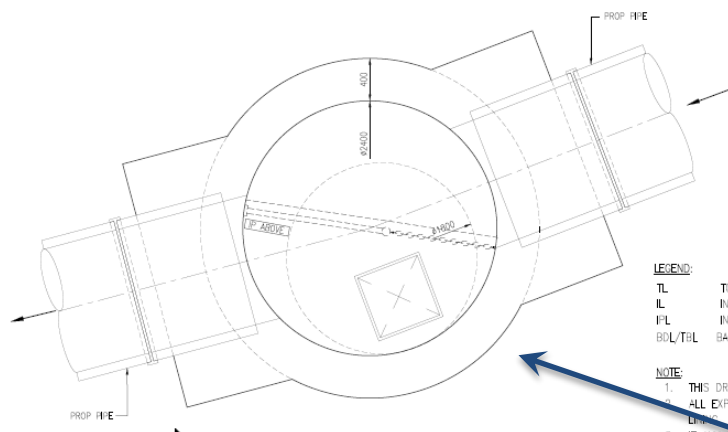
# Sewerage submission requirements (DP) – Cont'd

## Sample – Manhole (MH) Details Plan

### MH Schedule

SCHEDULE OF MANHOLES

| S/No. | MANHOLE No. | TOP LEVEL (TL) | INVERT LEVEL (IL) | DEPTH (H) | H1    | H2    | H3    | INTERMEDIATE PLATFORM LEVEL (IPL) | DISTANCE BETWEEN INTERMEDIATE PLATFORM PIPE CROWN (m) | SEWER PIPE DIA. (mm) |        | CHAMBER RING (DC) mm | REMARKS       |
|-------|-------------|----------------|-------------------|-----------|-------|-------|-------|-----------------------------------|---|----------------------|--------|----------------------|---------------|
|       |             |                |                   |           |       |       |       |                                   |   | INLET                | OUTLET |                      |               |
| 1     | MH-M2       | 101.350        | 93.899            | 7.451     | 3.200 | 2.400 | 1.000 | 97.299                            | 2.000   | 1200                 | 1200   | 1800/42400           | REFER TYPE 4  |
| 2     | MH-M3       | 101.900        | 94.240            | 7.660     | 6.010 | —     | 1.000 | —                                 | 2.210   | 1000/50080           | 1200   | 1800/42400           | REFER TYPE 4A |



Benching details  
& Orientation of  
Platform (where  
applicable)



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# Sewerage submission requirements (As-built)



# Sewerage submission requirements (As-built)

## Completion of **Sewerage** Work (As-built)

- DP clearance certificate for sewer work. Project reference number to be indicated.
- As-built engineering plans shall be **complete**, which includes
  - 1) the layout plan(s),
  - 2) longitudinal section plan(s),
  - 3) manhole details plan(s) (including manhole benching details) and a manhole schedule.
  - 4) Piling details for manholes (to indicate no piling if there is no piling) accompanied with pile records tabulated and submitted in a standardized Excel spreadsheet. (Excel spreadsheet is not required for Bakau piles)
- As-built plans should follow the DP cleared plans for new sewers in terms of their sizes, manhole locations etc.
- To indicate all newly built sewers/manholes as “As-Built”.
- As-built survey drawings complying with prevailing SLA Standards and Specifications for Utility Survey in Singapore (SVY21 coordinate system) submitted by Registered Surveyor, with the required endorsement.

# Sewerage submission requirements (As-built) – Cont'd

## Completion of **Sewerage** Work (As-built)

The following info shall be provided and clearly indicated in the layout and longitudinal section plan(s).

|   | Details to be provided  |
|---|---|
| Newly built sewers/manholes   | <p>Length, gradient, size and levels (top level, invert levels, drop levels, etc)</p> <p>Construction method, such as pipe jacking/cut and cover. Type of bedding (type D for sewers constructed by cut and cover)</p> <p>Piling details for manholes (no piling, indicate no piling) accompanied with pile records tabulated and submitted in a standardized Excel spreadsheet. (Excel spreadsheet is not required for Bakau piles)</p> <p>Pipe material and pipe thickness of the sewers</p> <p>Setback from buildings/structures</p> <p>Chainage in the longitudinal section plan(s)</p> |
| Existing sewers/manholes within/near the development site   | <p>Sewer size(s) and GIS ID</p> <p>Setback from buildings/structures</p>  |
| Newly built/existing drain-line from the last inspection chamber to the public manhole/sewer (for Y-junction) | <p>Length, gradient, size and levels (top level, invert levels, drop levels, etc)</p>   |
| Existing sewers/manholes within/near the development site to be removed/sealed/grouted                        | <p>Sewers/manholes (size, GIS ID) to be removed/sealed/grouted</p> <p>Method of abandonment such as to be removed/sealed/grouted</p>  |

# Sewerage submission requirements (As-built) – Cont'd

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## Completion of **Sewerage** Work (As-built)

- The longitudinal section drawing(s) should include details of other utilities/services that would be crossing or running parallel to the newly built sewer(s).
- To indicate clearly in the As-built Built plan the details of proposed mitigation measures such as RC trench, demountable structure etc.
- PUB WRN standard drawings shall be referred to in the preparation of manhole details plan(s).
- Other relevant details or structures such as enhanced pipes, pipe-in-pipe, duty/standby sewer, box-out, details of sewer plugs, advanced sewer connection, left-in structures such as caisson, sheetpile, RC trench, thrust block, weir-over, abandoned/removed/grouted sewers etc.
- The sewer layout plan(s) **must tally** with the longitudinal section plan(s).
- QP's and Owner's endorsements (where applicable).
- CCTV inspection for all newly built sewers/pumping mains.
- Water-tightness test report for all newly built sewers/pumping mains including manholes and chambers.

# Sanitary submission requirements

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## Completion of Sanitary Work

- Cover letter with clear caption (as per BCA's requirement)
- DP clearance certificate for sanitary work
- As-built sanitary drawings (to be endorsed by QP)
- As-built plan shall include:
  - the top and invert levels of existing/proposed manholes and lcs
  - Type, diameter, gradient, material and length of proposed drainlines and sewer connection lines
- Schematic of the sanitary plumbing and sanitary drainage system
- As-built M&E drawings (to be endorsed by PE who obtained the DP clearance certificate for M&E work)
- Water-tightness test report for new drain-lines and ICs
- Air test report for new discharge pipes/stacks and ventilating pipes/stacks
- Post-rectification CCTV report and video of existing sewer connection-to be reused\*

\*For reusing of sewer connection, QP shall ensure the connection is adequate and in serviceable condition. Any defects found shall be rectified before applying for TOP clearance.

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# Common Mistakes during DC/DP Stage



# Common Mistakes during DC/DP Stage

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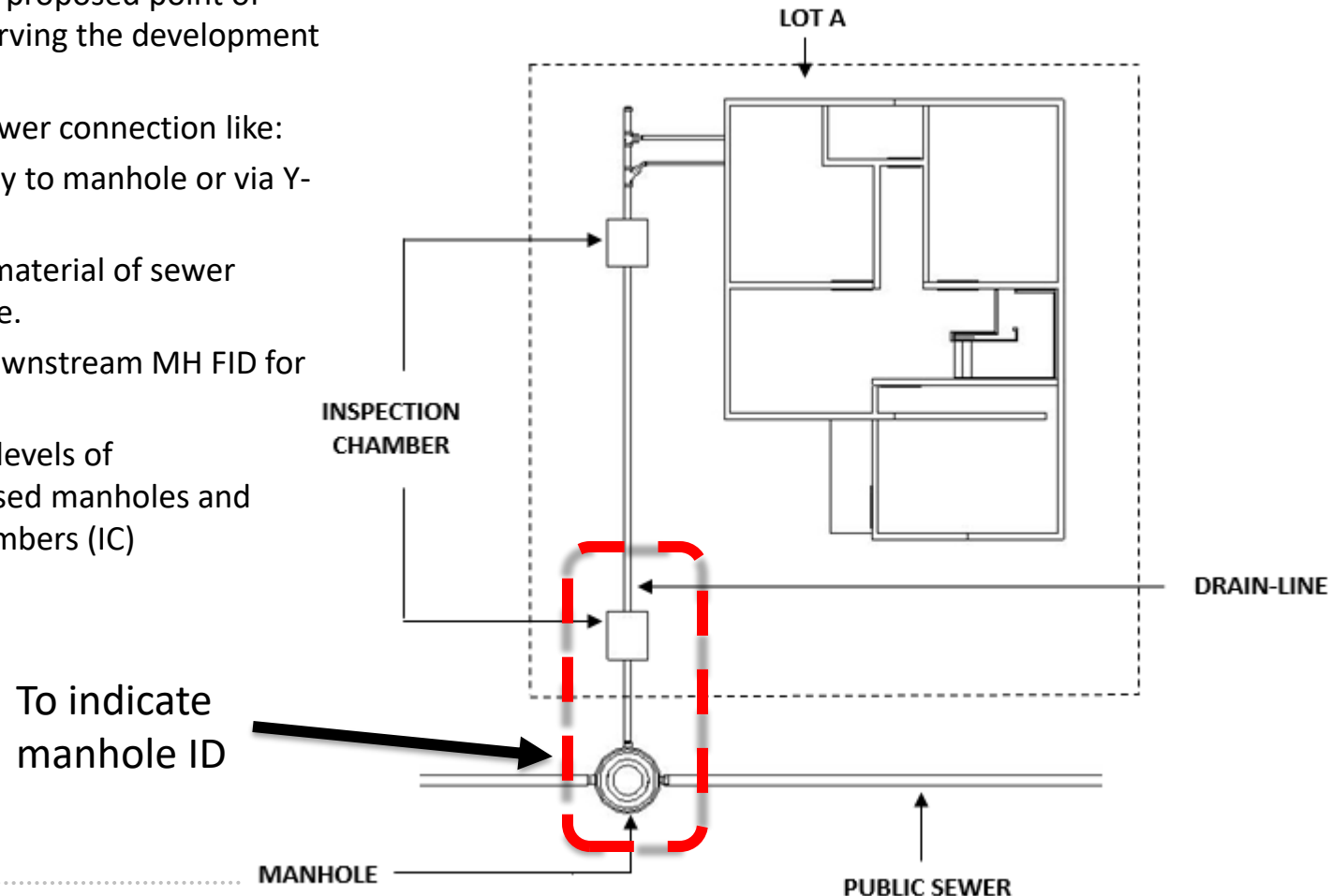
## Inconsistent/ incomplete plans and missing details

- The sewer layout plan(s) **do not tally** with the longitudinal section plan(s).
- Invert levels, length, size indicated on the plans **do not work out** to the proposed gradient.
- Drop levels **not labelled** as the through pipe level connected to the downstream manhole.
- Sewer connection at manholes are **not indicated**. i.e. sewers are connected soffit to soffit or invert to invert.
- **No manhole details plan** provided at DP stage.
- Missing manhole schedule.
- Standard benching details (transferred directly from PUB standard drawings and not reflecting what was constructed) provided at DP stage or no benching details at all. Intermediate platform orientation **not indicated**.
- Type D bedding **not provided** for sewers constructed by cut and cover method.
- GIS ID of existing sewers/ manholes are **not indicated**.
- Existing sewer details on the plans are **not indicated**.
- Existing manholes are indicated as square manhole without proper verification of the actual manhole structure on site.

# Common Mistakes during DC/DP Stage

## Did not Indicate Point of Sewer Connection

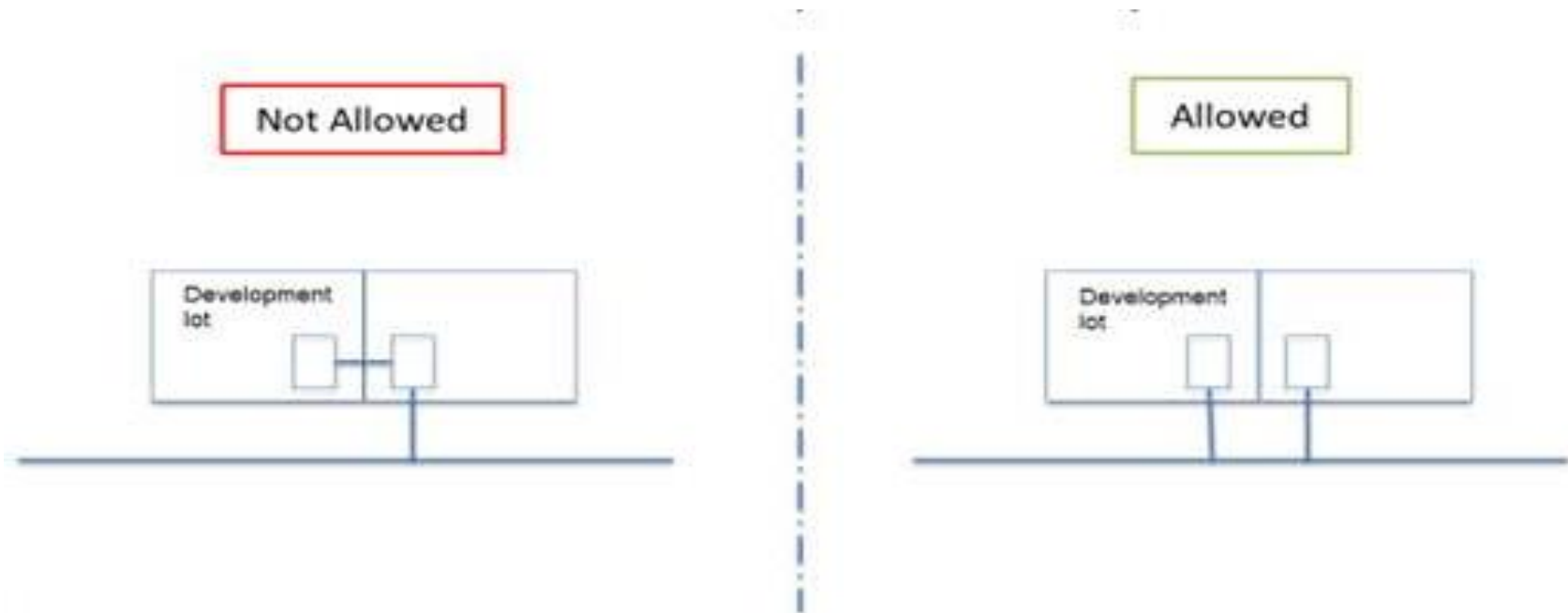
- Indicate the existing/proposed point of sewer connection serving the development clearly in drawings
- Indicate details of sewer connection like:
  - Connect directly to manhole or via Y-junction
  - Diameter and material of sewer connection pipe.
  - (Connecting downstream MH FID for y-junction)
  - Top and invert levels of existing/proposed manholes and inspection chambers (IC)



# Common Mistakes during DC/DP Stage

Point of Sewer Connection under clause 1.2.3g

For redevelopment, existing drain-line connection going into neighbouring premises shall be discontinued where direct connection to public sewer in the public area is feasible.



# Common Mistakes during DC/DP Stage

## Did Not Declare the Used Water Discharge Rate Correctly

- Provide the used water discharge rate (in L/s) based BS EN12056-2
- Attach calculations on how the rate is obtained (Refer to Annex 1 of Jun 2017 circular)
- Ejector discharges shall be separated from the gravity flow discharge in the discharge calculations.
- Floor traps installed in toilet should not be included in the quantity to prevent double counting of flow, as the flow has already been captured in the table by other appliances in the toilet like shower.



Our Ref: WRN/17.2  
30 Jun 2017

Developers, Architects, Engineers, Contractors, and Builders

Dear Sir/Madam,

### UPDATE FOR 'COMPOFWORK' FORM AND STANDARD VALUES FOR USED WATER FLOWRATE DECLARATION IN DC FORM

PUB has announced that with effect from 1 July 2017, the Sanitary Appliance Fee (SAF) and the Waterborne Fee (WBF) will be restructured into a single volume-based fee. It will therefore no longer be compulsory for QPs to declare the chargeable sanitary appliances in Section 3 and 4 of the Certificate of Completion and Inspection of Sanitary and Sewerage (COMPOFWORK).

2. QPs currently declare used water flowrate from proposed new developments. To help the industry and standardise the values used to declare the flowrates, QPs can use the table format as shown in Annex 1 (Based on BS EN12056-2).

3. The industry is advised to provide the table as part of your submission for new submissions from 1 Oct 17 onwards. If you have any queries concerning this circular, please contact our BPU hotline at 67313512 or email us at PUB\_BPU@pub.gov.sg or Mr Christian Budiman at Christian\_Budiman@pub.gov.sg.

### Sample table format and values to be used to declare used water flowrate in submission

Building/Block No: XXXX

| Appliances   | DU* (l/s) | QTY | DU x QTY (l/s) |
|--|-----------|-----|----------------|
| Wash basin   | 0.5       | 20  | 10             |
| Bidet  | 0.5       | 0   | 0              |
| shower w/o plug  | 0.6       | 20  | 12             |
| Urinal with flush valve  | 0.5       | 4   | 2              |
| Bath   | 0.8       | 2   | 1.6            |
| Kitchen sink   | 0.8       | 10  | 8              |
| Dishwasher   | 0.8       | 10  | 8              |
| Washing machine (up to 6Kg)  | 0.8       | 10  | 8              |
| Washing machine (up to 12Kg)   | 1.5       | 0   | 0              |
| WC   | 1.8       | 20  | 36             |
| Floor Trap (DN100)   | 2         | 20  | 40             |
| <b>Σ DU</b>  |           |     | <b>125.6</b>   |
| Frequency Factor (K)*  |           |     | 0.5            |
| $Q_{ww1} = K \sum DU$ (see below)  |           |     | 5.60           |
| Other source of Q  |           |     | 0.00           |
| <b>Q total to sewer(<math>Q_{ww1} + \text{Other source of Q}</math>)</b> |           |     | <b>5.60</b>    |

$$Q_{ww1} = K \sum DU = 0.5 (\text{sq root } (125.6)) = 5.60$$

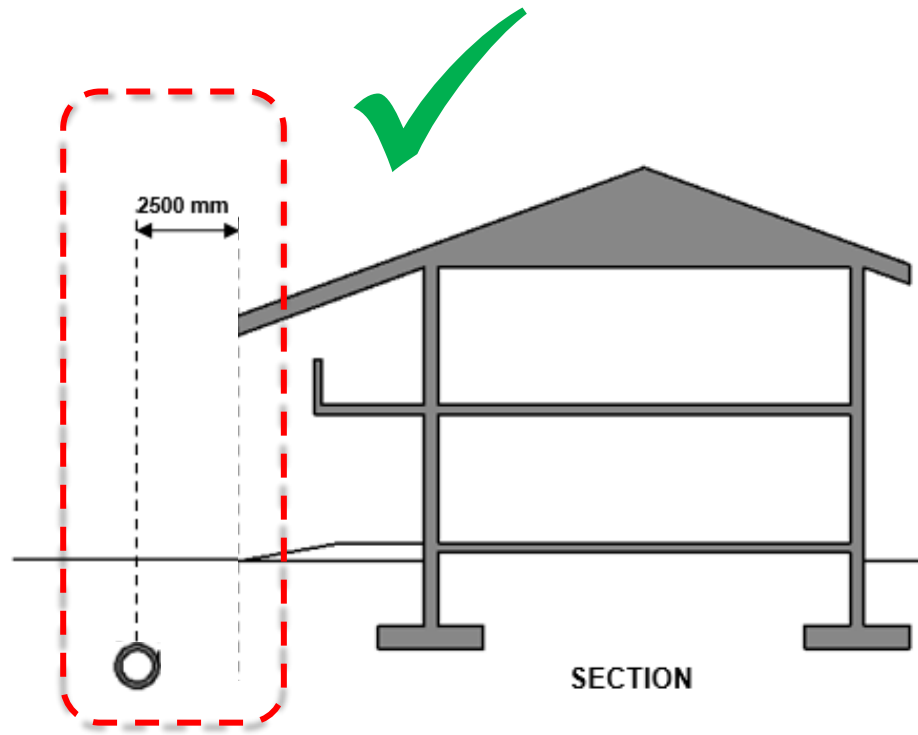
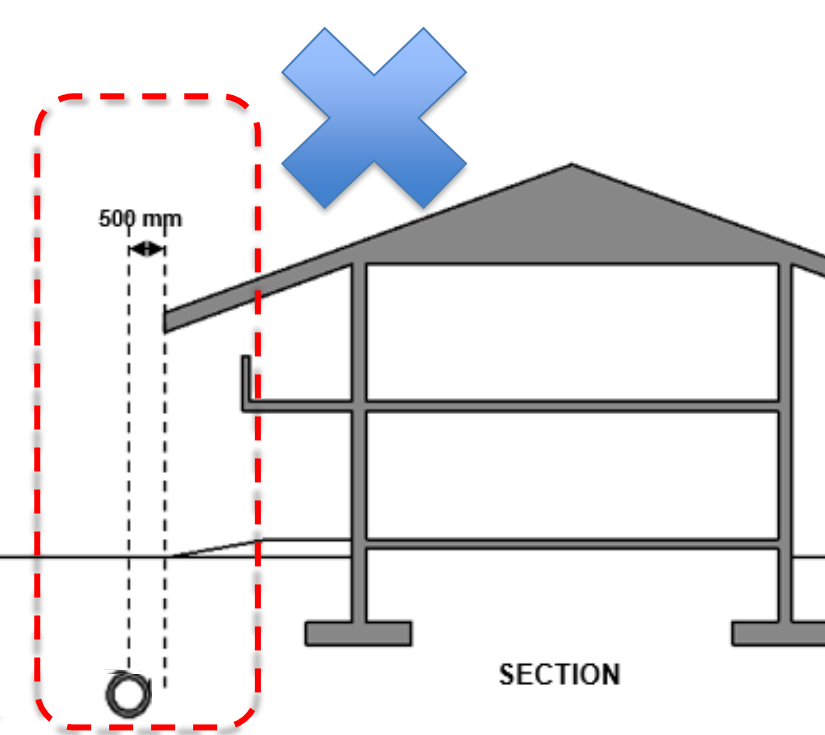
\* All DUs and Frequency Factor based on BS EN12056-2

| Development Type              | K, Frequency Factor |
|-------------------------------|---------------------|
| Office, dwelling, guest house | 0.5                 |
| Hospital, School, Restaurant  | 0.7                 |
| Toilet open to public         | 1                   |
| Special use eg. Lab           | 1.2                 |

# Common Mistakes during DC/DP Stage

Setback measured from 1<sup>st</sup> Storey wall only

- Setback is not measured from buildings/structures on 1<sup>st</sup> storey only
- Setback shall be measured from the outer most edge of the building structure, **including footings and overhangs**, to the centreline of the sewer



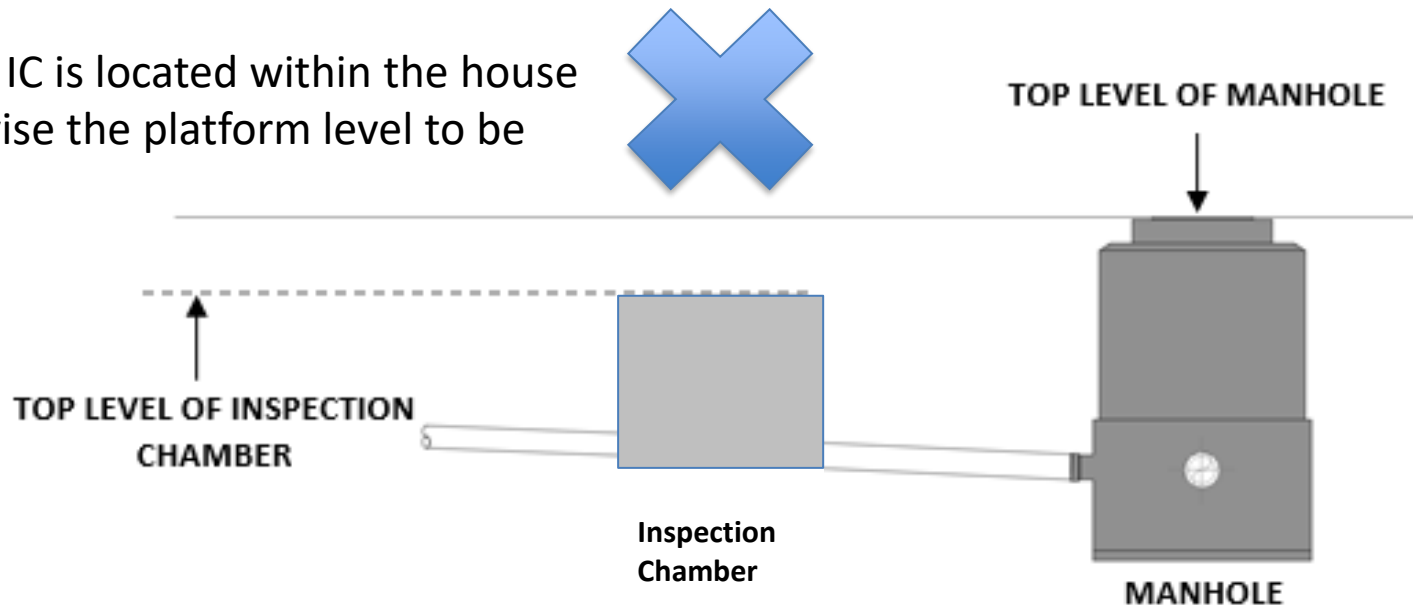


# Common Mistakes during DC/DP Stage

## Top level of IC lower than top level of MH

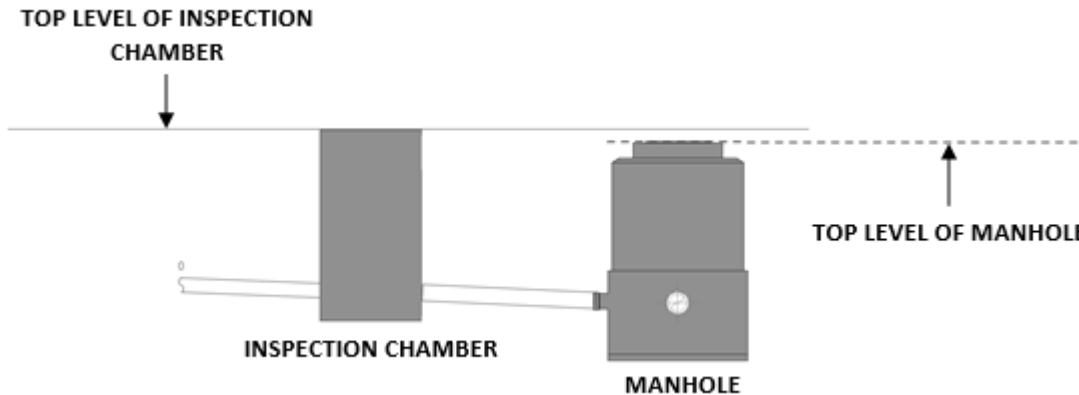
- Top levels of Inspection Chambers (IC) shall be at the same level or higher than the top level of the manhole to which the development connects
- This is to avoid used water overflow from the inspection chamber into the development lot due to downstream sewer blockage

Where IC is located within the house we advise the platform level to be higher.

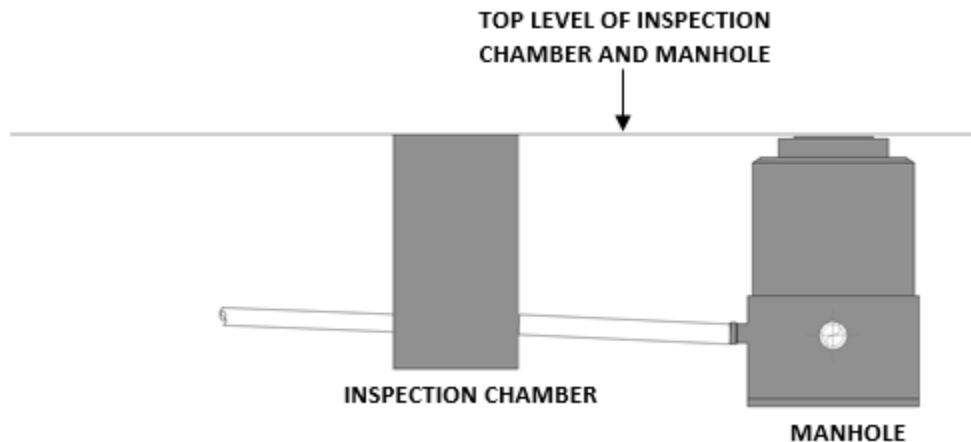


# Common Mistakes during DC/DP Stage

Top levels of Inspection Chambers (IC) shall be at the same level or higher than the top level of the manhole to which the development connects



Where IC is located within the house we advise the platform level to be higher.



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# Common Mistakes during Completion of Work Stage

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## Ventilation stack terminated at roof terrace

- Ventilation stack shall not be terminated in any private premises or private roof area that is designed for use by occupants
- Ventilation stack may be offset or connected to a common pipe of adequate size and extended for termination in the open air at the highest point of building or other suitable location that will not cause smell nuisance or health hazard to the occupants.
- Have a horizontal distance of 3m from any window



**Before**



Before Photo (Block 44)

**After**



After Photo (Block 44)

# Common Mistakes during Completion of Work Stage

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## As-built drawing submission

- **Incomplete** as-built drawings i.e. no manhole benching details. Manhole benching details is also necessary for PUB to proceed with site inspection.
- Only one (1) set of drawing endorsed by both the qualified surveyor and the QP should be submitted. QP should not be submitting the survey plan and the engineering plan separately as two (2) different plans.
- Sewer/manhole built on site is not in accordance to the DP cleared plan and no DP amendment was submitted prior to the start of work.
- Missing QP's abandonment endorsement on the plan for abandoning of the sewer & MH.

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# Common Mistakes during Design Stage

# Common Mistakes during Design Stage

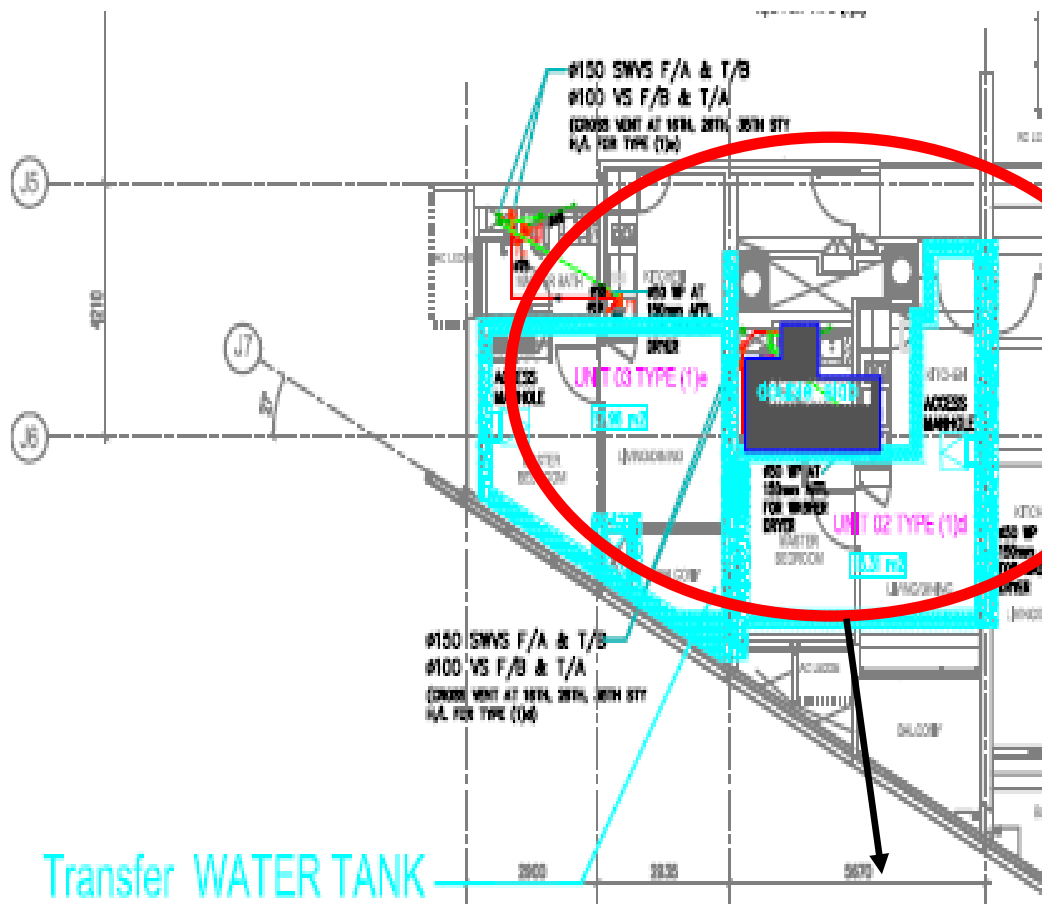
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## Position of Sanitary Pipes

- Sanitary pipes (i.e. waste pipes, discharge pipes and discharge stacks) shall **not** be placed above potable water storage tank, electrical transformer/ switchgear or above swimming pools and their balancing tanks.
- In all **multi-storey residential buildings** (e.g. condominium, apartment, HDB block) excluding single landed houses, the sanitary pipes shall be located such that:
  - No pipes from adjacent dwelling units shall be located within the dry areas (such as bedroom, living room, dining room, study room, etc) of a dwelling unit.
  - No pipes serving WC shall be located within the kitchen area of any dwelling unit.
  - No pipes from kitchen sink, floor traps and discharge pipes shall be sited directly above the stove in the kitchen.
- In all **non-residential buildings** (e.g. Commercial buildings, shopping mall, hotel, hospital, etc), the sanitary pipes shall be located such that:
  - No pipes from WC shall be located at the ceiling of a commercial unit.
  - No discharge stack or overhead sanitary pipe shall be sited within areas of the food establishment/F&B unit where food is cooked, prepared, stored or served.

# Common Mistakes during Design Stage

Sanitary pipes shall not be placed above potable water storage tank



PUBLIC UTILITIES ACT  
(CHAPTER 261, SECTION 72)  
PUBLIC UTILITIES (WATER SUPPLY)  
REGULATIONS

## FIRST SCHEDULE

Regulations 4 (1) and (2) and 8 (1)

### REQUIREMENTS FOR WATER FITTINGS

16. —(1) No storage tank shall be installed in such a position that —
- (a) it is directly below any sanitary pipe, floor trap, sewer pipe, reclaimed water pipe or waste pipe;

### Sewerage and Drainage (Sanitary Works and Sewerage Works) Regulations r3(m)(i)

No sanitary plumbing system shall be laid —

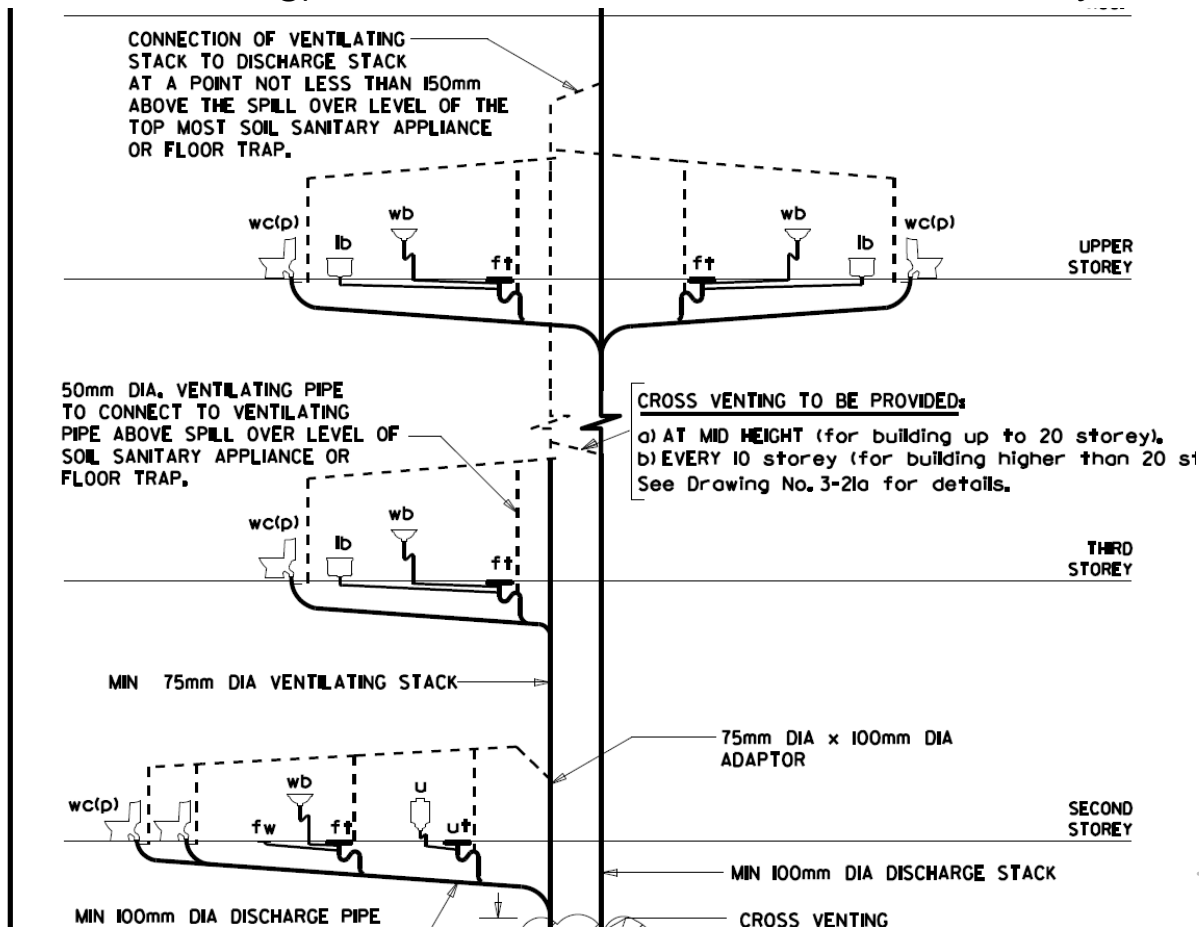
- I. Over, above or across any potable water storage tank, electrical transformer or switch gear; or
- II. In any place where it can endanger the health or safety of any person



# Common Mistakes during Design Stage

## Sizing of discharge pipes and stacks

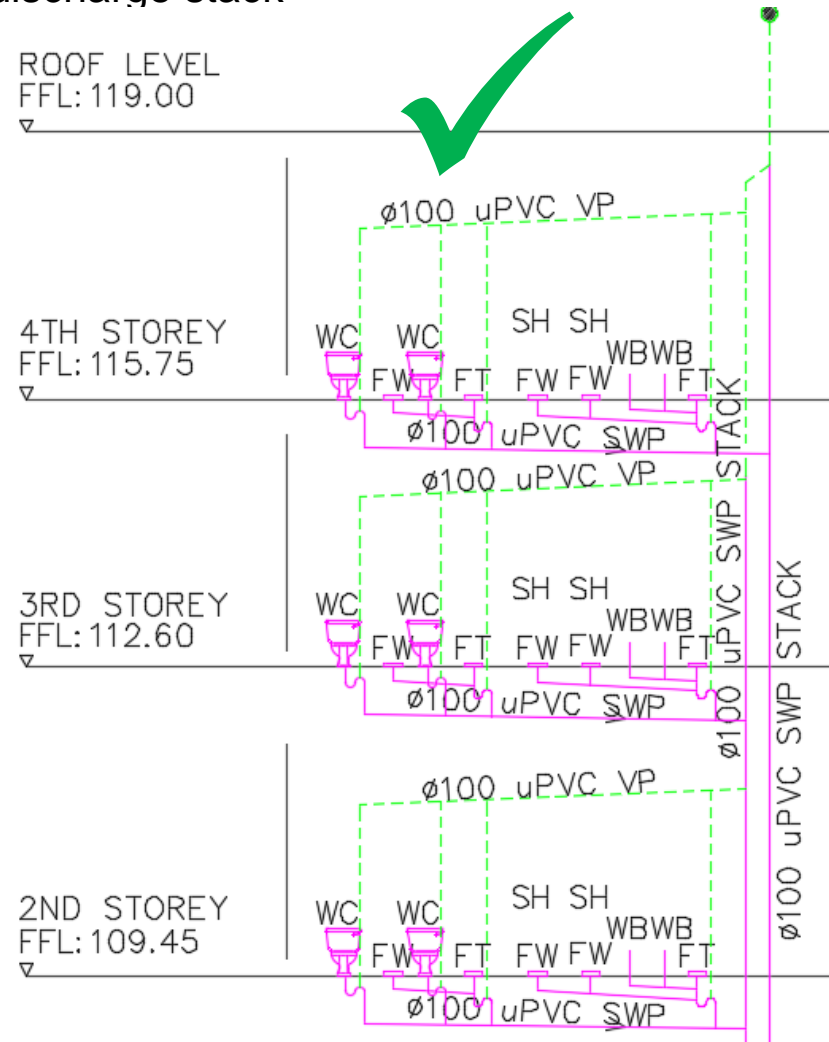
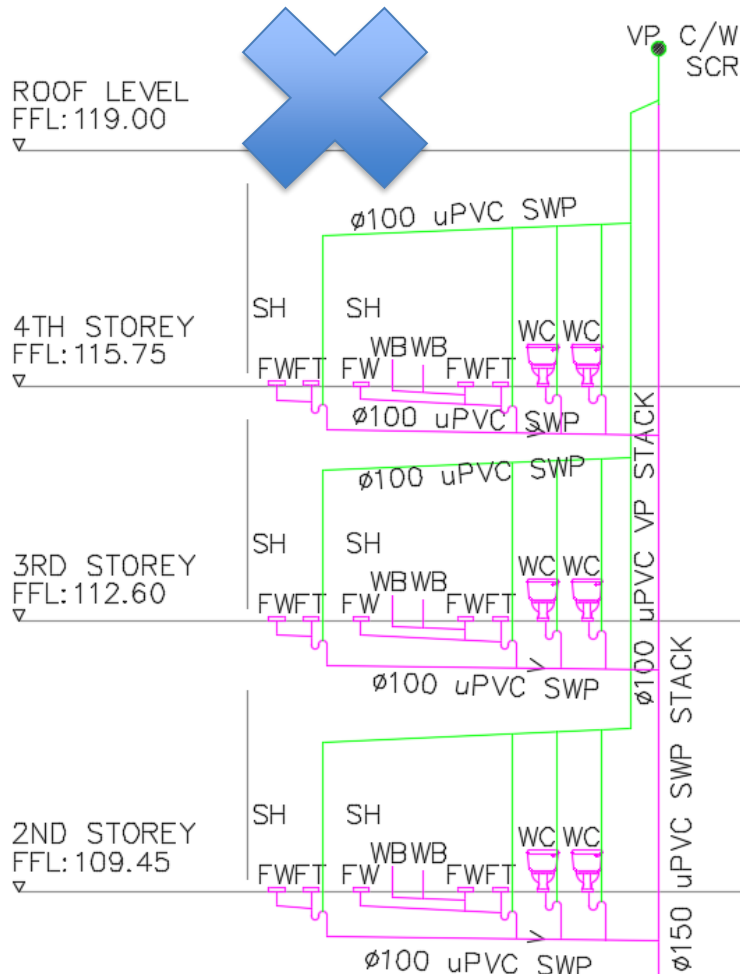
COPSSW clause 4.3.3e : The discharge pipes serving the 2nd & 3rd storey (if no discharge pipe connections from the 2nd & 3rd storey, then the next 2 upper storeys of the building) shall be connected to the secondary discharge stack



# Common Mistakes during Design Stage

## Sizing of discharge pipes and stacks

COPSSW clause 4.3.3e: The discharge pipes serving the 2nd & 3rd storey (if no discharge pipe connections from the 2nd & 3rd storey, then the next 2 upper storeys of the building) shall be connected to the secondary discharge stack

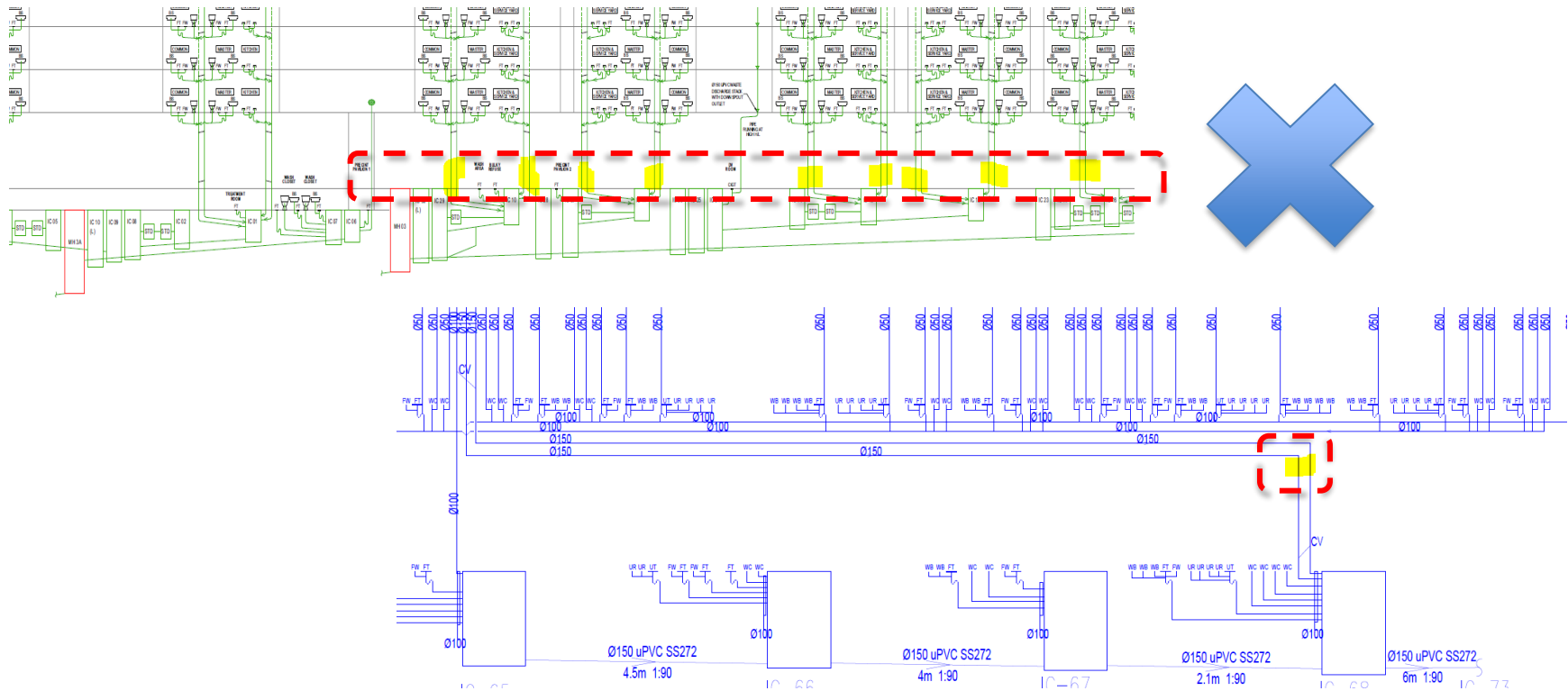


# Common Mistakes during Design Stage

## Provision of Cross Vents

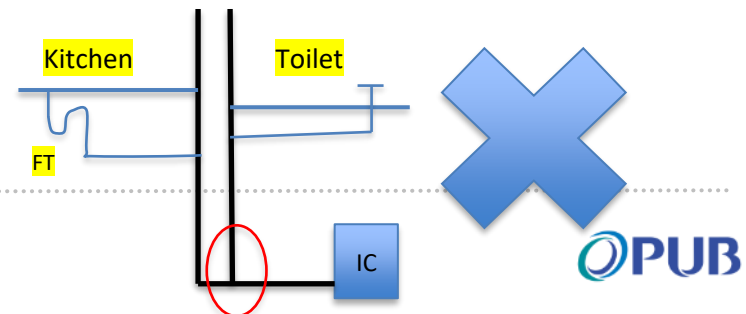
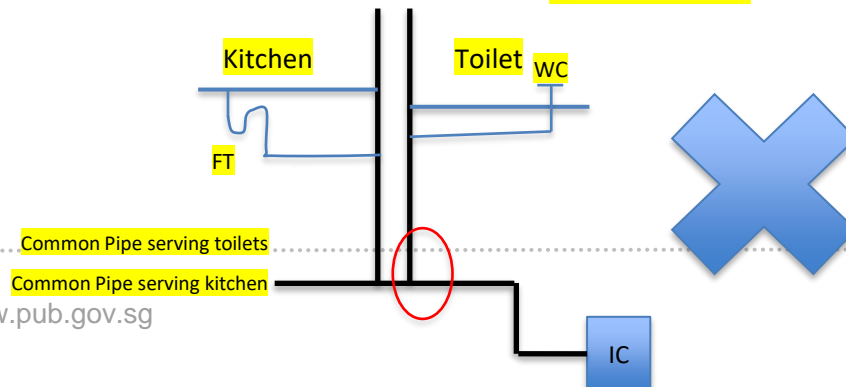
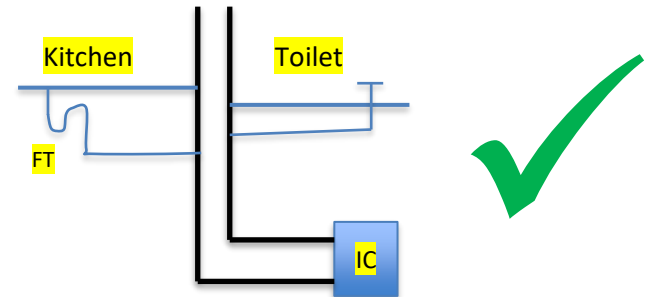
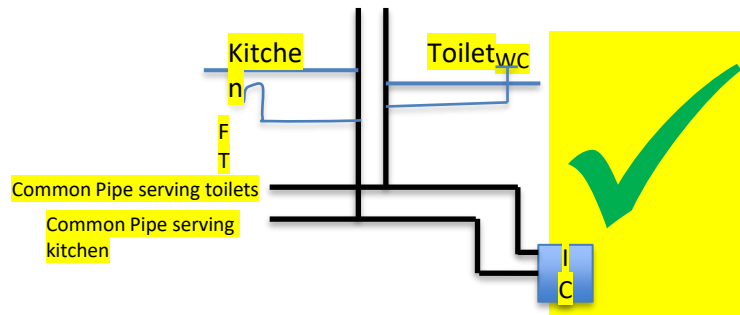
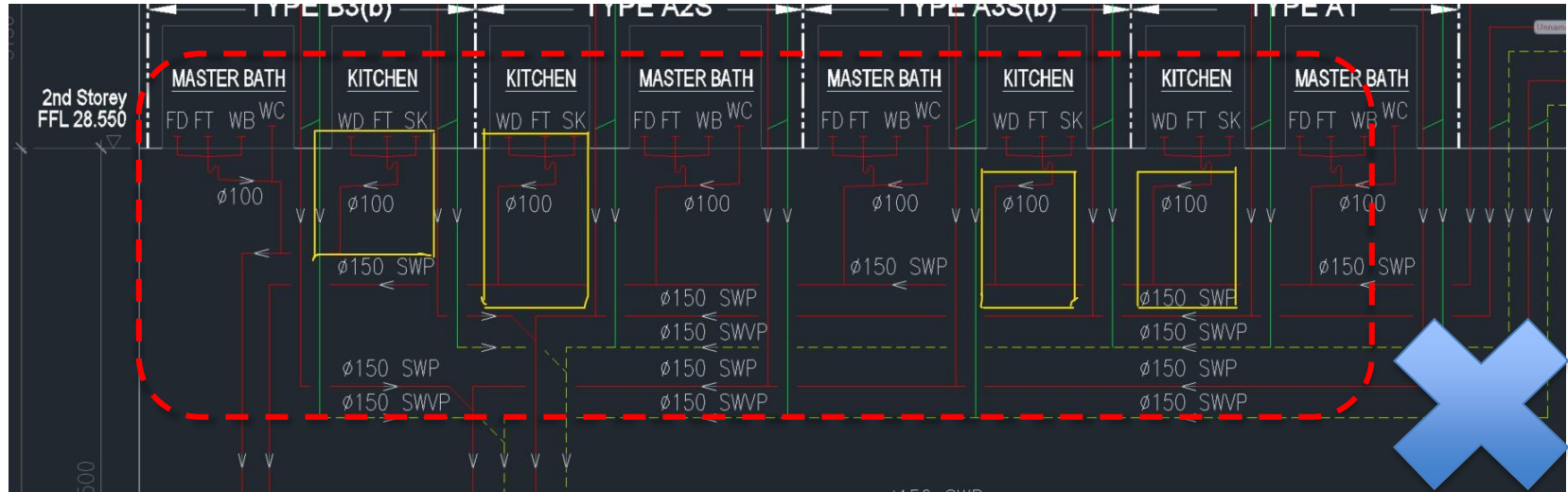
COPSSW clause 4.3.5dii : The cross-vents shall be installed at:

- 300mm above the ground floor level
- 225mm below the lowest discharge pipe connections
- The top of the ventilating stack at a level not less than 150mm above the spill over level of the highest sanitary appliance or floor trap whichever is the highest



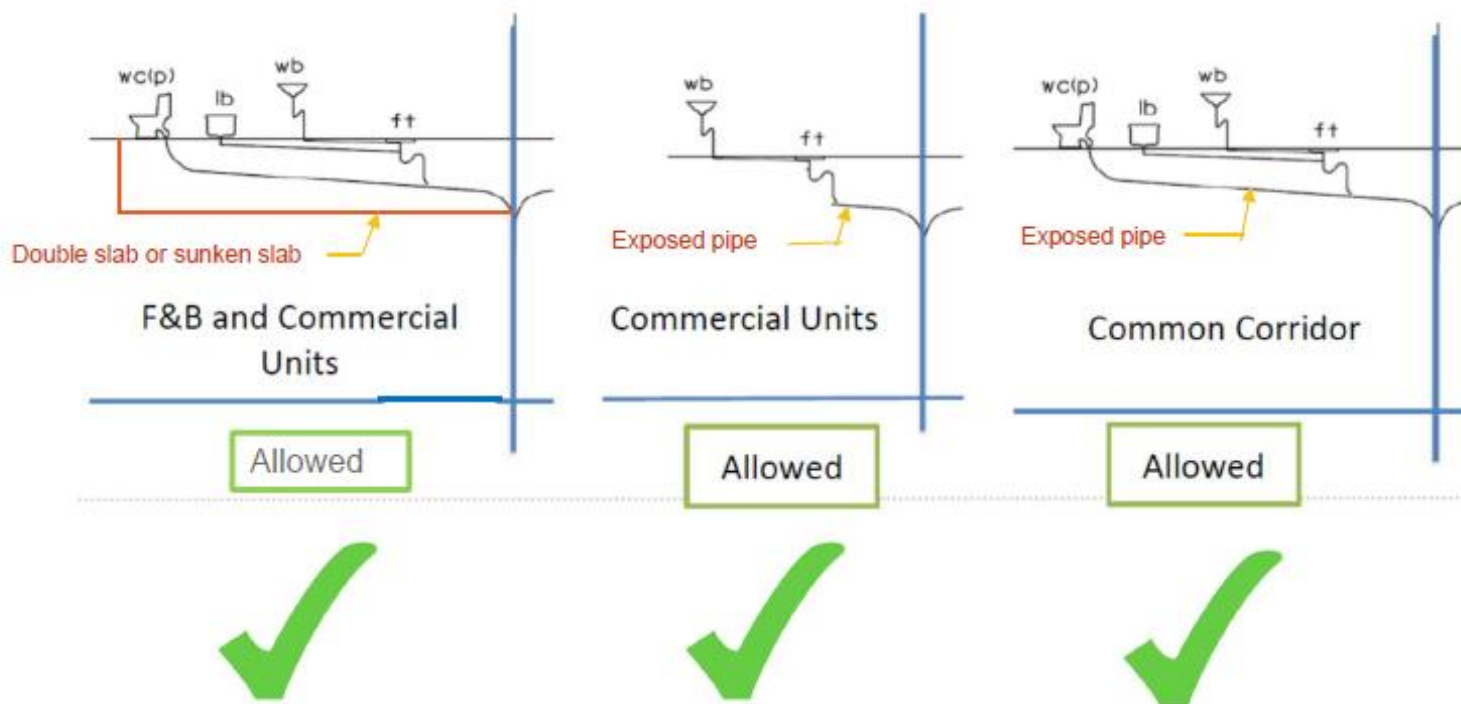
# Common Mistakes during Design Stage

FT serving kitchen sink shall not be connected to discharge stack/pipe receiving flow from toilet.



# Common Mistakes during Design Stage

## Acceptable designs for position of sanitary pipes



- The 1st sketch shows the overhanging pipe enclosed within a “double slab” or “sunken slab” in the F&B and commercial unit below.
- Not acceptable to PUB if the “double slab” or “sunken slab” is not a structural slab integrated with the building structure and it is not the official demarcation between upper and lower unit.
- Refer to next slides for the requirements of a “double slab” or “sunken slab”.

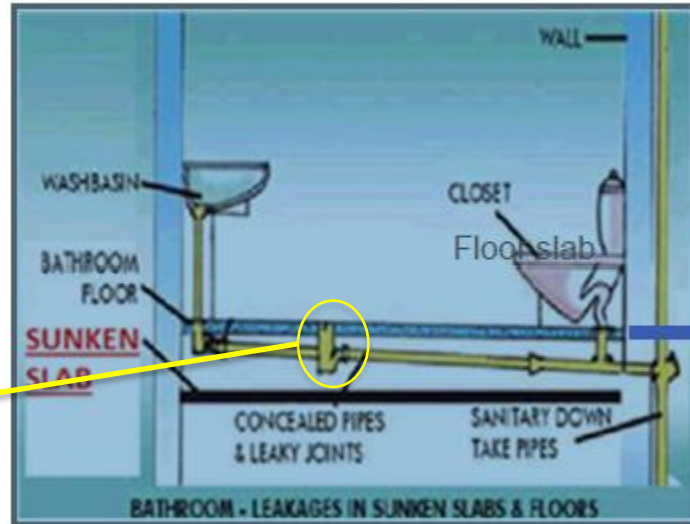
# Possible mitigation measures for position of sanitary pipes

## Recessed structural slab design:

### Case 1

- Sunken slab or double slab
- Pipe run inside floor cavity
- Pipe does not protrude into the floor below
- Acceptable to PUB

\*Floor trap(P-type) to be provided with two 45 deg bend before WC connection downstream.  
\* Shallow floor trap to be individually connected to the stack via a discharge pipe. Discharge pipe inter-connected with WC and shallow FT is not allowed.



- The sunken slab shall be a structural slab integrated with the building structure and it shall be the official demarcation between upper and lower unit.
- The owner of the upper unit or the MCST shall be responsible for the maintenance of the pipes and any water leakage problem at the sunken slab.
- Access openings to the pipes housed within the bathroom floor and sunken slab shall be provided either from the upper unit or common area.



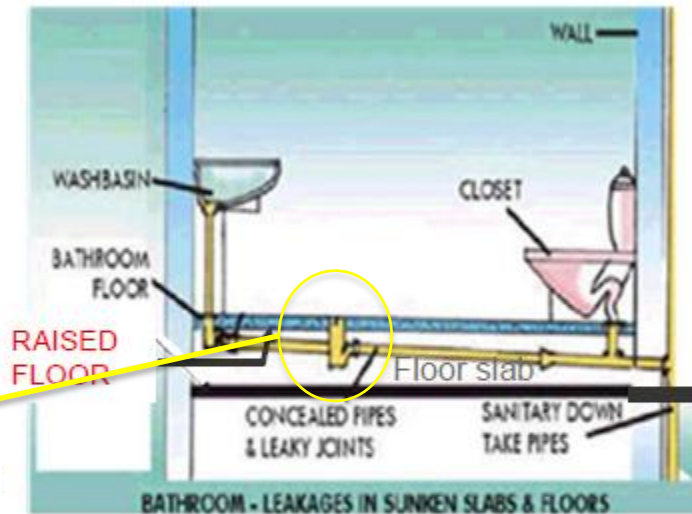
# Possible mitigation measures for position of sanitary pipes

## Raised toilet floor/platform design:

### Case 2

- Raised slab or double slab
- Pipe run within raised floor cavity
- Pipe does not protrude into the floor below

\*Floor trap(P-type) to be provided with two 45 deg bend before WC connection downstream.  
\* Shallow floor trap to be individually connected to the stack via a discharge pipe. Discharge pipe inter-connected with WC and shallow FT is not allowed.



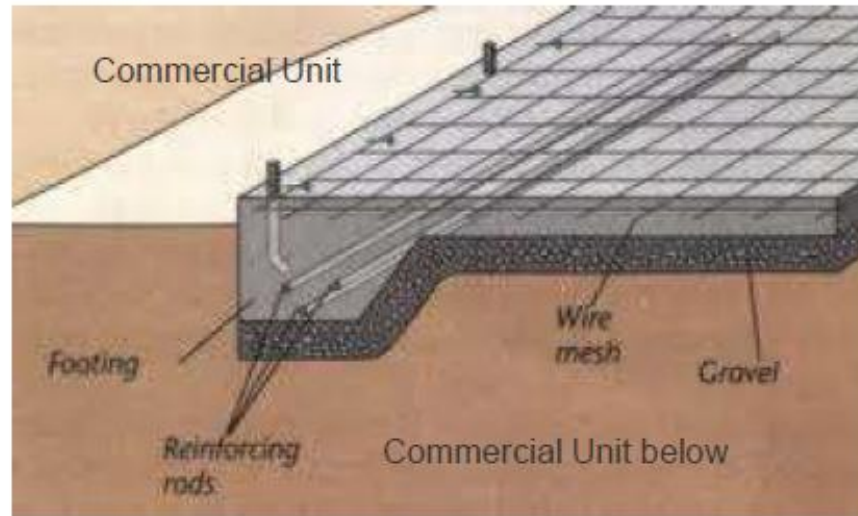
- The structural floor slab is the official demarcation between upper and lower unit.
- The owner of the upper unit shall be responsible for the maintenance of the pipes and for any water leakage problem at the structural floor slab.
- Access openings to the pipes housed within the bathroom floor and floor slab shall be provided from the upper unit.

# Possible mitigation measures for position of sanitary pipes

## Pipe trench design:

### Case 3

- Pipe trench
- Pipe run inside trench
- Pipe does not protrude into the floor below
- Acceptable to PUB



- The owner of the upper unit or the MCST shall be responsible for the maintenance of the pipes and any water leakage problem at the trench/slab
- Access openings to the pipes housed in the trench shall be provided either from the upper unit or common area.

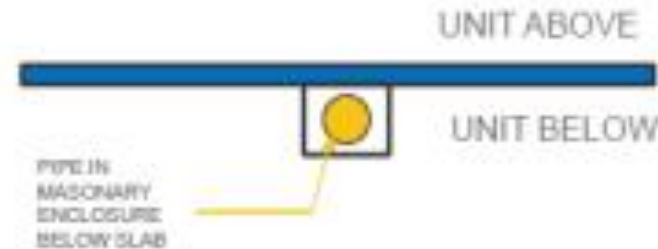
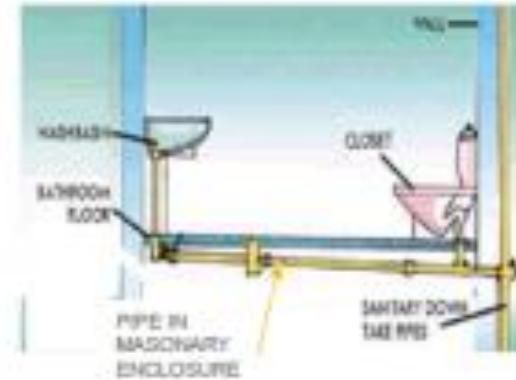


# Possible mitigation measures for position of sanitary pipes

## Not Acceptable Solution:

### Case 4

- Pipe in masonry enclosure
- The enclosure is in the floor below
- This is not considered a double slab
- NOT Acceptable to PUB



- The proposal above shows a duct attaching to the structural floor slab to conceal the overhanging pipes at the ceiling of the unit below.
- Not acceptable to PUB.

# Guidelines & Requirements

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## Useful Links

- Corresponding PUB Code of Practices can be found in the below link:  
<https://www.pub.gov.sg/Professionals/Resources/Code-of-Practices>
- Quick submission Guide can be accessed from the following link:  
<https://www.pub.gov.sg/Professionals/Requirements/Qualified-Persons/Quick-Submission-Guides>
- Standard designs, requirements, circulars relevant to used water (sanitary/sewerage matters) can be accessed from the following links:
- <https://www.pub.gov.sg/Professionals/Resources/Guides-and-Handbooks>, and  
<https://www.pub.gov.sg/Professionals/Resources/Circulars>





Thank You

