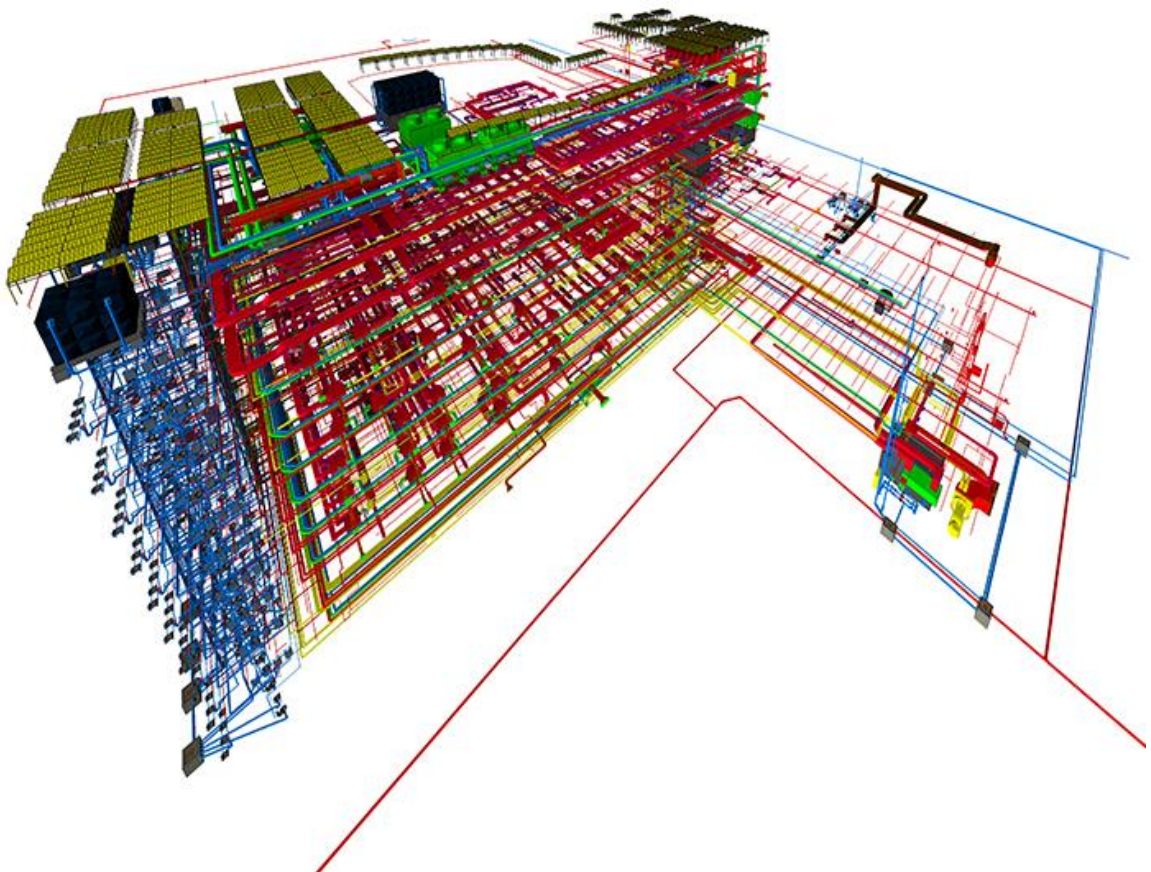


Code of Practice for Building Information Modelling (BIM) e-Submission

MECHANICAL, ELECTRICAL & PLUMBING (MEP) REQUIREMENTS



BCA acknowledges the leadership provided by the BIM Steering Committee in support of the production of the Code of Practice for Building Information Modelling (BIM) e-Submission.

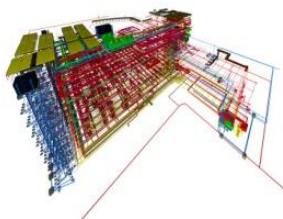
This Code of Practice (CP) has been prepared by the Centre for Construction IT on behalf of BCA and the BIM Steering Committee.

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BUILDING AND CONSTRUCTION AUTHORITY (BCA)

AGENCY - SPECIFIC REQUIREMENTS

1 BCA - CIVIL DEFENCE (CD) MECHANICAL AND ELECTRICAL PLANS IN PUBLIC SHELTERS

1.1 General Requirements

The Qualified Person (QP) shall familiarise with the *CD Technical Requirements (TR) for S1-S5 Public Shelters*, before preparing the respective CD ACMV System/ECS, Fire Protection System (FPS) and Water Supply, Sewerage and Drainage System (WSSDS) and CD Door Monitoring System (DMS) BIM submissions for Public Shelters. The submissions shall comprise native BIM full 3D models, 2D plans, sections & elevations and part 3D models and part 2D plans, sections & elevations, which are illustrative with details and dimensions, to show compliance with the CD Requirements. The level of detail and information shown in the 2D plans, sections and elevations shall be similar as that of traditional (2D) mechanical & electrical plan submissions. The submissions shall comprehensively cover important aspects of the shelters described in the following sections.

The QP shall consult the Civil Defence Shelter Engineering Department of BCA for clarification.

1.2 Air-Conditioning & Mechanical Ventilation (ACMV) System/ Environmental Control Systems (ECS)

1.2.1 Shelter Layout

A. Full BIM 3D Models

The 3D model shall show the entire CD shelter, CD modes of operation and include the following:

1. The whole ACMV/ ECS system, indicating clearly the ACMV/ ECS CD related rooms, equipment, accessories and, services routings. These shall include but are not limited to:
 - a) All ACMV/ ECS CD related plantrooms e.g. chiller plantroom, air handling unit (AHU) room and CD ancillary rooms, e.g. CD first aid room, CD pantry, etc.;

- b) CD related (dual purpose) equipment e.g. chillers, AHUs, pumps, electrical panels, control panels, etc., and CD related (dedicated) equipment, blast valves, etc.; and
- c) Services routings, sizes and setting-out from ceiling slabs and walls for ducts, pipes, cable trays, conduits, etc.

B. 2D Plans, Sections and Elevations generated from BIM Model

The 2D plans, sections and elevations shall illustrate clearly the following:

- a) General layout at all levels or space associated with the CD shelter.
- b) All ACMV/ ECS CD related plantrooms and ancillary rooms, locations, setting-out and performance capacities of CD related equipment, accessories, services sizes, layout and routings, and their supports;
- c) CD dry toilets; and
- d) All ACMV/ ECS CD related schematics and typical installation details.

C. Part BIM 3D Models

The Part 3D models shall show the ACMV/ ECS CD related rooms, equipment, accessories, services routings and their supports. These shall include but are not limited to:

- a) Plantrooms and ancillary rooms: Locations, layout and positioning of the CD related (dual purpose) e.g. AHUs, chillers, pumps, electrical panels, control panels, etc. and (dedicated) equipment, e.g. blast valves, 'dirty air' filters, etc. complete with their accessories and services, i.e. ducting, piping, cable trays, conduits, etc.;
- b) ACMV/ ECS services routing, e.g. ducts, pipes, cable trays, conduits, etc. complete with their supports; and
- c) CD dry toilets.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions and performance capacities of CD related equipment, accessories, services and their supports from ceilings, walls and floors;
- b) Operation and Maintenance access and clearance spaces for CD related equipment and services; and
- c) Services penetrations through floor and wall openings: Locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

1.3 Water Supply, Sewerage and Drainage Systems (WSSDS) and Fire Protection Systems (FPS)

1.3.1 Shelter Layout

A. Full BIM 3D Model

The 3D model shall show the entire CD shelter, CD modes of operation and shall include the following:

- a) The whole WSSDS and FP Systems indicating clearly the WSSDS CD related rooms, equipment, accessories and services routings. These shall include but are not limited to:
 - i. All WSSDS and FPS CD related plantrooms e.g. water distribution control room, ejector pump room, drainage pump room, etc. and CD ancillary rooms e.g. CD first aid room, CD pantry, etc.;
 - ii. All WSSDS CD dedicated drinking water pumps, etc.;
 - iii. WSSDS CD services routings, sizes and setting-out from ceiling slabs and walls for pipes, cable trays, trunkings, conduits, etc.; and
 - iv. All FPS CD related equipment, viz. isolation valves, removable short pipe section complete with quick coupling end caps and straps.

B. Full BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations shall illustrate clearly the following: -

- a) General layout at all levels or space associated with the CD shelter;
- b) All WSSDS and FPS CD related plantrooms and ancillary rooms, CD WSSDS related equipment and their performance capacities, accessories, services sizes, layout, setting-out and routings and their related supports; and
- c) CD dry toilets.

C. Part BIM 3D Model

The Part 3D model shall show the WSSDS CD related rooms, equipment, accessories and services routings. These shall include but are not limited to:

- a) Plantrooms and ancillary rooms: Locations, layout and positioning of the CD related equipment complete with their accessories and services, i.e. piping, cable trays, conduits, etc.;
- b) WSSDS and FPS services routings; and
- c) CD dry toilets.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions and performance capacities of CD related equipment, accessories, services and supports from ceilings, floors and walls;
- b) Operation and Maintenance access and clearance spaces for CD related-equipment and services; and
- c) Services penetrations through floor and wall openings: Locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

1.4 Electrical Power System (ELECT), Communications System (COMMS) and CD Door Monitoring System (DMS)

1.4.1 Shelter Layout

A. Full BIM 3D Models

The 3D model shall show the entire CD shelter and include the following:

- a) The whole ELECT, COMMS and CD DMS systems indicating clearly the CD related rooms, equipment, accessories and services routings. These shall include but are not limited to:
 - i. All CD related plant rooms, e.g. generator room, switch rooms, closets, etc.;
 - ii. CD related equipment, e.g. generator system, switchboards, communication system panels, etc.; and
 - iii. Services routings, sizes, spacings and setting-out from ceilings and walls i.e. cable trays, trunkings, conduits, fuel and vent pipes, exhaust pipes, etc.

B. Full BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations shall illustrate clearly the following:

- a) General layout at all levels or space associated with the CD shelter;
- b) All CD related plant rooms and ancillary rooms, locations, setting-out and performance capacities of CD related equipment, accessories and services sizes, layout and routings and their supports; and
- c) All CD related single line diagrams, schematics and typical installation details.

C. Part BIM 3D Models

The Part 3D model shall show the CD related rooms, equipment, accessories and services routings. These shall include but are not limited to:

- a) Plant rooms and ancillary rooms: Locations, layout and positioning of the CD related equipment, e.g. generator system, switchboards, communication system panels, etc, complete with their accessories and services, i.e. cable trays, trunkings, conduits, fuel and vent pipes, exhaust pipes, etc.; and
- b) Services routings, e.g. cable trays, trunkings, conduits, fuel and vent pipes, exhaust pipes, etc.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions and performance capacities of CD related equipment, accessories, services and their supports from ceilings, walls and floors;
- b) Operation and maintenance access and clearance spaces for CD related equipment and services; and
- c) Services penetrations on floor and wall openings, locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

2 BCA - CIVIL DEFENCE (CD) MECHANICAL AND ELECTRICAL PLANS IN TRANSIT SHELTERS

2.1 General Requirements

The Qualified Person (QP) shall familiarise himself with the CD Technical Requirements (TR) for S10 to S29 Public Shelters or CD Shelter Requirements for MRT Stations, whichever is applicable, before preparing the respective CD Environmental Control Systems (ECS), Water Supply, Sewerage and Drainage Systems (WSSDS), Fire Protection Systems (FPS), Electrical Power System (Elect), Communications System (Comms), CD Door Monitoring System (DMS) and CD Equipment Monitoring System (EMS) BIM submissions for Transit CD shelters. The submissions shall comprise native BIM full 3D models, 2D plans, sections and elevations and part 3D models and part 2D plans, sections and elevations, which are illustrative with details and dimensions, to show compliance with the CD requirements. The submissions shall comprehensively cover important aspects of the shelter described in the following sections:

2.2 Environmental Control Systems (ECS)

2.2.1 Shelter Layout

A. Full BIM 3D Models

The 3D model shall show the entire CD shelter, CD modes of operation and include the following:

- a) The whole ECS system, indicating clearly the ECS CD related rooms, equipment, accessories and, services routings. These shall include but are not limited to:
 - i. All ECS CD related plantrooms e.g. chiller plantroom, air handling unit (AHU) room, etc. and CD ancillary rooms, e.g. CD first aid room, CD pantry, etc.;
 - ii. CD related (dual purpose) equipment e.g. chillers, AHUs, pumps, electrical panels, control panels, etc., and CD related (dedicated) equipment, e.g. blast valves, gas filters, etc.; and
 - iii. Services routings, sizes and setting-out from ceiling slabs and walls for ducts, pipes, cable ladders, trays, conduits, etc.

B. Full BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned 3D models shall illustrate clearly the following:

- a) General layout at ground level, concourse, platform and any other level or space associated with the CD shelter, such as mezzanine floors and subway connections;
- b) All ECS CD related plantrooms and ancillary rooms, locations, setting-out and performance capacities of CD related equipment, accessories, services sizes, layout and routings, and their supports;
- c) Permanent toilets e.g. male toilets, female toilets, etc. and CD dry toilets; and
- d) All ECS CD related schematics and typical installation details.

C. Part BIM 3D Models

The Part 3D models shall show the ECS CD related rooms, equipment, accessories, services routings and their supports. These shall include but are not limited to:

- a) Plantrooms and ancillary rooms: Locations, layout and positioning of the CD related (dual purpose) e.g. chillers, AHUs, pumps, electrical panels, control panels, etc. and CD related (dedicated) equipment, e.g. blast valves, gas filters, etc. complete with their accessories and services, i.e. ductings, pipings, cable trays, conduits, etc.;
- b) ECS services routing, e.g. ducts, pipes, cable trays, conduits, etc.; and
- c) Permanent toilets and CD dry toilets.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions, positioning and performance capacities of CD related equipment, accessories, services and their supports from ceilings, walls and floors;
- b) Operation and Maintenance access and clearance spaces for CD related equipment and services; and
- c) Services penetrations through floor and wall openings: Locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

2.3 Water Supply, Sewerage and Drainage Systems (WSSDS) and Fire Protection Systems (FPS)

2.3.1 Shelter Layout

A. Full BIM 3D Model

The 3D model shall show the entire CD shelter, CD modes of operation and shall include the following:

- a) The whole WSSDS and FPS systems, indicating clearly the WSSDS and FPS CD related rooms, equipment, accessories and services routings. These shall include but are not limited to the following:
 - i. All WSSDS and FPS CD related plantrooms e.g. water distribution control room, ejector pump room, drainage pump room, sprinkler pump room, etc. and CD ancillary rooms e.g. CD first aid room, CD pantry, etc.;
 - ii. All WSSDS CD dual purpose and dedicated drinking water pumps, UV purifier, etc., and all FPS CD related equipment viz. isolation valves and removable short pipe section complete with quick coupling end caps; and
 - iii. WSSDS and FPS CD services routings, sizes and setting-out from ceiling slabs and walls for pipes, cable ladders, trays, trunkings, etc.

B. Full BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations shall illustrate clearly the following:

- a) General layout at ground level, concourse, platform and any other level or space associated with the CD shelter, such as mezzanine floors and subway connections;
- b) All WSSDS and FPS CD related plantrooms and ancillary rooms, CD WSSDS related equipment and their performance capacities, accessories, layout, setting-out and service sizes and routings and their related supports; and
- c) CD permanent toilets (e.g. male and female toilets) and CD dry toilets.

C. Part BIM 3D Model

The Part 3D model shall show the FPS and WSSDS CD related rooms, equipment, accessories and services routings. These shall include but are not limited to:

- a) Plantrooms and ancillary rooms: Locations, layout and positioning of the CD related equipment complete with their accessories and services, i.e. piping, cable trays, conduits, etc.;
- b) FPS and WSSDS services routings; and
- c) Permanent toilets and CD dry toilets.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions, positioning and performance capacities of CD related equipment, accessories, services and their supports from ceilings, floors and walls;
- b) Operation and Maintenance access and clearance spaces for CD related equipment and services; and
- c) Services penetrations through floor and wall openings: Locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

2.4 Electrical Power System (Elect), Communications System (Comms), CD Door Monitoring System (Dms) And Equipment Monitoring System (Ems)

2.4.1 Shelter Layout

A. Full BIM 3D Models

The 3D model shall show the entire CD shelter and include the following:

- a) The whole ELECT, COMMS, DMS and EMS systems, indicating clearly the CD related rooms, equipment, accessories and services routings. These shall include but are not limited to the following:
 - i. All CD related plantrooms, e.g. emergency main switchroom, distribution board room, generator room, and ancillary rooms e.g. CD first aid room, CD pantry, etc.;
 - ii. CD related (dual purpose) equipment, e.g. electrical panels, control panels, etc. and CD related (dedicated) equipment e.g. generator system, emergency main switchboards, etc.; and
 - iii. Services routings, sizes, spacings and setting-out from ceilings and walls i.e. cable ladders, trays, trunkings, generator exhaust pipes, fuel in-fill and vent pipes, etc.

B. Full BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations shall illustrate clearly the following:

- a) General layout at ground level, concourse, platform and any other level or space associated with the CD shelter, such as mezzanine floors and subway connections;
- b) All CD related plantrooms and ancillary rooms, locations, setting-out and performance capacities of CD related equipment, accessories and services sizes, layout and routings and their supports; and
- c) All CD related schematics and typical installation details.

C. Part BIM 3D Models

The Part 3D models shall show the CD related rooms, equipment, accessories and services routings. These shall include but are not limited to the following:

- a) Plantrooms and ancillary rooms: Locations, layout and positioning of the CD related (dual purpose) equipment, e.g. electrical panels, control panels, etc. and CD related (dedicated) equipment e.g. generator system, emergency main switchboard, etc. complete with their accessories and services, i.e. cable ladders, trays, trunkings, generator exhaust pipes, fuel in-fill and vent pipes, etc.; and
- b) Services routings, e.g. cable ladders, trays, trunkings, generator exhaust pipes, fuel in-fill and vent pipes, etc.

D. Part BIM 2D Plans, Sections and Elevations

The 2D plans, sections and elevations of the above-mentioned Part 3D models shall illustrate clearly the following:

- a) Locations, clear dimensions, positioning and performance capacities of CD related equipment, accessories, services and their supports from ceilings, walls and floors;
- b) Operation and Maintenance access and clearance spaces for CD related equipment and services; and
- c) Services penetrations through floor and wall openings, locations, sizes and types of sealing devices e.g. multi-cable transits (MCTs), puddle flanges, etc.

CITY GAS PTE LTD

3 CITY GAS SUBMISSION REQUIREMENTS

3.1 General Requirements

This document provides the general guidelines for professional engineers and licensed gas service workers to comply when they submit BIM model to City Gas. The professional engineers/ licensed gas service workers shall ensure the design of the gas installation and all gas service works carried out on the gas installation comply with the requirements and provisions of the latest revision of the following:

- The Gas Act (Cap 116A);
- The Gas (Supply) Regulations
- The Gas Supply Code
- Singapore Standard, SS 608, Code of Practice for Gas Installation
- City Gas Handbook on Gas Supply
- Any other relevant rules, regulations and Codes of Practice

CityGas Submission Documents

2D Views	BIM Model
<ul style="list-style-type: none"> • Site and location plan • Notes and legend page • Schematic drawing • Typical detail drawing 	<ul style="list-style-type: none"> • Floor plans generated from BIM model • Part 3D Model

A. 2D Views

Each submission plan shall bear the declaration on the right side column of the layout sheet. A blank space of 90 mm (w) x 60 mm (h) shall be provided on the right side column for City Gas internal use. Please refer to City Gas Handbook on Gas Supply for Designated Representative's declaration required by City Gas.

The submission of plans for approval by Designated Representative shall consist of the following plans:

1. Site and Location Plan

Location Plan

- Location plan with the development boundary line highlighted in red.

Site Plan

- Plan shall prepare at a scale of 1:500 or 1:1000;
- Highlight the development boundary line in red;
- Plan shall have grid lines and dimension indicated;
- Plan shall show the specifications of pipe installation; and
- Indicate the location of gas connection.

Fig. 1 - Example: Site Plan

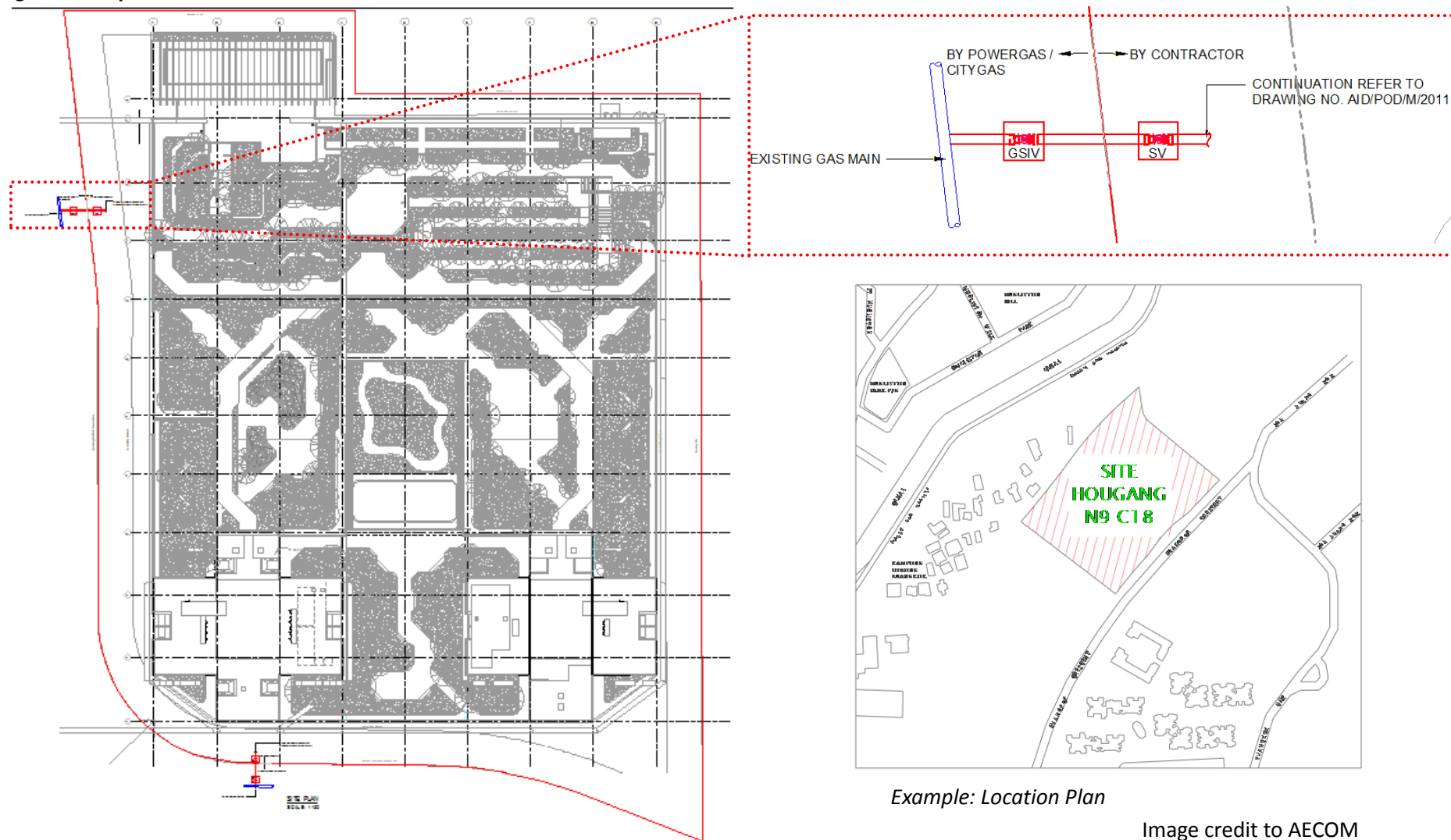


Fig. 3 - Example: Plans generated from BIM Model

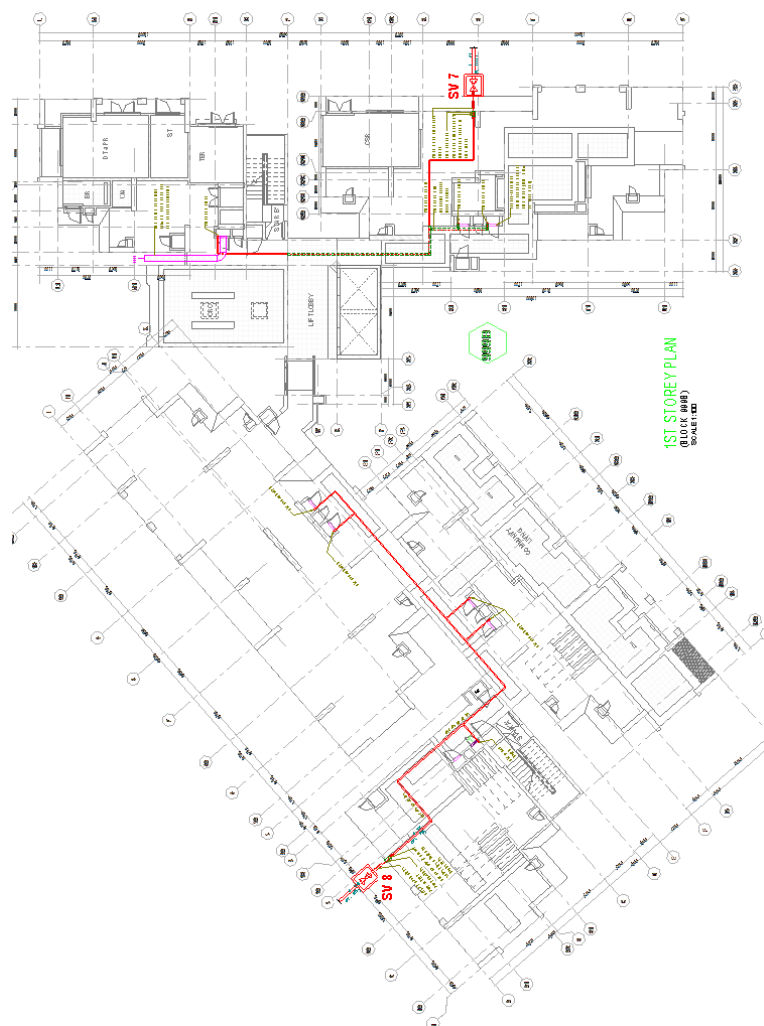


Fig. 4 - Example: Part 3D BIM Model



Image credit to UPC

C. File Deliverable Requirements

Submission plans must be saved in BIM format (Please refer to <Submission Format Summary> of this document). Each plan shall be submitted individually in its own file.

D. Resubmission/amendment submission

For resubmission/amendment submission, Designated Representative is required to submit only the deviated plans for approval.

E. As-built submission

As-built plans inclusive of line diagram for the installation are to be submitted together with the application for final pressure test. The as-built plans which show the actual pipe installation have to be endorsed by the Designated Representative responsible for the installation. The Designated Representative shall submit one set of as-built plan to owner.

F. Pipe materials and sizes used for gas installation

The table below shows the pipe materials and sizes commonly used for gas installation.

Material (Standards)	Size (mm)	Types of Joints (Standards)
Polyethylene pipes	32, 63, 125, 180, 250, 315	Butt fusion Electrofusion joint
Ductile iron pipes	100, 150, 200, 300	Bolted gland joint
Galvanised iron pipes (seamless & heavy gauge type)	20, 25, 32, 40, 50, 80, 100	Threads joint (Below 100mm diameter) Flange joint (100mm diameter and above)
Steel pipes (Seamless type)	20, 25, 32, 40, 50, 80, 100, 150, 200, 300	Welded joint
Copper pipes (seamless & half hard type)	15, 22, 28	Compression joint Capillary joint

INFO-COMMUNICATIONS MEDIA DEVELOPMENT AUTHORITY (IMDA)

4 IMDA TELECOMMUNICATION FACILITY CO-ORDINATION COMMITTEE SUBMISSION REQUIREMENT (IDA TFCC SUBMISSIONS)

4.1 General Requirements

The documents to be submitted shall meet the requirements specified under chapter 3 of the Code of Practice for Info-communication Facilities in Buildings (**COPIF**). The plans shall contain but not limited to the sectional and elevation drawings of the building. All dimensions and grids shall be indicated clearly on the plans.

IDA-TFCC Submission Documents

2D View	BIM Model
<ul style="list-style-type: none"> • Site and location plan • Notes and legend page • Schematic drawing 	<ul style="list-style-type: none"> • Main Distribution Frame (MDF Room) • Telecommunication Equipment Room (TER) • Telecommunication Risers • Floor plans generated from BIM model

A. 2D Views

1. Site and Location Plan

The plans shall contain the following:

Site Plan

- The means of access to the site and to the perimeter of each building;
- Distances between buildings and/or structures; and
- The existing (if any) and proposed underground telecommunication system at the site.

Location Plan

- The location of the lot relative to its neighboring lots; and
- The various roads constituting the access layout to the lot.

Fig. 5 - Example: Site Plan

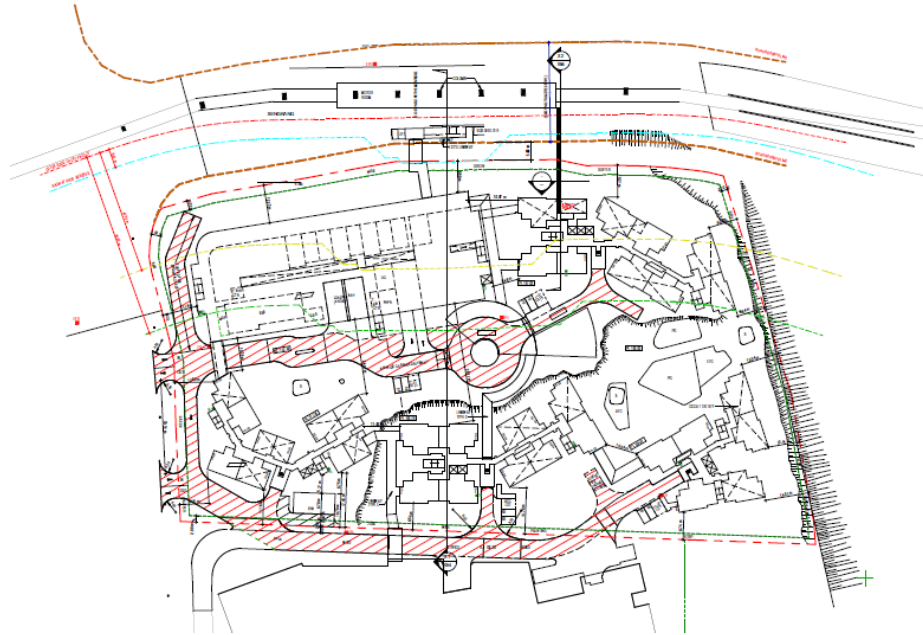


Fig. 6 - Example: Location Plan

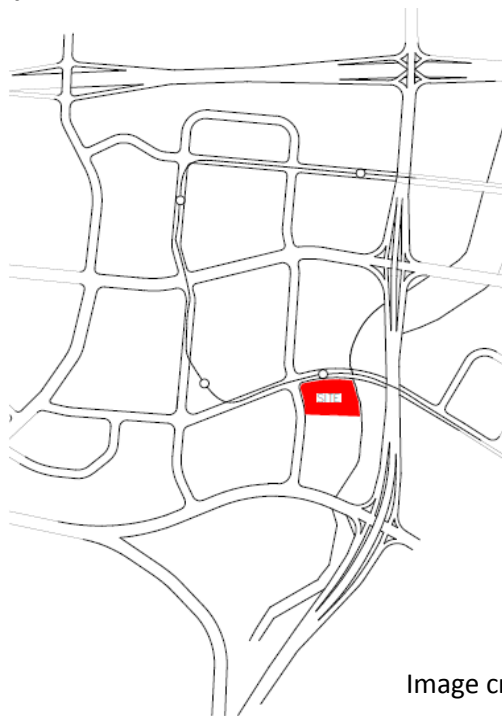


Image credit to Surbana Jurong

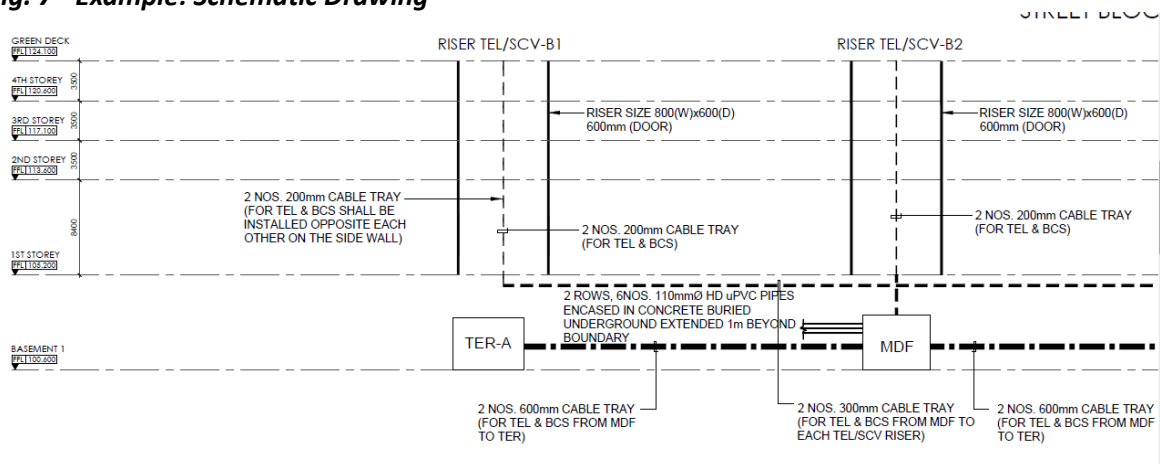
Fig. 7 - Example: Schematic Drawing

Image credit to Rankine&Hill

B. BIM Models and Plans Generated from BIM Models

1. Plans Generated from BIM Models

Model/Plans to be submitted to IDA TFCC to include lead-in pipes, main distribution frame (**MDF**) room, and telecommunication equipment room (**TER**), telecommunication risers and residential units or tenant premises shall include the following:

- Dimensions and the location of the lead-in pipes including the depth which the lead-in pipes is to be located;
- Dimensions of the MDF and TER rooms (i.e. length, breadth and height);
- Dimensions of the telecommunication riser (i.e. width and depth) and the location, size of the metal cable trays to be provided on the depth sides of the telecommunication risers;
- The layout plan and model for every floor highlighting the location and height of respective telecommunication points, i.e. TV points, telephone points, data points, fibre termination points, etc.; and
- Colour codes (Red) all the telecommunication risers.

2. Part 3D BIM Model

QPs shall provide part 3D BIM model. The part 3D BIM Model shall indicate the following:

a) Main Distribution Frame room or Telecommunication Equipment Room

- i. Location of the door into the MDF or TER room and louvers for ventilation. Where central air-conditioning is provided, the height of the air-conditioning ducting shall be indicated;
- ii. If a column is allowed to be located at any corner of the MDF or TER room, this is to be indicated inside the model; and
- iii. If a beam is allowed to be located at a height of higher than 3.5m in the MDF or TER room, this is to be indicated inside the model

Fig. 8 - Example: Part 3D MDF Room with lead in pipe

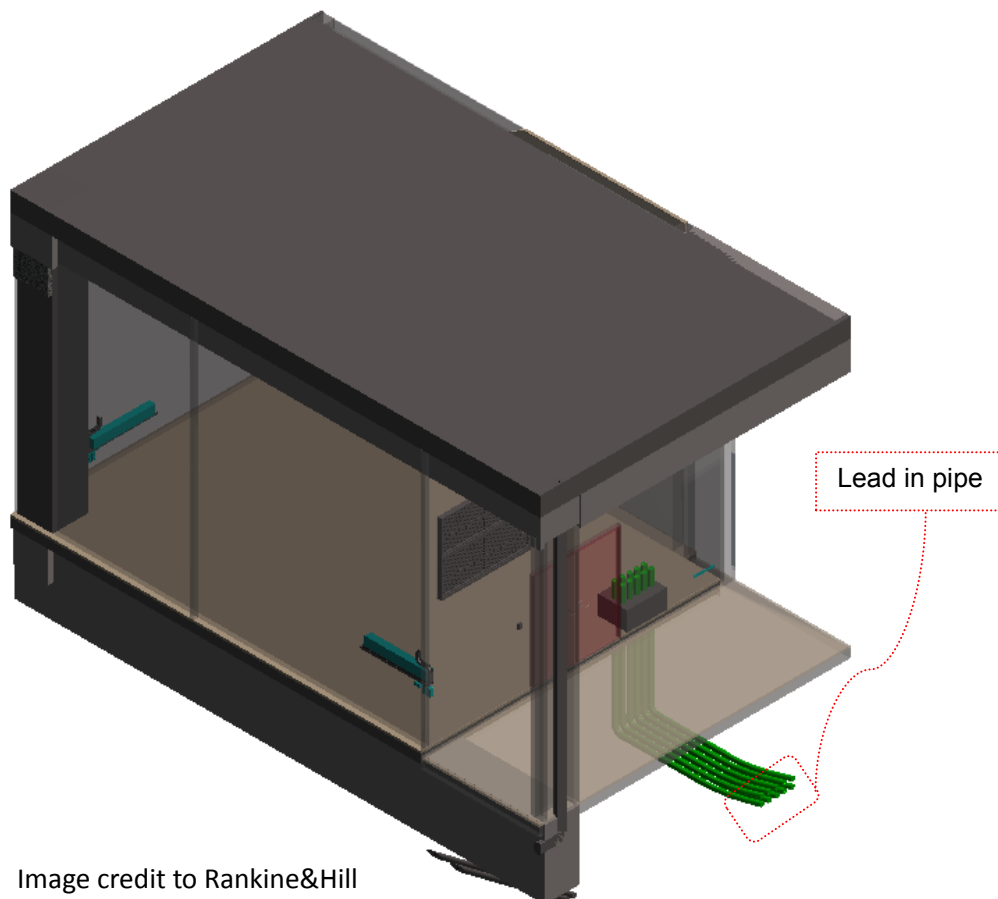


Image credit to Rankine&Hill

b) Telecommunication Risers

Location of cable trays, distribution boxes or frames, equipment, etc.

NATIONAL ENVIRONMENT AGENCY (NEA)

5 NEA - CENTRAL BUILDING PLAN DEPARTMENT AND PUB-WATER RECLAMATION (NETWORK) DEPARTMENTSUBMISSION REQUIREMENT (NEA-CBPD AND PUB-WRN)

The individual section below covers the specific presentation requirements necessary for each of the drawing views submitted to CBPD and PUB at the various stages below:

- Detailed Plan on Sanitary Works (for Sanitary Plumbing & Drainage System/ Sewer Connection)
- As-built Plan for TOP/CSC – Sanitary Works (Sanitary Plumbing & Drainage System/ Sewer Connection)

5.1 General Requirements for all CBPD/ PUB-WRN Submissions

QPs are to take note of the requirements below for all CBPD/ PUB-WRN submission:

- a) Site Plan: Include the connection to main pipe
- b) Key plan/Location plan to show surrounding site and location

5.2 Detailed Plan on Sanitary Works (for Sanitary Plumbing & Drainage System/ Sewer Connection)

A. Site Plan View

In specific, all key plan and site plan of sanitary plumbing and drainage system or sewer connection shall show the following:

1. Key Plan

- a) Boundary of development site shall be edged RED; and
- b) Outline of neighbouring development plots or buildings within 1km radius shall be shown.

2. Site Plan

- a) Layout of the site with boundary lines verged in RED.
- b) Outline of building or structure

- c) Sewer connection and its pipe size, the invert and top levels of last inspection chamber and the connecting manhole;
- d) Existing or proposed sewer or pumping main and their setback distance from building or structures, pipe sizes, invert and top levels of manholes;
- e) Reinforced concrete trench with removable slabs (annotated on the plan) for existing or proposed sewer under building or structures or with insufficient setback from building or structures; and
- f) Provision of or existing pump sump or holding tank or sewage treatment plant.

B. Floor Plan View

In specific, the basement, 1st storey and higher storey floor plan of sanitary plumbing and drainage system or sewer connection shall show the following:

1. Basement Plan

- a) All sanitary appliances or fittings and internal sanitary plumbing and drainage system connected to the 1st storey inspection chambers or the sewerage system;
- b) Pipe sizes, gradients, materials, invert and top levels of the sumps/chambers and inspection chambers;
- c) Declaration of all pipe sizes and materials used for sanitary appliances (e.g. discharge pipe, urinal pipe, vent pipe, discharge stack, etc.);
- d) Provision of Sewerage pumping system;
- e) Eating establishments/food shops and its kitchen or food preparation areas and grease trap or sewage diverter, if any;
- f) Potable water tank;
- g) Overhead sanitary pipes in food shops' kitchens or potable water tank;
- h) Toilets/sanitary facilities, refuse chutes, and washing areas; and
- i) Platform levels.

2. First Storey Plan

- a) All sanitary appliances or fittings or soil and vent stack(s) and their connection to inspection chambers;
- b) Internal sanitary drainage system and its connection to existing or proposed sewer or manhole;
- c) Pipe sizes, gradients, materials, invert and top levels of the sumps/chambers and inspection chambers;
- d) Declaration of all pipe sizes and materials used for sanitary appliances (e.g. discharge pipe, urinal pipe, vent pipe, discharge stack, etc.);

- e) Double floor slab (including access opening) for sanitary pipes sited over bedroom, living room, dining room and kitchen area;
- f) Reinforced concrete trench with removable slabs (annotated on the plan with width and length dimension) for existing or proposed sewer under building or structures or with insufficient setback from building or structures;
- g) Existing & proposed sewer or pumping main and their sizes, setback from building or structure;
- h) Invert and top levels of all the manholes including the connecting manhole(s);
- i) Adjacent lot and existing sewer/sanitary drainlines from adjacent lots,
- j) Provision of pump sump or holding tank or sewage treatment plant.
- k) Eating establishments/food shops and its kitchen or food preparation areas and grease trap or sewage diverter, if any;
- l) Potable water tank;
- m) Overhead sanitary pipes in food shops' kitchens or potable water tank;
- n) Toilets/sanitary facilities refuse chutes/bin centres, and washing areas;
- o) Existing sanitary drainlines that would be retained;
- p) Proposed ramp, boundary fence or walls;
- q) Length of branch drainline from WC to the Inspection Chamber; and
- r) Platform levels.

3. Second Storey to Highest Storey Plan

- a) All sanitary appliances or fittings or soil and vent stack(s) and internal sanitary plumbing and drainage system;
- b) Eating establishments/food shops and its kitchen or food preparation areas and grease trap or sewage diverter, if any;
- c) Overhead sanitary pipes in food shops' kitchens or potable water tank;
- d) Toilets/sanitary facilities, refuse chutes/bin centres and washing areas;
- e) Length of WC's discharge pipe to the discharge stack; and
- f) Double floor slab (including access opening) for sanitary pipes sited over bedroom, living room, dining room and kitchen area.

C. Roof Plan View

In specific, the roof plan of sanitary plumbing and drainage system or sewer connection shall show the following:

- a) Termination of sanitary ventilation stacks;
- b) Roof garden and window openings of penthouse units (indicated with distance from the ventilation stack to the window opening); and
- c) Potable water tank, if any.

D. Schematic Diagram for Sanitary Plumbing and Drainage system

In specific, the schematic diagram of sanitary works shall show all the sanitary plumbing and drainage system in the premises.

E. Elevation View

In specific, the elevation view of sanitary plumbing and drainage system or sewer connection shall show the following:

- a) Sanitary plumbing and drainage system within the premises connected to the sewerage system;
- b) Sewer connection and its pipe size, the last inspection chamber and the connecting manhole;
- c) Pipe size and invert or top levels of existing or proposed sewer or pumping main, and the setback distance from building or structures;
- d) Reinforced concrete trench with removable slabs (with width and depth dimension);
- e) Pump sump, sewage ejector tank, holding tank or sewage treatment plant.
- f) Building height;
- g) Sewer setback from building or structures; horizontal and vertical clearance distances between the building or structure/substructure and the sewers or pumping mains;
- h) Headroom for overhanging structures or roof eaves above existing or proposed sewer or pumping main;
- i) Proposed ramp, boundary fence or walls;
- j) Potable water tank; and
- k) Height of stack terminated on roof/roof garden.

5.3. As-built Plan for TOP/CSC – Sanitary Works (Sanitary Plumbing & Drainage System/ Sewer Connection)

A. Site Plan View

In specific, all key plan and site plan of TOP/CSC sanitary works with deviations shall show the following:

1. Key Plan

- a) Boundary of development site shall be edged RED; and
- b) Outline of neighbouring development plots or buildings within 1km radius shall be shown.

2. Site Plan

- a) Layout of the site with boundary lines verged in RED;
- b) Outline of building or structure;
- c) Sewer connection and its pipe size, material, the invert and top levels of last inspection chambers and the connecting manhole;
- d) Existing sewer or pumping main and their setback distance from building or structures; pipe sizes, invert and top levels of manholes including the connecting manholes;
- e) Sewer and Manhole ID for existing sewer/pumping main;
- f) Abandoned sewers/pumping mains;
- g) Reinforced concrete trench with removable slabs (annotated on the plan) for existing or proposed sewer under building or structures or with insufficient setback from building or structures;
- h) New sewer or diversion and their setback from building or structure, adjacent lot, Drainage Reserve, and Road Reserve;
- i) Provision of pump sump or holding tank or sewage treatment plant; and
- j) Party maintaining.

B. Floor Plan View

In specific, the basement, 1st storey and higher storey floor plan of TOP/CSC sanitary works with deviations shall show the following:

1. Basement Plan

- a) All sanitary appliances or fittings and internal sanitary plumbing and drainage system connected to the 1st storey inspection chambers or the sewerage system;
- b) Pipe sizes, gradients, materials, invert and top levels of the sumps/chambers and inspection chambers;
- c) Toilets/sanitary facilities, refuse chute chambers, car washing bays and garage gully;
- d) Sewerage pumping system;
- e) Platform levels;
- f) Eating establishments/food shops and its kitchen or food preparation areas and grease trap or sewage diverter, if any;
- g) Potable water tank (if any); and
- h) Overhead sanitary pipes in food shops' kitchens or potable water tank.

2. First Storey Plan

- a) Platform levels;
- b) All sanitary plumbing and drainage system and their pipe size, gradients, materials within the premises connected to the sewerage system, sewer connection and its pipe size, the top and invert levels of all inspection chambers and the connecting manhole, invert levels of backdrop connection pipes to inspection chamber/manhole;
- c) All sanitary appliances or fittings or sanitary plumbing system (soil and vent stacks) and their connection lines to inspection chambers;
- d) Declaration of all pipe sizes and materials used for sanitary appliances (e.g. discharge pipe, urinal pipe, vent pipe, discharge stack, etc.);
- e) Double floor slab (including access opening) for sanitary pipes sited over bedroom, living room, dining room and kitchen area;
- f) Sanitary facilities or toilets; refuse chutes/bin centres and washing areas;
- g) All existing or new sewers, diversion sewers or pumping mains and their sizes, gradients, and setback distances from building or structures; Invert and top levels of all the manholes including the connecting manhole(s); Adjacent lots and sewer/sanitary connection lines from adjacent lots, Drainage Reserve and Road Reserve;
- h) Sewer and Manhole ID for existing sewer/pumping main;

- i) Reinforced concrete trench with removable slabs (annotated on the plan with width and length dimension) for existing or proposed sewer under building or structures or with insufficient setback from building or structures;
- j) Eating establishments/food shops and its kitchen or food preparation areas and grease trap or sewage diverter, if any;
- k) Potable water tank;
- l) Overhead sanitary pipes in food shops' kitchens or potable water tank;
- m) Provision of pump sump or holding tank or sewage treatment plant;
- n) New ramp, boundary fence or walls; and
- o) Length of branch drainline to the Inspection Chamber.

3. Second Storey to Highest Storey Plan

- a) All sanitary appliances and fittings, soil and vent stacks and sanitary plumbing and drainage system connected to the inspection chambers and sewerage system at 1st storey;
- b) Double floor slab (including access opening) for sanitary pipes sited over bedroom, living room, dining room and kitchen area;
- c) Sanitary facilities or toilets, washing areas;
- d) Eating establishments/food shops and its kitchen or food preparation areas and grease trap, if any;
- e) Overhead sanitary pipes in food shops' kitchens or potable water tank; and
- f) Length of WC's discharge pipe to the discharge stack.

C. Roof Plan View

In specific, the roof plan of TOP/CSC sanitary works with deviations shall show the following:

- a) Sanitary pipes and potable water tank; and
- b) Termination of Vent stacks, roof garden and window openings of penthouse units (with dimension from the vent stack to the opening of window).

D. Schematic Diagram for Sanitary Plumbing and Drainage system

In specific, the schematic diagram of TOP/CSC sanitary works with deviations shall show all the sanitary plumbing and drainage system in the premises.

E. Elevation View

In specific, the elevation view of TOP/CSC sanitary works with deviation shall show the following:

- a) All sanitary appliances or fittings, soil and vent stacks and the sanitary plumbing and drainage system within the premises connected to the sewerage system;
- b) Double floor slab for sanitary pipes sited over bedroom, living room, dining room and kitchen area;
- c) Sewer connection and its pipe size, the last inspection chamber and the connecting manhole;
- d) Platform levels;
- e) Existing or Proposed sewer or pumping main, pipe sizes, gradients, and horizontal and vertical clearance distances between the building or structure/substructure and the sewers or pumping mains;
- f) Building height; headroom for overhanging structures or roof eaves above existing or proposed sewer or pumping main;
- g) Reinforced concrete trench with removable slabs;
- h) Pump sump or holding tank or sewage treatment plant;
- i) Proposed ramp, boundary fence or walls;
- j) Potable water tank (if any); and
- k) Height of vertical stack terminated on roof / roof garden.

F. Summary tables indicating the numbers of the sanitary appliances (water closets, urinals, bidets and slop sinks) installed at each units in the premises or lots of the development

PUBLIC UTILITIES BOARD (PUB)

6 PUB - WATER SUPPLY (NETWORK) SUBMISSION REQUIREMENT (PUB-WTR SUBMISSIONS)

6.1 General Requirements

The documents to be submitted to PUB-WTR shall meet the requirements specified under the Singapore Standard CP48 – Code of Practice for Water Services and Public Utilities (Water Supply) Regulations.

Only schematic line diagram and 3D cross sectional model of important parts/zones, as specified below, are required for PUB-WTR BIM e-submission. No 2D floor plans, elevations and sectional drawing views are required during submission.

PUB-WTR Submission Documents

2D View	Part 3D BIM Model
<ul style="list-style-type: none"> • Site and location plan • Schematic drawing • Notes and legend page • Typical detail 	<ul style="list-style-type: none"> • Water tanks • PUB meter chambers • PUB submeter compartments

6.2 2D Views

A. Site and Location Plan

Site and location plan shall including the following details:

- Proposed water meter location;
- Entrance to development; and
- Boundary of development sites.

Fig. 9 - Example: Site and Location Plan

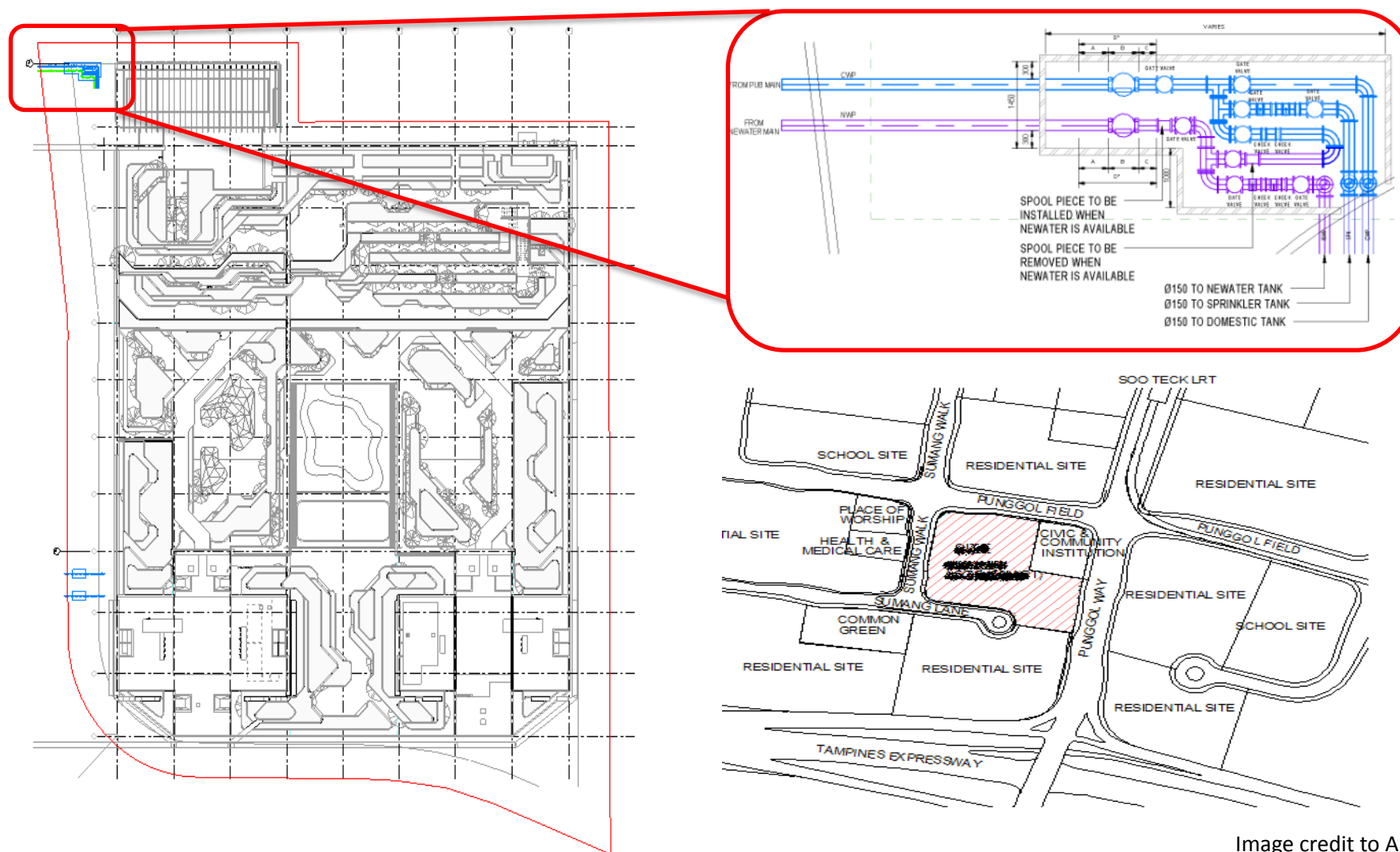


Image credit to AECOM

B. Schematic Drawing

Overall water system schematic drawing shall indicate the following:

- a) Proper labeling to be provided for the various water pipes;
- b) Reduced level of every floor;
- c) Reduced level of highest water fitting (including flush valve), fire hydrant and fire hose reel (if applicable) receiving direct supply from PUB water mains;
- d) Diameter of all water pipes;
- e) Terminal water draw-off fittings;
- f) Breakdown of estimated daily direct and indirect water requirements;
- g) Water tank including the following details:
 - i. Inlet, outlet, overflow, warning and drain pipes with their diameters;
 - ii. Reduced level of inlet to tank;
 - iii. Material of tank;
 - iv. Nominal size and effective capacity of tank; and
 - v. Enclosure/Room for the tank.
- h) PUB water/NEWater meters and chambers – For meter size 25 mm and above
 - i. Plan view**
 - Meter spacing;
 - Width of chamber; and
 - Valve assemblies downstream of water meter leading to the respective systems (e.g. domestic, fire hydrant, fire sprinklers, etc.).
 - ii. Elevation view**
 - Height of chamber;
 - Chamber cover details; and
 - Drainage.
- i) PUB Water meter for landed properties (for 15mm meter)
 - i. Elevation view**
 - Meter spacing;
 - Position in gate pillar; and
 - Height of enclosure.

j) PUB water submeter compartment (if applicable)

i. Plan view

- Distance from submeter to the door of compartment;
- Clearance between submeter and side wall of compartment; and
- Position of door of compartment.

ii. Elevation view

- Meter spacing;
- Spacing between PUB submeters;
- Drainage; and
- Height of submeter from the ground.

Fig. 10 - Example: Schematic drawing for PUB WTR submission

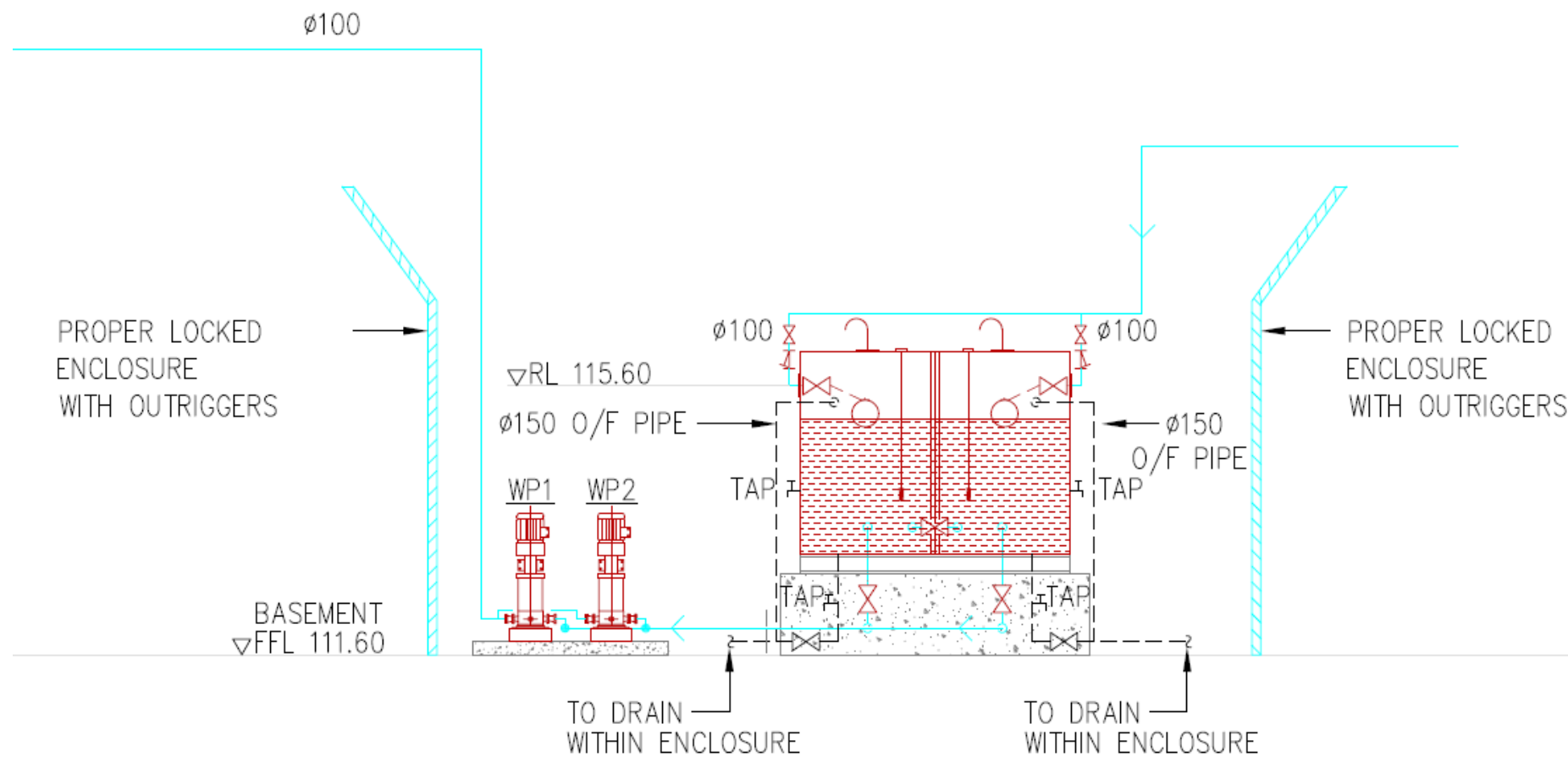


Image credit to Rankine&Hill

6.3. Part 3D BIM Model

The following part 3D BIM models maybe submitted:

- a) Water tank details with surrounding fencing/enclosure;
- b) PUB water and NEWater meter connection details and the meter chamber; and
- c) PUB sub-meter connection details and compartment details.

Fig. 11 - Example: Water Tank Details

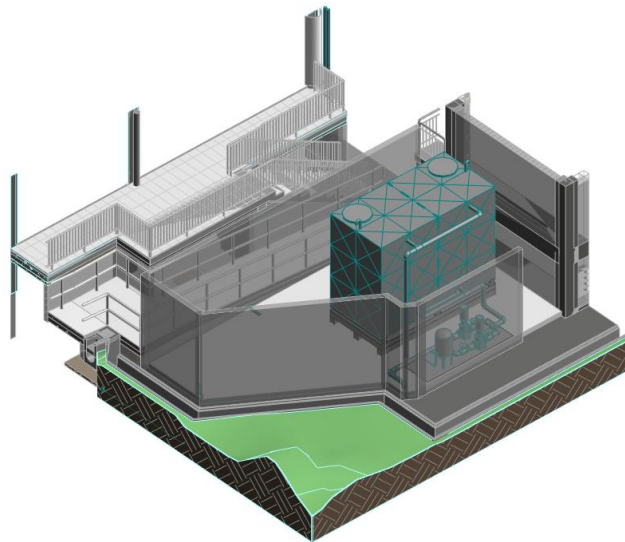


Fig. 12 - Example: Bulk Meter Connection

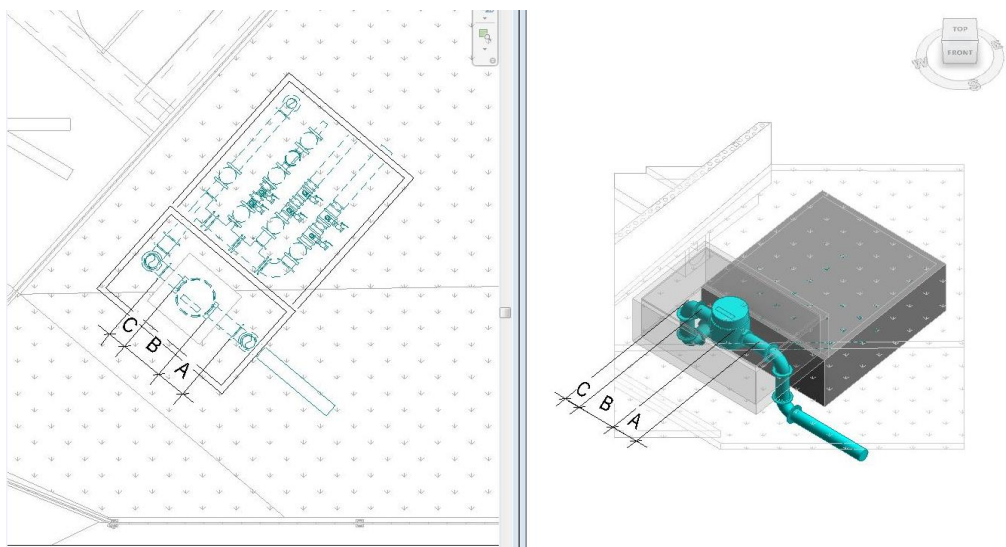


Image credit to Rankine&Hill

SINGAPORE CIVIL DEFENCE FORCE (SCDF)

7 SCDF FIRE SAFETY AND SHELTER DEPARTMENT (FSSD) REQUIREMENTS

7.1 General Requirements for All FSSD Submissions

The documents submitted under section 23 (1) of the Fire Safety Act shall consist of a location plan, a site plan, a floor plan of each storey, a roof plan of the building and sectional and elevation drawing of the building. All dimension and grid shall be indicated clearly on plans.

FSSD Submission Documents

2D View	BIM Model
<ul style="list-style-type: none"> • Site and location plan • Notes and legend page • Schematic drawing 	<ul style="list-style-type: none"> • Floor plans generated from BIM model • Part 3D BIM Model

7.2 2D Views

A. Site and Location Plan

1. Location Plan

- The coloured location of the lot relative to neighbouring lots; and
- The various roads constituting the access layout to the lot.

2. Site Plan

- The means of access to the site and to the perimeter of each building for fire fighting vehicles and equipment;
- Distances between each building or fire safety works and the relevant lot boundaries, other proposed or existing buildings or installations on the site;
- The location of existing and proposed internal fire-hydrants on the site; and
- Any other feature on or in the vicinity of the site which is likely to be a fire hazard or is likely to cause obstruction to fire fighting vehicles and equipment and rescue operations.

B. Schematic Diagram

A schematic diagram of the overall system (air-conditioning, mechanical ventilation or fire protection) showing clearly the key features and their functions, relative locations in the building, lots, sizes, capacities and other essential information including the air distribution design arrangement in the case of air-conditioning and mechanical ventilation systems.

7.3 Floor Plan generated from BIM Model and BIM Models

A. Floor Plan generated from BIM Model

Plans to be submitted for air-conditioning, mechanical ventilation and fire protection works shall include the following:

- a) Key features of the building in which the system is to be installed the particulars listed in Fire Safety (Building and Pipelines Fire Safety) regulations 6 and 7;
- b) The layout of the system on every floor plan showing clearly the various parts and their functions, locations, arrangements, sizes, capacities and other essential information;
- c) Necessary cross-sectional views as superimposed on the building or part thereof to fully describe the details and configurations of the system;
- d) For air-conditioning and mechanical ventilation systems such additional details as:
 - i. The volumetric rate of flow of air at each point of inlet and outlet of each system including those serving protected staircases, exit passageways, lobbies, areas of refuge, the Fire Command Centre, fire pump rooms, generator rooms, rooms used for the storage of flammable liquids or gas or other areas of special risk;
 - ii. The location of fire compartment walls, floors and air shafts;
 - iii. The location of fire dampers;
 - iv. The location of smoke detectors; and
 - v. The location and function of other fire precautionary features.

B. BIM Model

QP shall prepare the important part 3D model, in accordance to section 7.3 of this chapter, for submission. The part 3D BIM Model shall show the following clearly specified below:

1. ACMV System Checklist

- 1 Indicate the fire rating, capacity and dimensions of the ducts.
- 2 Indicate the location of compartment walls/floors, air shafts and location of fire dampers.
- 3 Indicate the location and volumetric rate of flow of air at each point of inlet and outlet of each system including those serving protected staircases, exit passageways, lobbies, areas of refuge, the Fire Command Centre, fire pump rooms, generator rooms, rooms used for the storage of flammable liquids or gas or other areas of special risk.
- 4 Indicate the routing of ducts.
- 5 Indicate then location of intake and exhaust of MV system
- 6 Indicate the types of ventilation duct. E.g. Kitchen exhaust, fresh air duct, duct for smoke control system.
- 7 Provide the necessary cross-sectional views as superimposed on the building or part thereof to fully describe the details and configurations of the system.

Fig. 13 - Example: Part 3D Model

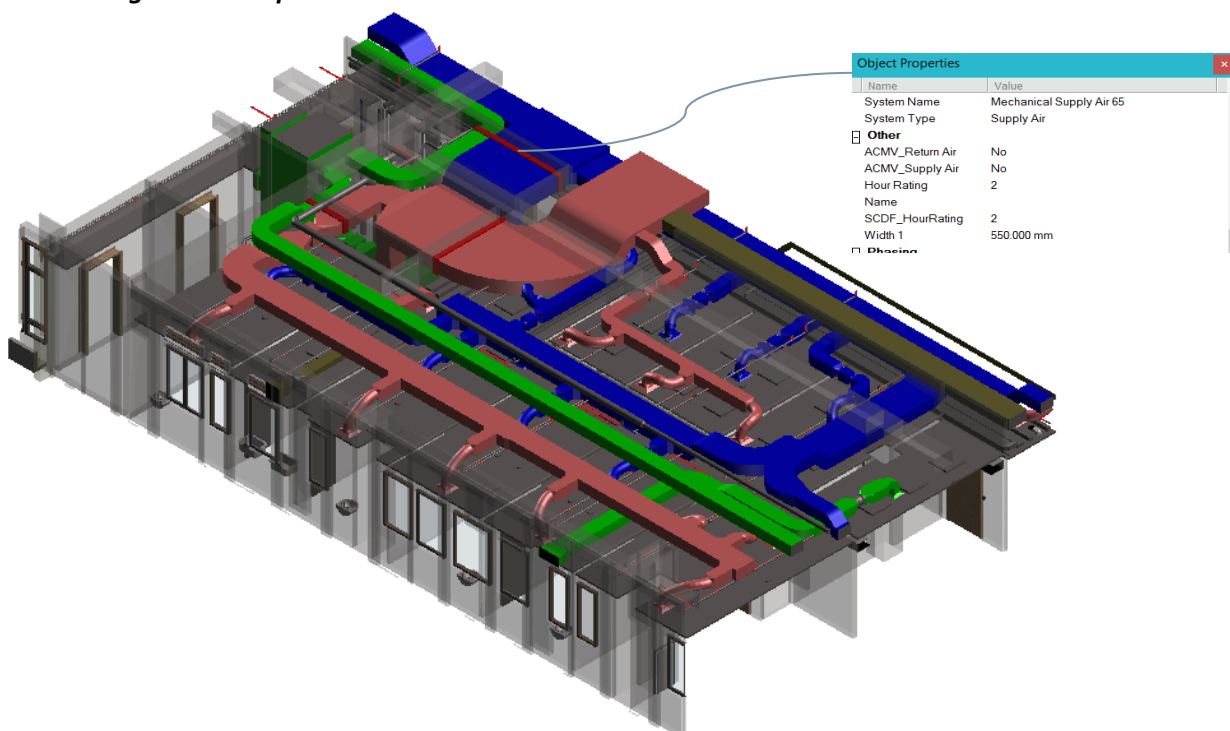


Image credit to Surbana Jurong

2. Sprinkler System Checklist

- 1 Indicate the sprinkler tank capacity and material of construction
- 2 Indicate the location of sprinkler tank
- 3 Indicate the location of standby generator and compartmentation.*
- 4 Indicate the highest point / most remote point of the sprinkler head
- 5 Indicate the location of sprinkler control valve & pump
- 6 Show the height of highest sprinkler above the control valve & pump
- 7 Indicate the pipe size and orifice size
- 8 Indicate the discharge density and temperature of sprinkler head
- 9 Indicate the design hazard group
- 10 Indicate the coverage per sprinkler head and area of operations
- 11 Indicate the Routing of sprinkler pipes
- 12 Provide the necessary cross-sectional views as superimposed on the building or part thereof to fully describe the details and configurations of the system

**Architectural consultant to provide info.*

Fig. 14 - Example: Sprinkler Tank

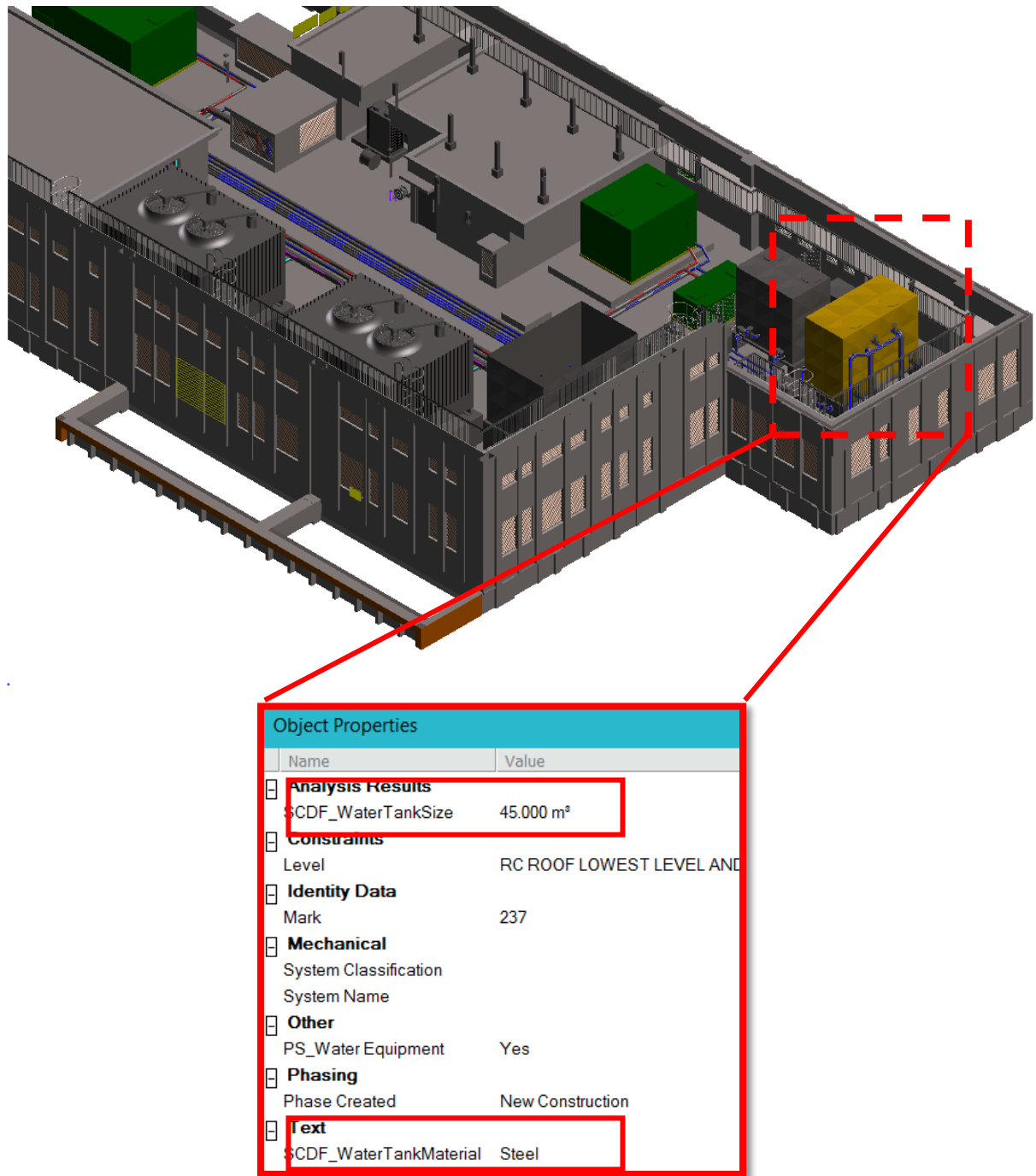

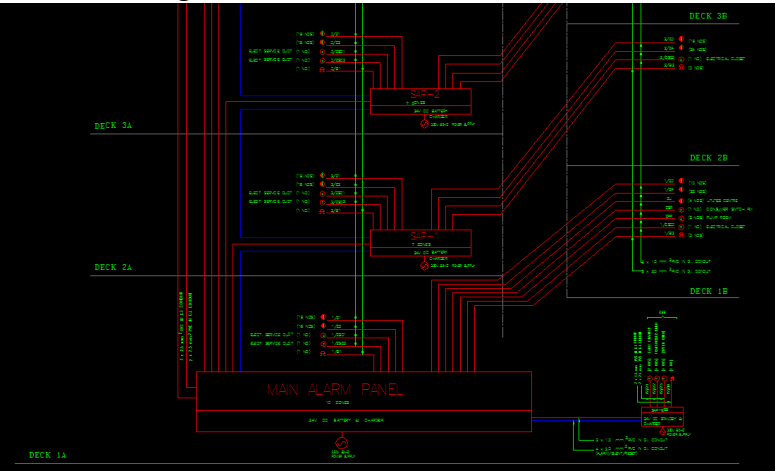
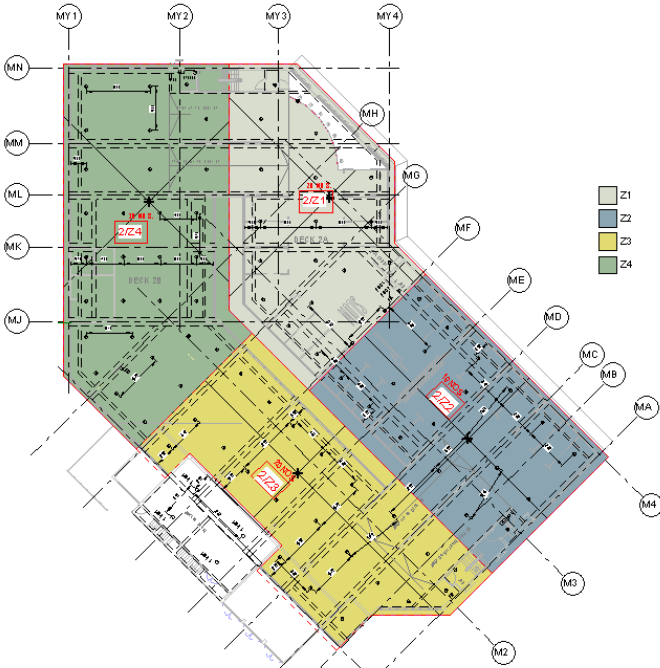


Image credit to Surbana Jurong

3. Detectors Checklist

S/N	Items	Compliance		
		Yes	No	NA
1	Type of detector 			
2	Schematic diagram  <p>Image credit to Surbana Jurong</p>			
3	Zoning  <p>Image credit to Surbana Jurong</p>			

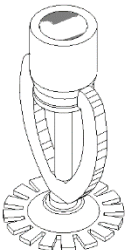
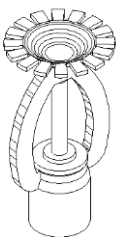
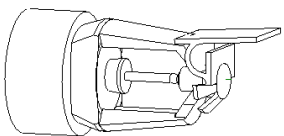
	<div><div><Detector Schedule></div><div><div>A</div><div>Name</div><div>Family and Type</div></div><div><div>Z4</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat Detector</div><div>Heat Detector Family: Heat 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CORE INFORMATION FOR BIM OBJECTS

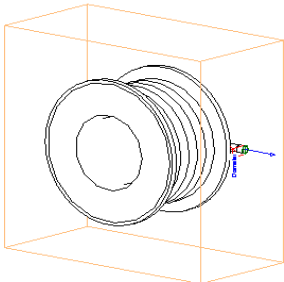
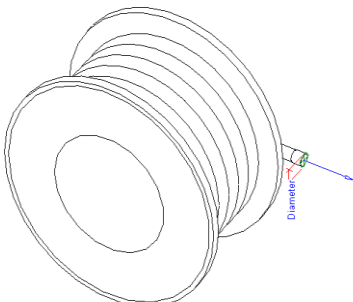
This section describes the essential non-geometry properties/attributes of the model objects that shall be provided for regulatory/technical agencies submission.

The BIM object shall contain minimum non-geometry information for technical agencies submission as following:

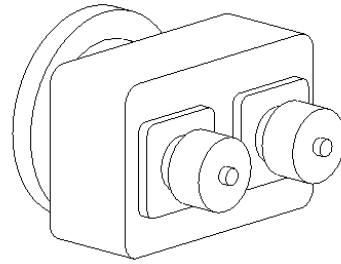
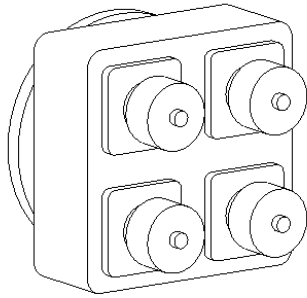
FSSD - Sprinkler System

Sprinklers		
Pendent	Upright	Sidewall
		

Parameter Name	Sample Value
Temperature Rating	68 °C
Sprinkler Type	Concealed/Exposed
K factor	8
Hazard Group	Ordinary/High Hazard

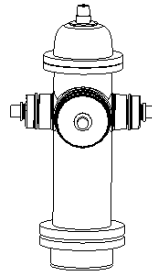
Fire Hose Reel	
Fire Hose Reel with Cabinet	Fire Hose Reel
	

Parameter Name	Sample Value
Design Pressure	6 Bars
Design Flow Rate	L/s
Breeching Inlet	
4 Way Breeching Inlet	2 Way Breeching Inlet



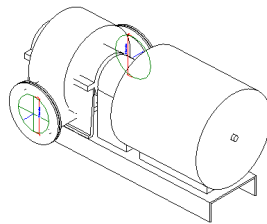
Parameter Name	Sample Value
Design Pressure	6 Bars
Design Flow Rate	L/s

Fire Hydrant



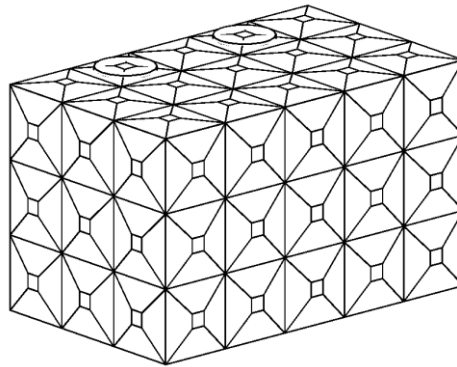
Parameter Name	Sample Value
Design Pressure	6 Bars
Design Flow Rate	L/s

Fire Sprinkler Pump



Parameter Name	Sample Value
Pump Flow rate	25 l/s
Pump Head	50m

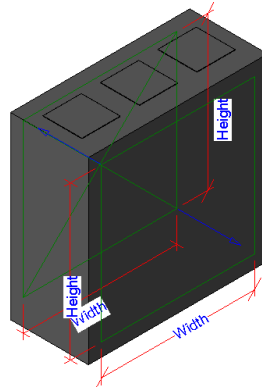
Sprinkler Tank



Parameter Name	Sample Value
Length	4m
Width	3m
Height	3m
Effective Volume	21.6m ³
Effective Height	1.8m
Tank Material	Pressed steel

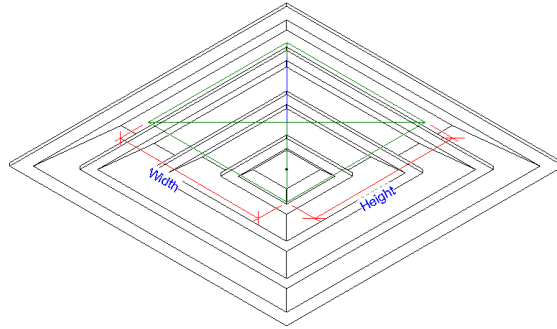
FSSD - ACMV

Fire Damper



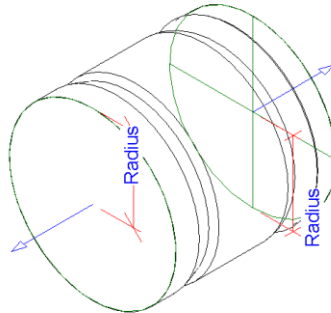
Parameter Name	Sample Value
Hour Rating	2 hrs

Air Terminal

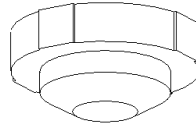


Parameter Name	Sample Value
Design Air Flow	175 CMH

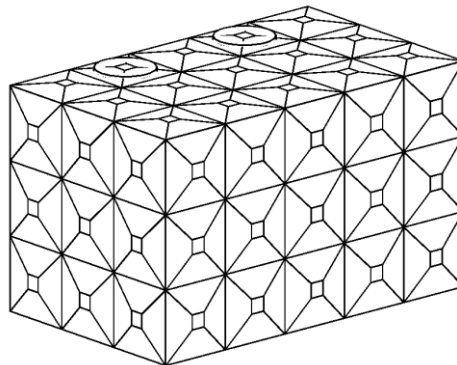
Mechanical Fans



Parameter Name	Sample Value
Design Air Flow	300 CMH
Static Pressure	250 Pa
Emergency Source	Yes/No

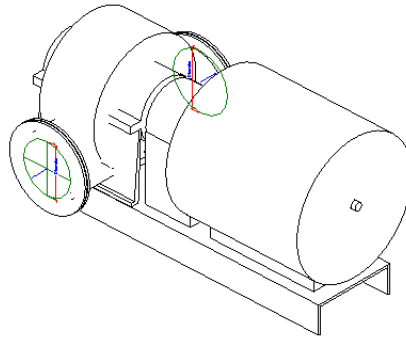
FSSD - Detectors**Detectors**

Parameter Name	Sample Value
Detector Type	Smoke/Heat

PUB Water & CBPD Sanitary**Sprinkler Tank**

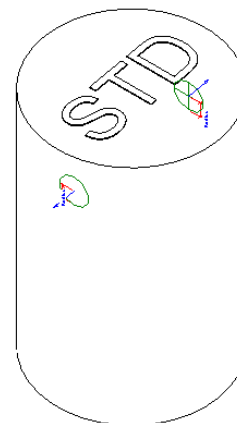
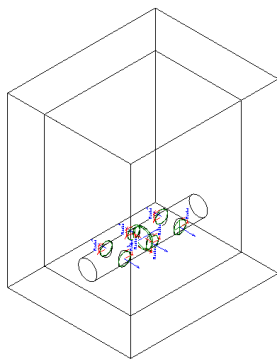
Parameter Name	Sample Value
Length	4m
Width	3m
Height	3m
Effective Volume	21.6m ³
Effective Height	1.8m
Tank Material	Pressed steel

Fire Sprinkler Pump



Parameter Name	Sample Value
Pump Flow rate	10 L/s
Pump Head	25 m
Emergency Power Source	Yes/No

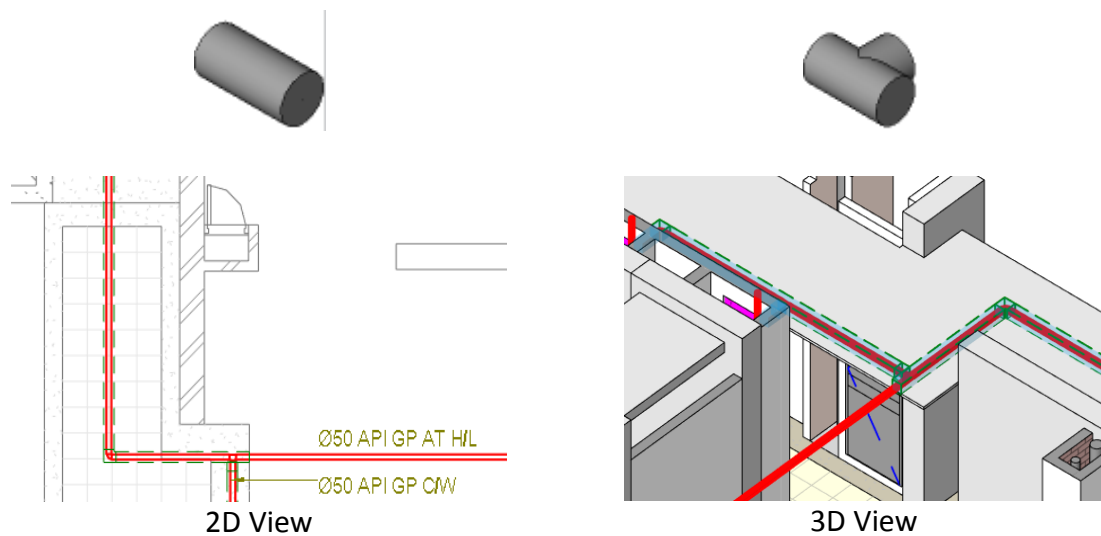
Inspection Chamber/ Silt Trap



Parameter Name	Sample Value
Top Level	110.300 mm
Invert Level	109.550 mm
Depth	0.750 mm

CITYGAS

Pipe and Pipe Fittings (includes elbows, tees, unions and etc.)

**2D view requirements**

Plans shall show the specifications of gas installation such as dimensions, pipe material, ventilation arrangement including routing & pipe sleeve/ducting, pipe location etc. as required under the Regulations and Codes.

3D view requirements

3D model view is for better visualization of the gas installation. Process of gas installation is based on 2D model view

Gas Pipe Box-up

Parameter Name	Sample value
Type	Fire Rated

Gas Pipe Sleeve

Parameter Name	Sample value
Material	Stainless Steel

COLOUR STANDARDS

This section describes the standard colours to adopt for MEP regulatory submission.

a. Air-Conditioning & Mechanical Ventilation System

System	Colour	Red	Green	Blue
Supply Air System*	5	0	0	255
Return Air System*	6	255	0	255
Fresh Air System*	3	0	255	0
Exhaust Air System*	54	153	153	0
Kitchen Supply Air System*	91	127	255	127
Kitchen Exhaust Air System*	53	204	204	102
Staircase Pressurization Air System*	71	191	255	127
Toilet Exhaust Air System*	55	153	153	76
Fire rated duct hatching	14	153	0	0
Fire Damper	1	225	0	0
Thermostat	94	0	153	0

** System includes all connected ducts, grilles, diffusers, fittings, accessories, equipment etc.*

b. Plumbing and Sanitary System

System	Colour	Red	Green	Blue
Domestic cold water supply system*	5	0	0	255
Domestic hot water supply system*		0	0	0
NEWater pipe	214	153	0	153
Vent pipe system*	3	0	255	0
Sanitary discharge system*	1	255	0	0
Inspection chamber, waste sump	14	153	0	0

* System includes all connected pipes, fittings, accessories, equipment etc.

c. Fire Protection System

System	Colour	Red	Green	Blue
Fire sprinkler system*	1	255	0	0
Wet riser system*	1	255	0	0
Fire alarm system* (exclude call point)	14	153	0	0
Emergency voice communication system *	14	153	0	0
Dry riser system* (Submission for reference)		0	0	0
Hose reel system* (Submission for reference)		0	0	0
Fire hydrant system* (Submission for reference)		0	0	0

* System includes all connected pipes, fittings, accessories etc.

d. Gas System

System	Colour	Red	Green	Blue
Gas system*	1	255	0	0
Gas ventilation duct	3	0	255	0

* System includes all connected pipes, fittings, accessories etc.

SUBMISSION FORMAT SUMMARY

Technical agencies	1 st submission	Amendment submission	As-built submission
PUB - WTR	light-weight	-	light-weight
BCA - TSED	native	native	native
BCA - CDSD	native	native	native
IDA-TFCC	native	native	-
CityGas	light-weight	light-weight	light-weight
SCDF <ul style="list-style-type: none"> • FPS • ACMV • Detector 	light-weight	light-weight	-
NEA-CBPD & PUB-WRN	light-weight	light-weight	dwg – for 1st storey light-weight native

*** The respective regulatory agency reserves the right to request BIM native file for verification.**

LIST OF FIGURES

Fig. 1 - Example: Site Plan

Fig. 2 - Example: Schematic Diagram

Fig. 3 - Example: Plans generated from BIM Model

Fig. 4 - Example: Part 3D BIM Model

Fig. 5 - Example: Site Plan

Fig. 6 - Example: Location Plan

Fig. 7 - Example: Schematic Drawing

Fig. 8 - Example: Part 3D MDF Room with lead in pipe

Fig. 9 - Example: Site and Location Plan

Fig. 10 - Example: Schematic drawing for PUB WTR submission

Fig. 11 - Example: Water Tank Details

Fig. 12 - Example: Bulk Meter Connection

Fig. 13 - Example: Part 3D Model

Fig. 14 - Example: Sprinkler Tank

CODE OF PRACTICE FOR BIM E-SUBMISSION SERIES

This section is part of the Code for Practice for BIM e-Submission series:

Code of Practice for BIM e-Submission	
	A. General Requirements
	B. Architectural Requirements
	C. Civil & Structural (C&S) Requirements
	D. Mechanical, Electrical & Plumbing (MEP) Requirements

All documents related to BIM e-Submission can be downloaded from the CORENET website:

- Code of Practice for BIM e-Submission
- BIM e-Submission Templates
- BIM e-Submission Template Guides

[https://www.corenet.gov.sg/general/building-information-modeling-\(bim\)-e-submission.aspx](https://www.corenet.gov.sg/general/building-information-modeling-(bim)-e-submission.aspx)



Building and Construction Authority
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www.bca.gov.sg

For more information and feedback on
the Code of Practice for
Building Information Modelling series,
please visit the CORENET website:
www.corenet.gov.sg