



## **BLD62304103247 Building Science and Services**

### **Final Project: Building Services Design in Kitchen- 40%**

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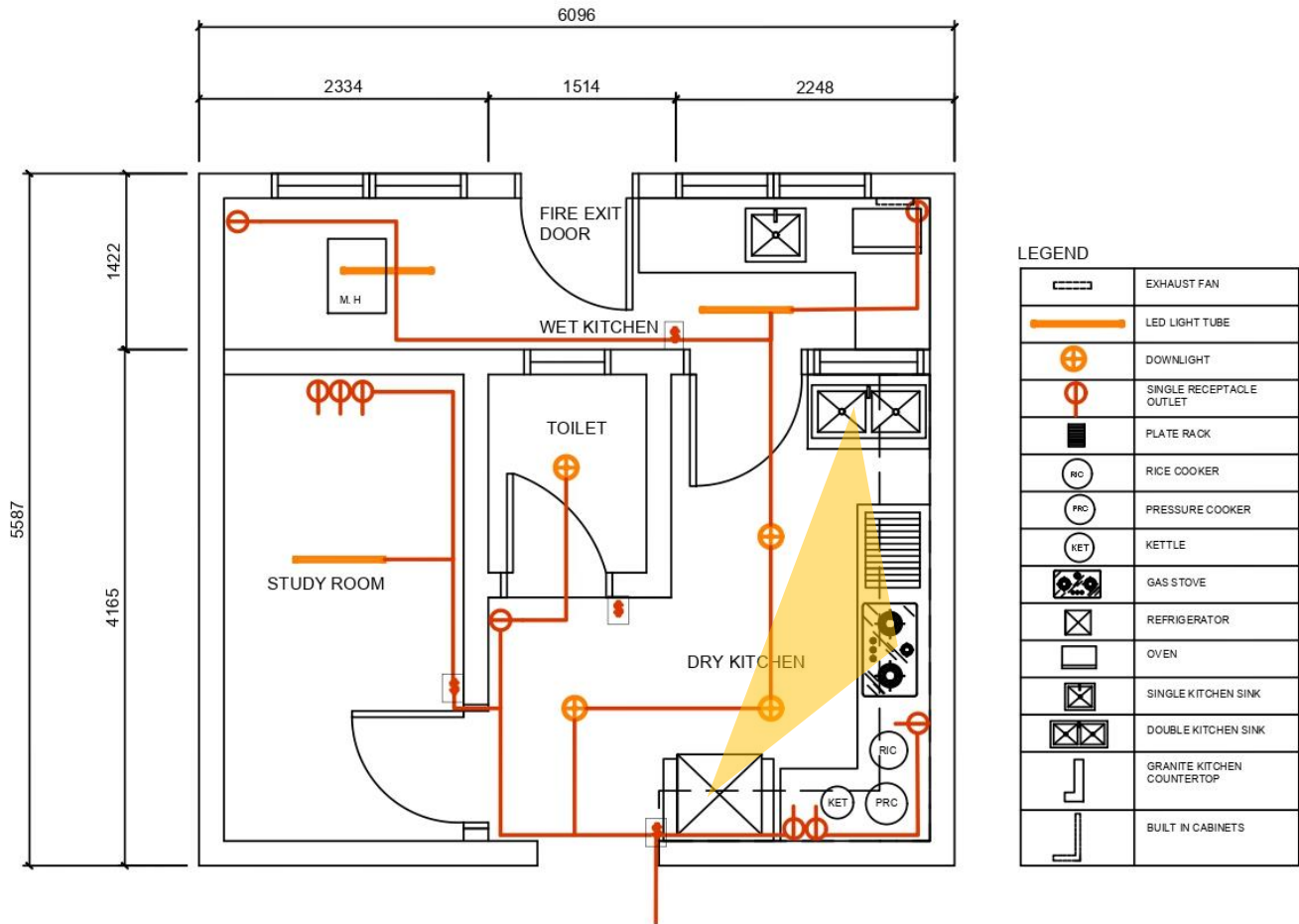
Programme: Bachelors of Arts (Honours) Interior Architecture

Batch: April 2020

Lecturer: Ms. Sharon

### Task 1(a): Site Study and Re-design Kitchen

- Layout of all worktops, cabinetry, walls, doors, exits, function of neighboring spaces
- Locations of outlets of building services



Old Kitchen Layout Plan

#### Justifications why the kitchen layout is remained:

As the space is limited, the kitchen is ideal to utilize a L-shape countertop and cabinetry to allow movements and free flow in the kitchen area. According to the kitchen triangle layout guidance, the main features: sink, stove and refrigerator have to be located in a triangle form for convenience as they are not too far away or too near from each other that might lead to fire catastrophe or inconvenience for mobility and activities in the kitchen. Thus, the layout of the kitchen is maintained to reach its maximum effectiveness of utilization in the kitchen

## Photos of existing kitchen



Front View



Aluminium Double Sink



White laminated wooden built-in cabinets



Wet Kitchen



Side View (North)



Side View (South)

## MCO Kitchen Habits: Dialogues between my mother and I

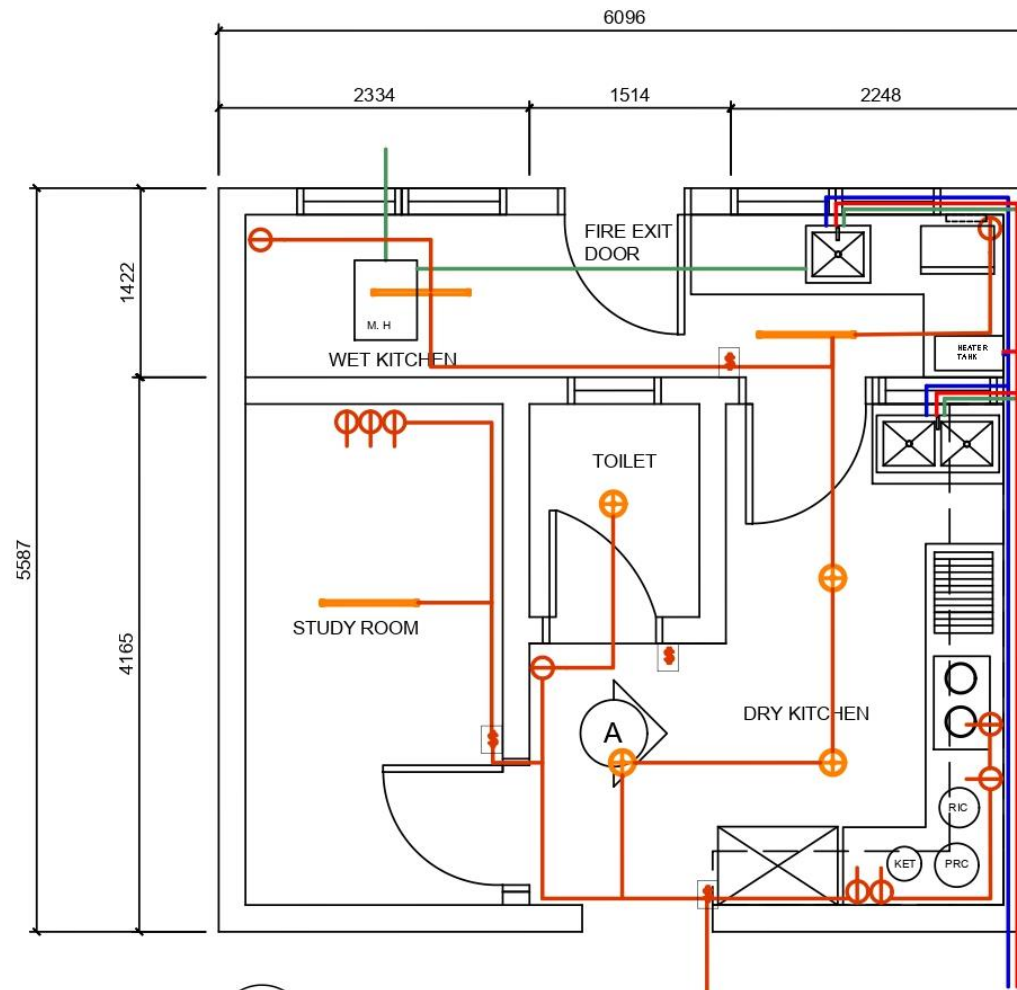
Proposal of having new kitchen utensils in my mother's wish list to ease her cooking experience and change the granite worktop to another color for aesthetic in the long run.

Me (Interviewer): "Mum, what are your three main cooking habits during MCO and what kitchen utensils do you normally use?"

Mum (Interviewee/Main Cook): "I normally fry, boil or steam food because they are the quickest methods to cook food, especially having to prepare 3 meals per day. Frequently used utensils/ equipment would be the rice cooker, knife, chopping board, hob and hood, frypan, kettle, pressure cooker, stove, grater, oven and of course refrigerator to keep the food before closed."

Me (Interviewer): "Thank you for the hard work mum. If you were to renovate our kitchen, what's in your wish list of an ideal kitchen that you would like to work in?"

Mum (Interviewee/ Main Cook): A multinational and beautiful kitchen definitely lifts up my mood while preparing the food. First of all it would be great if we could change the black granite kitchen worktop to another color because the dust is easily visible as we do not often use the kitchen on normal days. Utensils I wish to own would be a side by side fridge for bigger storage. A new exhaust fan is needed too since our old one is stained badly. I would also prefer an electrical stove because I do not have to buy the gas cylinder as it needs frequent replenishment which is a hassle for me.



# LEGEND

	EXHAUST FAN
	LED LIGHT TUBE
	DOWNLIGHT
	SINGLE RECEPTACLE OUTLET
	PLATE RACK
	RICE COOKER
	PRESSURE COOKER
	KETTLE
	GAS STOVE
	REFRIGERATOR
	OVEN
	SINGLE KITCHEN SINK
	DOUBLE KITCHEN SINK
	GRANITE KITCHEN COUNTERTOP
	BUILT IN CABINETS
	COLD WATER
	HOT WATER
	WASTE

PL  
1

NEW KITCHEN PLAN  
SCALE 1: 50

NOTE:

DRAWN BY: TEE HUI QING

ID NO. : 0334497

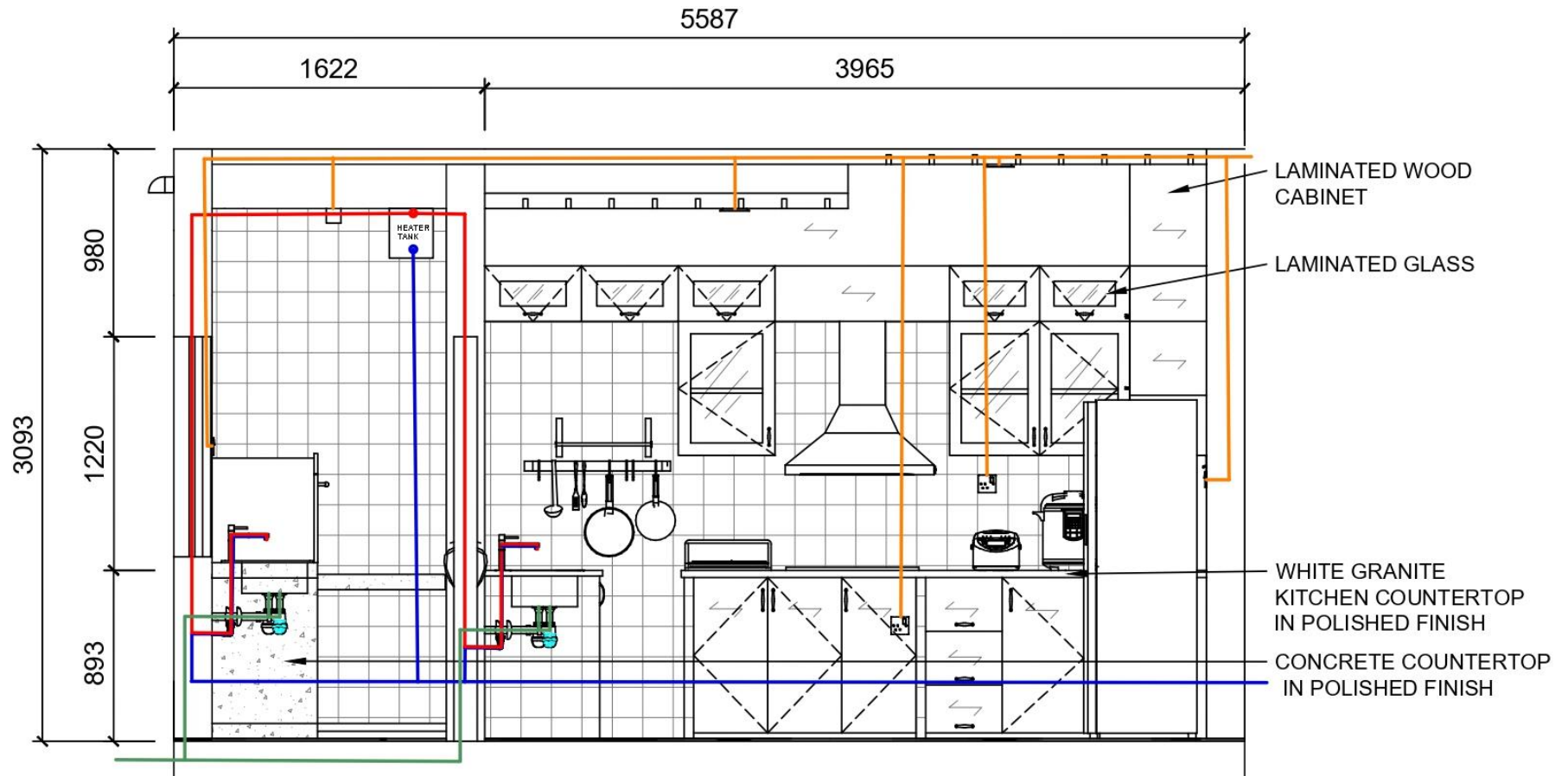
CHECKED BY: MS. SHARON

DRAWING TITLE:  
NEW KITCHEN PLAN

SCALE 1:50

DATE: 19 JULY 2020

DWG NO: DWG\_THQ\_1



EL  
A

**NEW KITCHEN ELEVATION A**

SCALE 1: 30

\*LEGEND REMAINS THE SAME

NOTE:

DRAWN BY: TEE HUI QING

ID NO. : 0334497

CHECKED BY: MS. SHARON

DRAWING TITLE:  
NEW KITCHEN ELEVATION A

SCALE 1:30

DATE: 19 JULY 2020

DWG NO: DWG\_THQ\_2



## Task 1 (b): Designing and Justifications of Building Services Selection & Location

### Electrical, Lighting and VAC (12%)

#### - Specifications (from actual product catalogs) for electrical equipment (5%)



##### **Sharp Side by Side Refrigerator SHP-SJX508MS**

Dimension: 900mm (W) x 1770mm (H) x 590mm (D)

Gross Capacity (L): 600

Catalogue:

<https://rb.gy/z4motg>

**Justification:** Bigger storage than single door refrigerator as my mum likes to buy groceries in huge amount to cook for over the weekdays



##### **Electrolux 70cm Built in Ceramic Hob EHC7240BAv**

Dimension: 700mm (W) x 420mm (D) Connected

Load kW: 3000 Catalogue:

<https://rb.gy/hxw0bz>

**Justification:** Has precise heat controls, residual heat indicators and child lock mode for a more convenient and eco-friendly usage than gas stove so kids around won't get hurt easily



##### **Electrolux Cooker Hood**

**EFC926BAR** Dimension: 875mm (L) X 490mm (W) x 600-890mm (H)

Voltage: 220-240

Catalogue: <https://rb.gy/sxwu6>

**Justification:** Ducted Hood can improve air flow as unfiltered air is simply sent outside via ducting. Ugly ducting can be hidden inside the soffit. It can efficiently remove cooking odor & smoke



##### **White Granite Kitchen Countertop**

Brand: Sheridan UK

Catalogue: <https://www.sheridan-uk.com/worktops/granite-worktops/>

**Justification:** One of the hardest substances on earth, easy to clean and maintain, extremely hard-wearing worktops, won't scratch under normal use. Dust isn't visible.



##### **GOLDLUX 10 INCH WALLTYPE EXHUAUST FAN**

Dimension: 335mm (L) X 335mm (W) X 138mm (THK)

Watt: 38W

Catalogue:

<https://rb.gy/nag1py>

**Justification:** Has thermal fuse built-in safety and lightweight because it's made up of plastic



##### **SR-HB184KSK IH RICE COOKER**

Brand: Panasonic

Dimension: Aprox 270mm (L) X 348mm(W) X 232mm (H)

Cooking Capacity: 1.8 litres

Watt: Keeping Warm 600W

Catalogue: <https://rb.gy/jtpzdp>

Bill and Quantities

**Calculations (Per Year):**

Old Cooker: 0.7W X 2hr X RM0.218 X 365 days= RM 111.40

New Cooker: 0.6W X 2hr X RM0.218 X 365 days= RM 95.50



**Electrolux Oven EOB2400AOX**

Brand: Electrolux

Dimension: 560mm (L) X 550mm(W) X 600mm (H)

Capacity: 74 Litres Connected load KW: 2780

Catalogue: <https://rb.gy/hzffhk>

Justification:

Acoustic signal, Minute minder, Anti fingerprint stainless steel, Oven energy efficiency class A, Full programmable timer, Larger capacity to bake food as my mum likes to bake when she is free.



**Philips 6L Pressure Cooker HD2137**

Brand: PHILIPS

Dimension: 1200mm (L) X 610mm (W) X 850mm (H)

Power: 1000 W

Capacity: 6L

Catalogue: <https://rb.gy/2dtxjh>

Justification: Aluminum alloy inner pot is durable and offers more effective heat conduction. Special colored Whitford golden coating is anti-scratch and non-stick. User can use it frequently without spoiling its appearance in a short period of time.



**PHILIPS 12W LED DOWNLIGHT (WARM WHITE)**

Brand: PHILIPS

Dimension: 140mm (L) X 140mm (W) X 26mm (H) Watt: 12 W

Catalogue: <https://rb.gy/jbndum>

Justification: Efficient LED Light Source saves up to 80% energy, long lasting and super slim design compared to the previous Fluorescent lighting that requires constant replacement

General Justification of buying the new kitchen utensils/ equipment mentioned above:

- Side by side fridge for bigger storage,
- Electrical stove to save cost of buying gas cylinders and for convenience as it just require electricity from plugs,
- Cooker Hood (Extraction) as the existing is stained and to improve air circulation in the kitchen,
- White Granite Worktop: Dust appear more visible and obvious on black worktop so white granite can approve the kitchen's appearance and brighten up the kitchen as a whole
- Exhaust Fan: Existing exhaust fan broke down and size smaller than the proposed one, which isn't efficient enough
- Rice cooker: Larger capacity and more energy saving because the new cooker operates on a lower wattage than the old cooker but show similar performance
- Oven, Pressure Cooker: Larger capacity
- LED Downlight: Higher luminance than Fluorescent Downlight and last longer which saves more costs in the long run

### - Lighting: Qualitative & Quantitative Evaluations of lighting adequacy for critical workshop (5%)

Proposal to have the 3 Fluorescent Downlights changed to LED Downlights as their lifespan lasts longer than Fluorescent Downlights, needing lesser bulb replacements means users can save more costs in the long run. Furthermore, LED downlights produce higher luminance for users to have better lighting in the kitchen workspace to provide eye comfort and prevent accidents caused by lack of visibility.

#### Reasons of opting LED Downlights:

Aspects	Fluorescent Downlight	LED Downlight
Lifespan	7000 hours to 15000 hours of lifespan before bulb replacement needed	25000 hours to 200000 hours of lifespan, long-lasting light source
Warranty	Typically, 1-2 years warranty and requires regular bulb replacement	Often 5 to 10 years warranty and zero maintenance cost
Warm up/ Cooling	Exhibit short delay when turning on due to warm up needed	Respond rather instantaneously (no warm up or cool down needed)
Heat Loss	Roughly 15% of emission are lost due to heat dissipation and heat losses	Emit very little forward heat and generate light using electricity
Efficiency	Much lower efficiency (< 30 lumens/watt)	Efficiency level mostly fall above 50 lumens/watts

Illuminance, Lux= Lumen/ Area (m<sup>2</sup>)

Area of Kitchen  
= (3.715m X 2.086m) + (1.942m X 1.476m)  
= 7.759 + 2.87  
= 10.62m<sup>2</sup>

Surface	Fluorescent Downlight	LED Downlight
Kitchen Worktop	Illuminance, Lux = 38 lumens/ 10.62m <sup>2</sup> = 3.58	Illuminance, Lux = 60 lumen/ 10.62m <sup>2</sup> = 5.65
Kitchen Floor	Illuminance, Lux = 35 lumens/ 10.62m <sup>2</sup> = 4.43	Illuminance, Lux = 57 lumens/ 10.62m <sup>2</sup> = 5.37

#### Justification:

LED Downlight is more eco-friendly and long lasting than fluorescent downlight although it is more expensive. This is because LED Downlight emits higher illuminance (lux) value than fluorescent downlight both on the kitchen worktop and floor which means LED illuminates the room brighter than fluorescent downlight. Moreover, LED Downlight has longer lifespan than the Fluorescent Downlight, thus the cost of bulb replacement can be saved up. In conclusion, it is worth the investments in purchasing the LED Downlight compared to Fluorescent Downlight despite its slight difference in the initial market cost.



**- Ventilation: Quantitatively evaluate both passive (openings) and active- hood or other exhaust fans, ventilation fans etc (2%)**

Proposal of installing an extraction hood back instead of a charcoal filter equipped because the air recycled and released into the kitchen isn't entirely 'clean' and effective as it might make the kitchen feel greasy over time. Extraction hood has the ducted hood which directly connects to the outer wall so the grease in the air can be released out of the house.



**Electrolux Cooker Hood EFC926BAR**

Dimensions: 875mm (L) X 490mm (W) X 600-890mm (H)

Voltage: 220-240 V

Catalogue: <https://rb.gy/sxwux6>

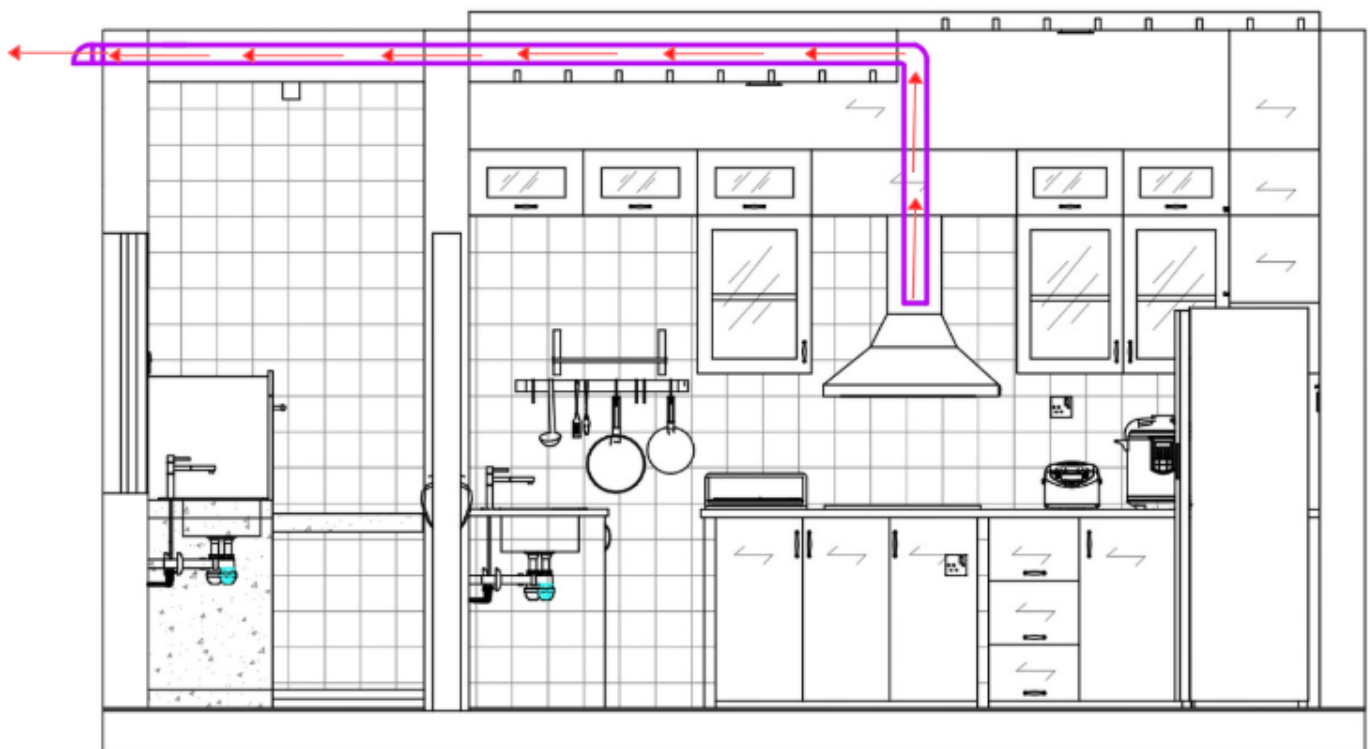


**【Stainless Steel Cap】+ Flexible Aluminum Cooker Hood Ducting Hose Kitchen**

Dimensions: 150mm

Material: Aluminum Hose and Stainless-Steel Cap

Catalogue: <https://rb.gy/b8ecq4>



← Air Flow: Air sent outside via ducting hidden in the soffit

Justifications:

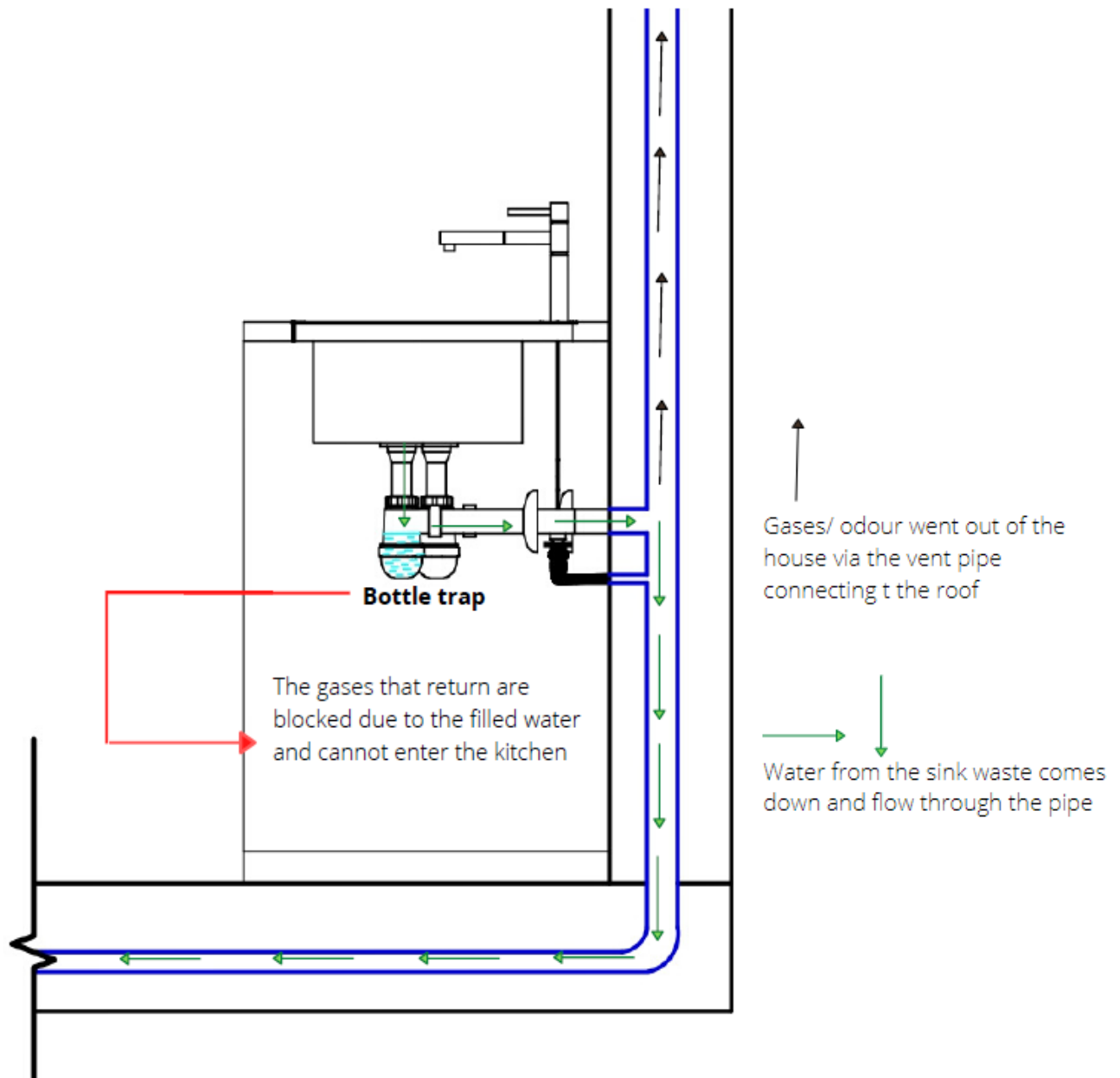
- Ducted Hood can improve air flow as unfiltered air is simply sent outside via ducting. Ugly ducting can be hidden inside the soffit. It can efficiently remove the cooking odor, smoke and steam.
- Its efficiency and effectiveness in removing smoke and humidity is worth for doing large volumes of cooking

## Water Supply and Plumbing (10%)

### - Elevation of plumbing under kitchen sink & justifications

#### Justification:

- Bottle trap is used to trap water so that it separates the gas/ bad odor from the clean air in the kitchen so that the foul smell will not go indoor from the outdoor area
- Hollow vent pipe connected to the roof is used to drive the gas/ bad odor out of the indoor space to prevent foul smell
- Waste water flows downwards to the waste pipe to waste drainage outdoor via the manhole by the force of gravity



## Water supply and Plumbing (10%)

### - Specifications for sink, tap, dishwasher and plan their inlet and outlet and the corresponding water supply distribution

Proposal of using back a stainless-steel double sink for user to clean more utensils at the same time with its quality guaranteed over a long period as stainless-steel do not rust. A mixer tap is chosen instead of a mere cold-water output tap so that user can wash hands more comfortably and improve hygiene in the kitchen. To enable instant hot water supply, a water heater tank is installed on the ceiling to preheat water and channel it to the following taps.



#### **HILLESJON Inset Sink (2 Bowls)**

Dimension: 750mm (L) X 460mm (W) X 180mm(H)

Insert Sink Base Material:  
Stainless Steel

Catalogue: <https://rb.gy/9iskmx>

##### Justification:

Sink in stainless steel, a hygienic, strong and durable material that's easy to keep clean. Under the sink is a sound-absorbing material which reduces resonances in the metal when using the sink, thus lowering the sound level. Thus, user can use it to clean more utensils at the same time in a quieter environment

#### **BSUNDSVIK Single-lever kitchen mixer tap, chrome-plated**

Dimension: 150mm (H)

Catalogue:

<https://www.ikea.com/my/en/p/sundsvik-single-lever-kitchen-mixer-tap-chrome-plated-50173989/>

##### Justification:

The mixer tap insert has hard, durable ceramic discs that can handle the high friction that occurs when you change the temperature of the water. Chrome-plated brass is a hard and durable surface that is easy to clean. Hot water is necessary in the kitchen to better remove oils from hands that can harbor bacteria

#### **JH Horizontal Storage**

Capacity: JH15 Model Liters

Dimension: 260mm





Catalogue: <https://rb.gy/lpnsvu>

##### Justification:

Its instant hot water can allow user to wash hand more comfortably when doing the dishes and remove bacteria that might harbor on user's hand but not too hot to burn the hands. Furthermore, this utilizes a heat elevator technology that saves 20% electric consumption compared to older model versions.

## Fire Safety (3%)

Proposal of reusing laminated wood for the cabinetry finish but natural wood stain is picked instead for personal preference and laminated wood is the strongest wood material to be used in building the kitchen cabinets. White Granite countertop is opted instead of black granite worktop for its aesthetics and neat appearance over the time for users who do not dust the kitchen that often.

Furniture	Existing Material	Proposed Material	Reasons
Built- in Cabinets	 Yellow Laminated Wood	 Natural look Laminated Wood	<ul style="list-style-type: none"> <li>- Laminated Wood is selected back because of its longest durability of wood material and higher fire resistance for cabinetry compared to other type of wood</li> <li>- Laminated wood is an ideal option for wood-lovers as they need not worry over its lifespan as it is waterproof, moisture resistant and easy to clean</li> <li>- Its lightweight quality do not interfere with its strength and ductility</li> <li>-Users who find quiet environments pleasing to work in the kitchen will find laminated wood helpful as it absorbs and insulate sound up to 30~50DB</li> </ul>
Granite Kitchen Worktop	 Black Granite Kitchen Worktop	 White Granite Kitchen Worktop	<ul style="list-style-type: none"> <li>- White color granite kitchen worktop is opted instead</li> <li>- Dust, which are similar to the silvery/white color, will appear obvious on the black granite worktops if there isn't frequent cleaning routine</li> <li>- White granite worktop brightens up the kitchen and give out a clean look and minimalistic feel which suits the user's preference</li> <li>- It is durable as it is hard to scratch and has high resistance to heat which lowers the fire accident rate</li> </ul>

## Interior Perspective Views of New Kitchen



Dry Kitchen (from Wet Kitchen)



Dry Kitchen (Entrance)



Dry Kitchen (from Wet Kitchen)



Wet Kitchen