

FORM 5  
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE  
(CHAPTER 499)  
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

- ☒ No previous application for variation of an environmental permit.  
☐ The environmental permit was previously amended.

Application No. : .....

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

Hong Kong Vipassana Meditation Centre Limited

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. :  
(if applicable)

B3. Correspondence Address :

B4. Name of Contact Person :

B5. Position of Contact Person :

B6. Telephone No. :

B7. Fax No. :

B8. E-mail Address : (if any)

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

Hong Kong Vipassana Meditation Centre Limited

C2. Application No. of the Current Environmental Permit : EP-580/2020

C3. The Current Environmental Permit was Issued in : month / year

09 / 02 / 20

**Important Notes :** Please submit the application together with  
(a) 3 copies of this completed form; and  
(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation to the Environmental Protection Department at the following address :  
The EIA Ordinance Register Office,  
27th floor, Southern Centre, 130 Hennessy Road,  
Wan Chai, Hong Kong.

☐ Tick (✓) the appropriate box

EPD185



**PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT**

D1.  Condition(s) in the Current Environmental Permit :	D2.  Proposed Variation(s) :	D3.  Reason for Variation(s) :	D4.  Describe the environmental changes arising from the proposed variation(s) :	D5.  Describe how the environment and the community might be affected by the proposed variation(s) :	D6.  Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7.  Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
<p>Clause 2.1: All measures described in the Project Profile (No. PP-597/2020) submitted with the application on 14 January 2020 shall be fully implemented.</p> <p>Clause 2.2: The reclaimed water of the Project shall be used for toilet flushing only, or otherwise agreed by the Director. The reclaimed water quality shall meet the requirements set out in Table 1 of this permit.</p>	<p>Please refer to the Environmental Review Report Section 3</p>	<p>Please refer to the Environmental Review Report Section 1.2</p>	<p>Please refer to the Environmental Review Report Section 4</p>	<p>Please refer to the Environmental Review Report Section 4</p>	<p>The environmental performance requirements set out in the project profile is not affected.</p> <p>The same standard (USEPA criteria for Urban Reuse (Unrestricted)) for toilet flushing approved in current environmental permit is applied to the proposed landscape irrigation.</p> <p>For details, please refer to Table 2 of the Environmental Review Report</p>	<p>Non-spray irrigation (drip irrigation systems) will be adopted for the proposed landscape irrigation so as to avoid human contact with the treated water</p>

## PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

 _____ Signature of Applicant	 _____ Full Name in Block Letters	 _____ Position
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on behalf of	<u>Hong Kong Vipassana Meditation Centre Limited</u> Company Name and Chop (as appropriate)	<u>6 August 2021</u> Date
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### NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.
2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.

HONG KONG  
VIPASSANA MEDITATION CENTRE LIMITED

**Environmental Review Report**

REUSE OF TREATED SEWAGE EFFLUENT FROM  
A TREATMENT PLANT AT  
HONG KONG VIPASSANA MEDITATION CENTRE,  
LANTAU ISLAND

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## **1. INTRODUCTION**

### **1.1 Background**

- 1.1.1 Hong Kong Vipassana Meditation Centre Limited (hereinafter called “HKVMC”) is the Hong Kong branch of the Vipassana Meditation Centres International ([www.dhamma.org](http://www.dhamma.org)). Since there is no public sewage connection to the centre, a sewage treatment plant (hereinafter called “STP”) is constructed to ensure water quality of treated effluent complies with the Water Pollution Control Ordinance (WPCO) discharge licence requirement. The STP is installed within the boundary of VMC at Lot No. 146 in D.D.319, Tung Wan, Lantau Island (see Figure 1). This STP is provided under phase one development and under operation. Capacity of the STP is duly designed at 37m<sup>3</sup>/day to serve the entire centre when it is fully occupied.
- 1.1.2 An Environmental Permit (EP-580/2020) has been issued on 22 September 2020 by EPD stipulating the environmental requirements pursuant to the Reuse of Treated Sewage Effluent from a Treatment Plant at Hong Kong Vipassana Meditation Centre, Lantau Island.
- 1.1.3 It involves the installation, operation and water monitoring of a treated sewage effluent (hereinafter called “TSE”) reuse system to treat sewage effluent for toilet flushing within HKVMC. The water consumption from TSE reuse system for toilet flushing is anticipated as 20 m<sup>3</sup>/day.

## 1.2 Objectives

- 1.2.1 The proposed variations mainly involve installation of irrigation tank and drip irrigation system. The treated sewage effluent is now suggested to be reused for both toilet flushing and landscape irrigation. Potable water consumption can be further reduced with the operation of the TSE reuse system for irrigation, and this will contribute to a green and sustainable environment (See Figure 2).
- 1.2.2 The treated sewage effluent is proposed to reuse for landscape irrigation in order to reduce potable water consumption and further make good use of the treated water. This in turn supports internal water usage of HKVMC and contribute to a green and sustainable environment.
- 1.2.3 A total area of about 3,200 m<sup>2</sup> of greening zones (see Figure 4) is proposed to be irrigated by the treated water. Non-spray irrigation (drip irrigation systems) will be adopted so as to avoid human contact with the treated water.
- 1.2.4 This Environmental Review Report serves as evaluating the environmental implication and material change of the proposed modification in compared with the preceding project profile.
- 1.2.5 The objectives of the environment review report are to:
- Propose modification of the existing TSE reuse system within HKVMC including retrofit of treated effluent holding tank with application of drip irrigation system, relocation of water tanks; and increased of anticipated water consumption from TSE reuse system;
  - Identify adjacent sensitive receivers and the variation of possible environmental impacts and recommended mitigation measures in both construction and operation stages; and
  - Illustrating the adoption of landscape irrigation by TSE reuse system would not constitute any material change under the EIAO.

## 1.3 Program for TSE Reuse System and Drip Irrigation System Installation

Phase One and Phase Two developments of VMC were completed in August 2016 and February 2018 respectively. The construction of the TSE reuse system is completed in early 2021 and the whole system will be put into operation after testing and commissioning. The landscape drip irrigation will be completed in 2021 upon approval under EIAO.

## **2. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**

### **2.1 Existing and Planned Sensitive Receivers**

2.1.1 The representative sensitive receivers (SR) in the vicinity of the TSE reuse system at VMC are listed in Table 1 and their locations are shown in Figure 3.

**Table 1: Representative Sensitive Receivers in the Vicinity of TSE Reuse System at VMC**

<b>SR No. *</b>	<b>Description</b>	<b>Type of Use</b>	<b>No. of Storey</b>	<b>Distance between SR and Plant Boundary (m)</b>
ANSR1	The former Mok Law Shui Wah School	Institution & Residential	1	100
ANSR2	The former HK Red Cross Shek Pik Youth Camp	Recreational	1	250
WSR3	Shek Pik Reservoir	Reservoir	N.A.	1000
WSR4	Tung Wan	Beach	N.A.	500
ANSR5	CSD Staff Quarters	Residential	1	1000
WSR6	Natural Stream	Stream	N.A.	50
ANSR7	Lantau South Country Park	Recreational	N.A.	100
SR8	Rock Carving at Shek Pik, Lantau Island	Declared Monument	N.A.	800
SR9	Tung Wan Site of Archaeological Interest, Shek Pik	Site of Archaeological Interest	N.A.	250

\* Remarks: ANSR denotes “Air & noise sensitive receiver.”  
 WSR denotes “Water sensitive receiver.”



### 2.1.2 Air Quality and Noise

The former Mok Law Shui Wah School (ANSR1) located to the north (about 100 m from VMC), the former Hong Kong Red Cross Shek Pik Youth Camp (ANSR2) located to the northwest (about 250 m from VMC), CSD Staff Quarters (ANSR5) located to the northwest (about 1000 m from VMC), Lantau South Country Park (ANSR7) located to the north (about 100 m from VMC) are identified as air and noise sensitive receivers during the construction and operation stages.

### 2.1.3 Water Quality

Shek Pik Reservoir (WSR3) to the north (about 1000 m from VMC), Tung Wan (WSR4) located the southwest (about 500 m from VMC) and Natural Stream (WSR6) located to the northwest (about 50 m from VMC) are identified as water sensitive receivers during the construction and operation stages.

### 2.1.4 Cultural Heritage

Rock Carving at Shek Pik, Lantau Island (Declared Monument) (SR8) located to the northwest (about 800 m from VMC) and Tung Wan Site of Archaeological Interest, Shek Pik (SR9) located to the northwest (about 250 m from VMC) are defined as cultural heritage sensitive receivers during the construction and operation stages.

### 2.1.5 Health and Hygiene

Users of VMC including students, staff and visitors are identified as sensitive receivers during the operation stage.

### **3. PROPOSED MODIFICATION OF THE PROJECT**

#### **3.1 Modification 1 – Drip Irrigation System**

A total area of about 3,200 m<sup>2</sup> of greening zones (see Figure 4) is proposed to be irrigated by the treated water. In order to avoid human contact with the treated water, non-spray irrigation (drip irrigation systems) will be adopted. Drip irrigation systems distribute water through a network of valves, pipes, tubing, and emitters. “Perforated Pipe Systems” (See Figure 5) will be used for irrigation. Arteries of PVC tube with perforated drip holes will be laid onto the soil ground. A water timer (see Figure 4) is installed with auto irrigation settings of 20 minutes in the morning (06:00-06:20) and 20 minutes in the evening (18:00-18:20) during summer. From the timer, an artery of perforated PVC tube with drip holes (of approximately 1-2 mm diameter) pierced in an interval of 5-8 cm, will be placed / arrayed to cover the soil bed of the plot. An on-the-spot measurement with this irrigation system marked a consumption of 8 litres of water per minute and a two sessions of 20 minutes of irrigation. The duration and other settings of this irrigation system can be adjusted depend on the season and precipitation.

#### **3.2 Modification 2 – Additional treated effluent holding tank (Irrigation Tank)**

The TSE reuse system is proposed to be modified by installing an irrigation tank storage tank with associated pipelines, which is proposed to be located next to the flushing tank.

#### **3.3 Modification 3 – Relocation of water sampling point**

The water sample is proposed to be withdrawn from the exit point of the treated effluent holding tank #2 instead of the flushing tank / irrigation tank. As the hilltop water tanks (flushing tank and irrigation tank) will be relocated to the roof of the meditation hall (highest building) in the expected future, climbing of cat ladders is needed for carrying out inspection or water sampling. Due to safety concerns of climbing cat ladder and to avoid disturbing student attending meditating class in the meditation hall, the water sample is proposed to be withdrawn from the exit point of the treated effluent holding tank #2, instead of the flushing tank and irrigation tank.

#### **3.4 Modification 4 – increased in water consumption from TSE reuse system.**

With proposing one more usage (landscape irrigation) on the treated water, the anticipated water consumption from TSE reuse system is increased from 20m<sup>3</sup>/day to 37m<sup>3</sup>/day for toilet flushing and landscape irrigation, and this will further contribute to a green and sustainable environment.

## 4. ENVIRONMENTAL REVIEW

### 4.1 Possible Impacts on the Environment

#### 4.1.1 Possible Environmental Impacts and Environmental Implication from proposed modification during Construction Stage

	<b><u>Possible Environmental Impacts listed in previous DIR during Construction Stage</u></b>	<b><u>Environmental implications from the proposed modifications</u></b>
Air Quality	Given the small scale of electrical and mechanical works involving the installation of chemical dosing system, two transfer pumps, a few water tanks and associated distribution pipe work, no adverse air quality impact is expected during the construction stage.	With additional of only one more effluent holding tank (the irrigation tank) and very few associated pipeline connections within the boundary of VMC, there is <b>no environmental implication</b> from the proposed modifications.
Noise	Construction noise would be generated mainly from equipment installation within the STP and associated pipeline connection within the boundary of VMC. In view of the small scale of the project, adverse construction noise impact even to the closest noise sensitive receiver Mok Law Shui Wah School (ANSR1) would not be anticipated.	With additional of only one more effluent holding tank (the irrigation tank) and very few associated pipeline connections within the boundary of VMC, there is <b>no environmental implication</b> from the proposed modifications
Water Quality	No site runoff and wastewater would be generated from the construction of the TSE reuse system, hence adverse water quality impact to Tung Wan (WSR4) and the nearby Natural Stream (WSR6) during the construction stage is not anticipated.	No site runoff and wastewater would be generated from the construction of the TSE reuse system. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Waste	There will be negligible amount of solid waste produced during the construction of the TSE reuse system. Waste to be generated includes small packing carton boxes for dosing pumps and some plastic bags for spare parts. All waste will be taken away by garbage trucks; therefore adverse waste management impact is not anticipated during the construction stage.	Only negligible amount of solid waste will be produced, and the waste generated will be transported away by garbage trucks. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Ecology	Relevant equipment installation and associated distribution pipe work would be located within the	Installing of the additional irrigation tank and drip irrigation

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	boundary of VMC. Adverse ecological impact to environment including adjacent Lantau South Country Park (ANSR7), Natural Steam (WSR6) and Tung Wan (WSR4) is not anticipated during the construction stage.	system would be located within the boundary of VMC. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Landscape and Visual	A detailed tree survey was carried out before the construction of VMC. No trees will be cut down owing to construction of TSE reuse system. Also, relevant equipment installation and associated distribution pipe work would be located within the boundary of VMC and a new built road will be used to transport the materials in and out of the STP. Owing to the small scale of the project, the landscape and visual impact during the construction stage is negligible.	Installing of the additional irrigation tank and drip irrigation system would be located within the boundary of VMC. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Health and Hygiene	Adverse impact on health and hygiene is not anticipated during the construction stage.	Adverse impact on health and hygiene is not anticipated. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Cultural Heritage	Relevant equipment installation and associated distribution pipe work would be located within the boundary of VMC. Owing to large separation distance and the proposed works will be carried out within the boundary of VMC, adverse direct and indirect impact to both built heritage and archaeology including Rock Carving at Shek Pik, Lantau Island (Declared Monument) (SR8) and Tung Wan Site of Archaeological Interest, Shek Pik (SR9) are not anticipated during the construction stage.	Relevant equipment installation and associated distribution pipe work would be located within the boundary of VMC. Owing to large separation distance and the proposed works will be carried out within the boundary of VMC, adverse direct and indirect impact to both built heritage and archaeology including Rock Carving at Shek Pik, Lantau Island (Declared Monument) (SR8) and Tung Wan Site of Archaeological Interest, Shek Pik (SR9) are not anticipated during the construction stage. Therefore, there is <b>no</b>

		<p><b>environmental implication</b> from the proposed modifications.</p> <p>As a precautionary measure, the Antiquities and Monuments Office (AMO) will be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO</p>
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#### 4.1.2 Possible Environmental Impacts and Environmental Implication from proposed modification during Operation Stage

	<b><u>Possible Environmental Impacts listed in previous DIR during Operation Stage</u></b>	<b><u>Environmental implications from the proposed modifications</u></b>
Natural Resources	Currently the toilets inside VMC all utilize potable water for flushing activities. The use of reclaimed water under the proposed TSE reuse system will reduce the water demand for toilet flushing, especially during dry season. It is anticipated that a maximum of 20 m <sup>3</sup> /day of potable water can be saved due to the proposed TSE reuse system.	<p>The reclaimed water is proposed for toilet flushing as well as landscape irrigation.</p> <p>Thus, it is anticipated that the maximum volume of portable water that can be saved is increased from 20m<sup>3</sup>/day to 37m<sup>3</sup>/day due to the proposed modification, which is considered as an advantage.</p>
Air Quality	The TSE reuse system will be operated in enclosed STP consuming only electricity with no fuel combustion exhaust gases so there will be no gaseous air pollutants and fugitive dust particulate emissions during the operation. The sodium hypochlorite solution will be stored in a covered tank within the STP and the operation of the TSE reuse system itself will not produce any odour, so there will not be any potential odour nuisance generated from the	<p>Since there is only minor modification on the operation of TSE reuse system, negligible additional air quality impact is anticipated.</p> <p>The operation of the TSE reuse system itself will not produce any odour, so there will not be any potential additional odour nuisance generated from the operation of the TSE reuse system.</p> <p>Therefore, adverse impact to nearby air sensitive receivers including the former</p>

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	<p>operation of the TSE reuse system. In addition, a deodourizing unit was installed as part of the STP to remove odour generated inside the plant room. Since additional equipment of the proposed TSE reuse system will be installed inside the STP and there will not be any change to the existing plant room area, the existing deodourizing unit is considered sufficient to treat any odour generated during the wastewater treatment process. Adverse impact to nearby air sensitive receivers including the former Mok Law Shui Wah School (ANSR1) and the former Hong Kong Red Cross Shek Pik Youth Camp (ANSR2) are not anticipated during the operation stage.</p>	<p>Mok Law Shui Wah School (ANSR1) and the former Hong Kong Red Cross Shek Pik Youth Camp (ANSR2) are still not anticipated during the operation stage.</p> <p>There is <b>no environmental implication</b> from the proposed modifications.</p>
Noise	<p>The two transfer pumps will be the main potential noise source during the operation of the TSE reuse system. However, in view of low power rating of pumps and the equipment will be installed inside the STP at lower level of VMC with good enclosure, noise arising from the TSE reuse system is anticipated to be well controlled such that even the closest noise sensitive receiver the former Mok Law Shui Wah School (ANSR1) would not detect any noise during the operation stage.</p>	<p>With installation of drip irrigation system, few numbers of tiny pumps will need to be added. However, in view of low power rating of pumps, negligible noise is anticipated to be produced, such that even the closest noise sensitive receiver the former Mok Law Shui Wah School (ANSR1) would not detect any noise during the operation stage. Therefore, there is <b>no environmental implication</b> from the proposed modifications.</p>
Water Quality	<p>During operation stage, the treated effluent from STP will flow from effluent holding tank #1 to effluent holding tank #2. The 10% NaOCl solution will be dosed to effluent holding tank #2. The treated water quality of the TSE reuse system is shown in Table 2.</p>	<p>The operation of the STP is basically unchanged. The treated effluent from STP will flow from effluent holding tank #1 to effluent holding tank #2. The 10% NaOCl solution will be dosed to effluent holding tank #2. Therefore, there is <b>no environmental implication</b> from the proposed modifications.</p>
Waste	<p>During operation phase, sludge generated</p>	<p>The operation of the STP and the sludge</p>

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	from the wastewater treatment process will be recycled back to the anoxic tank for biological degradation. Excess sludge will be stored inside the sludge holding tank and tankered-away to nearby sewage treatment works if required. No adverse waste management impact is expected during the operation.	handling method is basically unchanged. No adverse waste management impact is still expected during the operation. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Ecology	Part of the treated effluent from the STP will be further processed at the TSE reuse system while the remaining will be discharged to the surface u-channel leading to the Natural Stream (WSR6) and Tung Wan (WSR4). Since treated effluent from the STP should comply with the WPCO discharge licence requirement, no adverse ecology impact is anticipated during the operation of the TSE reuse system.	As more treated effluent will be consumed due to landscape irrigation, the remaining treated effluent to be discharged will be further decrease. Since treated effluent from the STP should comply with the WPCO discharge licence requirement, no adverse ecology impact is anticipated during the operation of the TSE reuse system. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Health and Hygiene	All treated effluent from the STP will be disinfected with UV lights and sodium hypochlorite prior to reuse. Since the treated water from TSE reuse system for toilet flushing is for non-potable use, the impact on human health and hygiene is minimal. However, potential health and hygiene concerns may exist if there is incorrect connection of the potable and reclaimed water pipes.	All treated effluent from the STP will be disinfected with UV lights and sodium hypochlorite prior to be reused. The treated water for toilet flushing and landscape irrigation is for non-portable use only. And with the adoption of non-splashing drip irrigation system for landscape irrigation, the possible human contact with the treated water is avoided. As a result, the impact on human health and hygiene is still minimal. Therefore, there is <b>no environmental implication</b> from the proposed modifications.
Hazard to Life	50% sodium hydroxide solution (50L) for pH adjustment and 10% sodium hypochlorite solution (200L) for disinfection will be used for the operation of the STP and the TSE reuse system. Sodium hydroxide is classified as Category 3 corrosive substance under the Dangerous Goods	Since the amount of sodium hydroxide solution and sodium hypochlorite solution added remains the same, no hazard impact is anticipated during the operation of the TSE reuse system. Therefore, there is <b>no environmental</b>

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	<p>Ordinance (Cap 295). It is hazardous in case of skin contact or eye contact. Sodium hypochlorite is classified as Category 4 poisonous substance under the Dangerous Goods Ordinance (Cap 295). It will liberate toxic gas if it is accidentally mixed with incompatible chemicals. In fact, if sodium hydroxide mixes with sodium hypochlorite, only heat, but not toxic gas, would be evolved. The small amount of sodium hydroxide and sodium hypochlorite solutions stored on site is within Fire Services Department dangerous goods exemption quantity. Also, they would not constitute potentially hazardous installations in accordance with HKPSG Chapter 12.4. As such, no hazard impact is anticipated during the operation of the TSE reuse system.</p>	<p><b>implication</b> from the proposed modifications.</p>
<p>Landscape and Visual</p>	<p>Since relevant equipment installation and associated distribution pipe work would be located within the boundary of VMC, the landscape and visual impact is anticipated to be insignificant during the operation stage.</p>	<p>Since additional tank and drip irrigation system would be located within the boundary of VMC, the landscape and visual impact is anticipated to be insignificant during the operation stage. Therefore, there is <b>no environmental implication</b> from the proposed modifications.</p>
<p>Cultural Heritage</p>	<p>The treated effluent from STP will be discharged to the surface u-channel leading to the Natural Stream (WSR6) and Tung Wan (WSR4). However the treated effluent would not pass through built heritage nor site of archaeological interest; hence, no adverse cultural heritage impact is anticipated during the operation stage.</p>	<p>As more treated effluent will be consumed due to landscape irrigation, less treated effluent will be discharged to the surface u-channel leading to the Natural Stream (WSR6) and Tung Wan (WSR4). And the treated effluent would not pass-through built heritage nor site of archaeological interest; hence, no adverse cultural heritage impact is anticipated during the operation stage. Therefore, there is <b>no environmental implication</b> from the proposed modifications.</p>



**Table 2: Treated Water Quality of TSE Reuse System**

<b>Water Quality Parameter</b>	<b>Unit</b>	<b>USEPA Criteria Urban Reuse (Unrestricted) *</b>	<b>Treated Water Quality of the TSE Reuse System</b>
pH	-	6-9	6-9
Biochemical Oxygen Demand (BOD <sub>5</sub> )	mg/L	≤ 10	≤ 10
Turbidity	NTU	≤ 2	≤ 2
Fecal Coliform	No./100mL	Not Detectable	Not Detectable
Total Residual Chlorine	mg/L	≥ 1	≥ 1 **

Remarks:

\* From Table 4-4 of USEPA (2012) Guidelines for Water Reuse

\*\* The proposed dosing of NaOCl should be determined subject to actual effluent quality prior to commissioning in order to maintain the specific residual chlorine level. The required dosing of NaOCl should also be reviewed through the monitoring mechanism as stated in Section 4.2.2 under the row “Water Quality”

Reclaimed water from the TSE reuse system will follow the USEPA criteria for Urban Reuse (Unrestricted), which is more stringent than the criteria for Agricultural Reuse (Non-Food Crops). In addition, it will have an overall better water quality than the existing WPCO discharge licence requirement. Since the treated effluent from effluent holding tank #1 will not be dosed with the 10% NaOCl solution, nearby sensitive receivers such as the Natural Stream (WSR6) and Tung Wan (WSR4) will not be affected. Therefore, no adverse water quality impact is expected during the operation of the TSE reuse system.

As only minor variation on the operation of the water reuse system and no human contact with the treated water is expected, the same frequency of water sampling in the previously issued environmental permit (EP-580/2020) is adopted, which is illustrated in Section 4.2.2 “Water Quality”.

## 4.2 Environmental Protection Measures to be Incorporated

### 4.2.1 Environmental Mitigation Measures during Construction Stage

	<b><u>Environmental Mitigation Measures stated in Previous DIR during Construction Stage</u></b>	<b><u>Change in Environmental Mitigation Measures in proposed modification</u></b>
Air Quality	No adverse air quality impact due to construction of TSE reuse system will be anticipated.	No adverse air quality impact due to modification of TSE reuse system or installation of drip irrigation system will be anticipated. It remains the same when compared with the previous DIR during construction stage.
Noise	Implementation of good site practices e.g., regular maintenance of powered mechanical equipment and use of silent equipment as the proper noise control measures are recommended to minimize the potential noise impact during the construction stage.	Good site practices will still be implemented to minimize the potential noise impact during the construction stage. It remains the same when compared with the previous DIR during construction stage.
Water Quality	There will be no site runoff and wastewater generated from the construction of TSE reuse system.	There will still be no site runoff and wastewater generated from the modification of TSE reuse system. It remains the same when compared with the previous DIR during construction stage.
Waste	There will be negligible amount of solid waste produced from the construction of the TSE reuse system. The waste will be taken away by garbage trucks and disposed of at nearby refuse collection point or refuse transfer station.	There will be negligible amount of solid waste produced from the modification of TSE reuse system and installation of drip irrigation system. The waste will be taken away by garbage trucks and disposed of at nearby refuse collection point or refuse transfer station. It remains the same when compared with the previous DIR during construction stage.

#### 4.2.2 Environmental Mitigation Measures during Operation Stage

	<b><u>Environmental Mitigation Measures stated in Previous DIR during Operation Stage</u></b>	<b><u>Change in Environmental Mitigation Measures in proposed modification</u></b>
Air Quality	The sodium hypochlorite solution will be stored in a covered tank within the STP and the operation of the TSE reuse system itself will not produce any odour, so there will not be any potential odour nuisance generated from the operation of the TSE reuse system. In addition, a deodourizing unit was installed as part of the STP to remove odour generated inside the plant room. Since additional equipment of the proposed TSE reuse system will be installed inside the STP and there will not be any change to the existing plant room area, the existing deodourizing unit is considered sufficient to treat any odour generated during the wastewater treatment process. No adverse impact to the nearby sensitive receivers is anticipated during the operation stage.	The basic operation principle of the TSE reuse system remains unchanged, and the mitigation measures remain the same as in the previous DIR. Therefore, no adverse impact to the nearby sensitive receivers is anticipated during the operation stage.
Noise	Equipment will be enclosed to contain any noise generated from the operation. Also, acoustic door and air duct silencer are adopted. It is believed above measures are sufficient in reducing noise transmission out of the plant room.	The basic operation principle of the TSE reuse system remains unchanged. The mitigation measures adopted are still sufficient in reducing noise transmission out of the plant room.
Water Quality	A program should be set up for monitoring the water quality from the TSE reuse system to ensure compliance with the quality standards specified in Table 2. Water sample	Water quality monitoring program from TSE reuse system to ensure compliance with the quality standards specified in Table 2 is implemented. Water sample will be withdrawn from the exit point of the

	<p>will be withdrawn from flushing tank weekly for pH and total residual chlorine testing by rapid test kits. In addition, water sample will be withdrawn from the flushing tank monthly for turbidity, BOD5 and fecal coliform testing by HOKLAS accredited laboratory (or other international accredited laboratory that is HOKLAS-equivalent). Should exceedance of water quality standard be found, the TSE reuse system will be suspended immediately. The TSE reuse system will be resumed only when the quality of water sample is tested and complies with the requirement stated in Table 2. In addition, in order to promote the treated water quality from TSE reuse system, the flushing tank will be cleaned at least once every six months.</p>	<p>treated effluent holding tank #2 weekly for pH and total residual chlorine testing by rapid test kits. In addition, water sample will be withdrawn from the treated effluent holding tank #2 monthly for turbidity, BOD5 and fecal coliform testing by HOKLAS accredited laboratory (or other international accredited laboratory that is HOKLAS-equivalent). Should exceedance of water quality standard be found, the TSE reuse system will be suspended immediately. The TSE reuse system will be resumed only when the quality of water sample is tested and complies with the requirement stated in Table 2. In addition, in order to promote the treated water quality from TSE reuse system, the effluent holding tank #2, flushing tank and irrigation tanks will be cleaned at least once every six months.</p> <p>The water sample is proposed to be withdrawn from the exit point of the treated effluent holding tank #2 instead of the flushing tank / irrigation tank. As the hilltop water tanks (flushing tank and irrigation tank) will be relocated to the roof of the meditation hall (highest building) in the expected future, climbing of cat ladders is needed for carrying out inspection or water sampling.</p> <p>Due to safety concerns of climbing cat ladder and to avoid disturbing student attending meditation class in the meditation hall, water sample is proposed to be withdrawn from the exit point of the</p>
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		<p>treated effluent holding tank #2, instead of the flushing tank and irrigation tank.</p> <p>To sum up, the water quality standard follows the USEPA criteria for Urban Reuse (Unrestricted) as stated in Table 2, which is unchanged when compared with the previous DIR. The water quality monitoring program also remains the same when compared with the previous DIR, as only minor variation on the operation of the water reuse system and no human contact with the treated water is expected.</p> <p>The only variation is relocating the water sampling point to treated effluent holding tank #2 due to safety concerns and minimizing disturbance of meditation class.</p>
Waste	There will be negligible amount of sludge produced from the wastewater treatment process. Excess sludge will be stored inside the sludge holding tank and tankered-away to nearby sewage treatment works if required.	It remains the same when compared with the previous DIR during operation stage. It is anticipated that the amount of sludge produced is still negligible. Excess sludge will be stored inside the sludge holding tank and tankered-away to nearby sewage treatment works if required.
Health and Hygiene	The treated water pipeline system will be a separate system and will not be connected with the potable water pipeline system. To avoid cross-connection of the treated water supply to the potable water supply, the treated water pipes will be colour-coded and clearly labeled with warning signs so that physical connection of the treated water pipes with potable water fittings would not be possible.	<p>The treated water pipeline system will be a separate system and will not be connected with the potable water pipeline system to avoid contaminating the potable water supply system. To prevent reclaimed water from entering the potable mains water supply, the back-up water supply to supplement the reclaimed water will be fitted with backflow prevention device.</p> <p>To avoid cross-connection of the treated water supply to the potable water supply, the treated water pipes will be colour-</p>

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		<p>coded and clearly labeled with warning signs so that physical connection of the treated water pipes with potable water fittings would not be possible.</p> <p>As landscape irrigation is proposed to be adopted by the reclaimed water so as to minimize any health and hygiene impact by the reclaimed water to the general public, non-spray irrigation will be implemented. Drip irrigation for landscape irrigation is proposed to be adopted in order to minimize the exposure to the general public.</p>
Hazard to Life	<p>A newly built road to the entrance of VMC was completed under Phase One of the development so sodium hydroxide and sodium hypochlorite solutions can be delivered to the STP directly by truck. The chemical will be stored in enclosed tank and protected by drip tray. The sodium hydroxide solution will be kept below 50L in storage and the sodium hypochlorite solution will be kept below 250L in storage not exceeding the exempted quantity under the Dangerous Goods Ordinance (Cap. 295) and its subsidiary Regulations. During normal operation, staff will be required to wear personal protective gears, including hand gloves, face mask and apron to prevent direct contact with the chemical while working inside the STP. An emergency plan will also be developed for the operation of the TSE reuse system.</p>	<p>It remains the same when compared with the previous DIR during operation stage. The chemical will still be stored in enclosed tank and protected by drip tray. The sodium hydroxide solution will still be kept below 50L in storage and the sodium hypochlorite solution will be kept below 250L in storage not exceeding the exempted quantity under the Dangerous Goods Ordinance (Cap. 295) and its subsidiary Regulations. During normal operation, staff will still be required to wear personal protective gears. An emergency plan will still be adopted for the operation of the TSE reuse system.</p>

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Comments on Environmental Effects	<p>The use of treated water for toilet flushing will reduce the quantity of potable water consumed in VMC. This is considered to be benefits or positive impacts of the project. The promotion of the use of treated water in appropriate circumstances to enable conservation of potable water will contribute to a green and sustainable environment in Hong Kong.</p>	<p>Proposed landscape irrigation by treated water will further reduce the quantity of potable water consumed in VMC. This is considered to be benefits or positive impacts of the project.</p>
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## **5. EVALUATION OF MATERIAL CHANGE**

### **5.1 Definition**

A material change means a physical addition or alteration to a designated project which results in an adverse environmental impact as defined in section 6.1 of the Technical Memorandum on Environmental Impact Assessment Process.

### **5.2 General Rules**

The material change shall refer to significant changes only. As a matter of principle, an environmental impact is considered to be adverse if any factor listed in Annex 3 applies and the criteria in Annexes 4 to 10 may be violated. As a general rule, changes under the following circumstances are regarded as material changes to a designated project:

<b><u>General rule of material changes stated in section 6.1 of the Technical Memorandum</u></b>	<b><u>Justification of any material change for the proposed variation of environmental permit</u></b>
a change to physical alignment, layout or design of the project causing an environmental impact likely to affect existing or planned community, ecologically important areas or sites of cultural heritage;	<p>Only minor change in physical alignment, layout, design of the project will be carried out. And with implementing the mitigation measures mentioned in section 4.2, it is anticipated that the change in physical alignment will not cause any environmental impact on existing community, ecologically important areas or sites of cultural heritage.</p> <p>As a result, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.</p>
a physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to affect ecologically important areas, or disrupting sites of cultural heritage;	<p>No reclamation or dredging activities will be carried out in the proposed modification.</p> <p>As a result, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.</p>



<p>an increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum without mitigation measures in place;</p>	<p>Negligible amount of solid waste will be generated during construction stage and they will be transported away by garbage trucks.</p> <p>Sludge will be generated from the wastewater treatment process during operation stage. They will be recycled back to the anoxic tank for biological degradation. Excess sludge will be stored inside the sludge holding tank and tankered-away to nearby sewage treatment works if required.</p> <p>With suitable implementation of the mitigation measures mentioned in section 4.2, violating guidelines or criteria in this technical memorandum is not expected.</p> <p>As a result, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.</p>
<p>an increase in throughput or scale of the project leading to physical additions or alterations that are likely to violate the guidelines or criteria in this technical memorandum without mitigation measures in place;</p>	<p>With installation of irrigation tank and drip irrigation system with VMC's boundary, the scale of the project leading to physical additions or alterations is negligible.</p> <p>And with suitable implementation of the mitigation measures mentioned in section 4.2, violating guidelines or criteria in this technical memorandum is not expected.</p> <p>As a result, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.</p>

<p>a change resulting in physical works that are likely to affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.</p>	<p>Installing of the additional irrigation tank and drip irrigation system would be located within the boundary of VMC, which is distanced with the sensitive receiver, ecological habitat, or a site of cultural heritage.</p> <p>Adverse ecological impact to environment including adjacent Lantau South Country Park (ANSR7), Natural Steam (WSR6) and Tung Wan (WSR4); and adverse direct and indirect impact to both built heritage and archaeology including Rock Carving at Shek Pik, Lantau Island (Declared Monument) (SR8) and Tung Wan Site of Archaeological Interest, Shek Pik (SR9) are not anticipated.</p> <p>As a result, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.</p>
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### 5.3 Conclusion of any material change

To summarize, the proposed modification of the designated project will not fall into any circumstances stated in a general rule. In light of the only minor change in physical alignment, layout or design of the project, and not likely to affect existing or planned community, ecologically important areas or sites of cultural heritage. And with suitable implementation of the mitigation measures mentioned in section 4.2, violating guidelines or criteria in this technical memorandum is not expected.

## **6. CONCLUSION**

The proposed modification involves the modification of the TSE reuse system (irrigation tank with associated pipeline is added), installation of drip irrigation system, vary of water sampling point and increased in anticipated water consumption from TSE Reuse System. With proper implementation of the above environmental mitigation measures that will be incorporated into the TSE reuse system, insurmountable environmental impact during the construction and operation stages of the proposed installation of irrigation tank and drip irrigation system is not expected. It has demonstrated that the Project will not result in any adverse environmental impacts during construction and operation stage. No environmental implication from the proposed modification is expected. Since drip irrigation for landscape irrigation is proposed to be adopted, the exposure of treated water to the general public is minimized and thus no adverse impact on health and hygiene is anticipated. Moreover, adoption of landscape irrigation by TSE reuse system with drip irrigation system would not constitute any material change under the EIAO.

To conclude, the use of the treated effluent for toilet flushing and landscape irrigation by drip irrigation system has the advantages of (i) reducing the demand on potable water since it is a scarce resource deserved for preservation, (ii) reducing wastewater discharges from the STP and the pollution loading to the environment and (iii) avoiding human contact with the aerosol / nebulization of recycling water, and hence reducing the risk of disease.

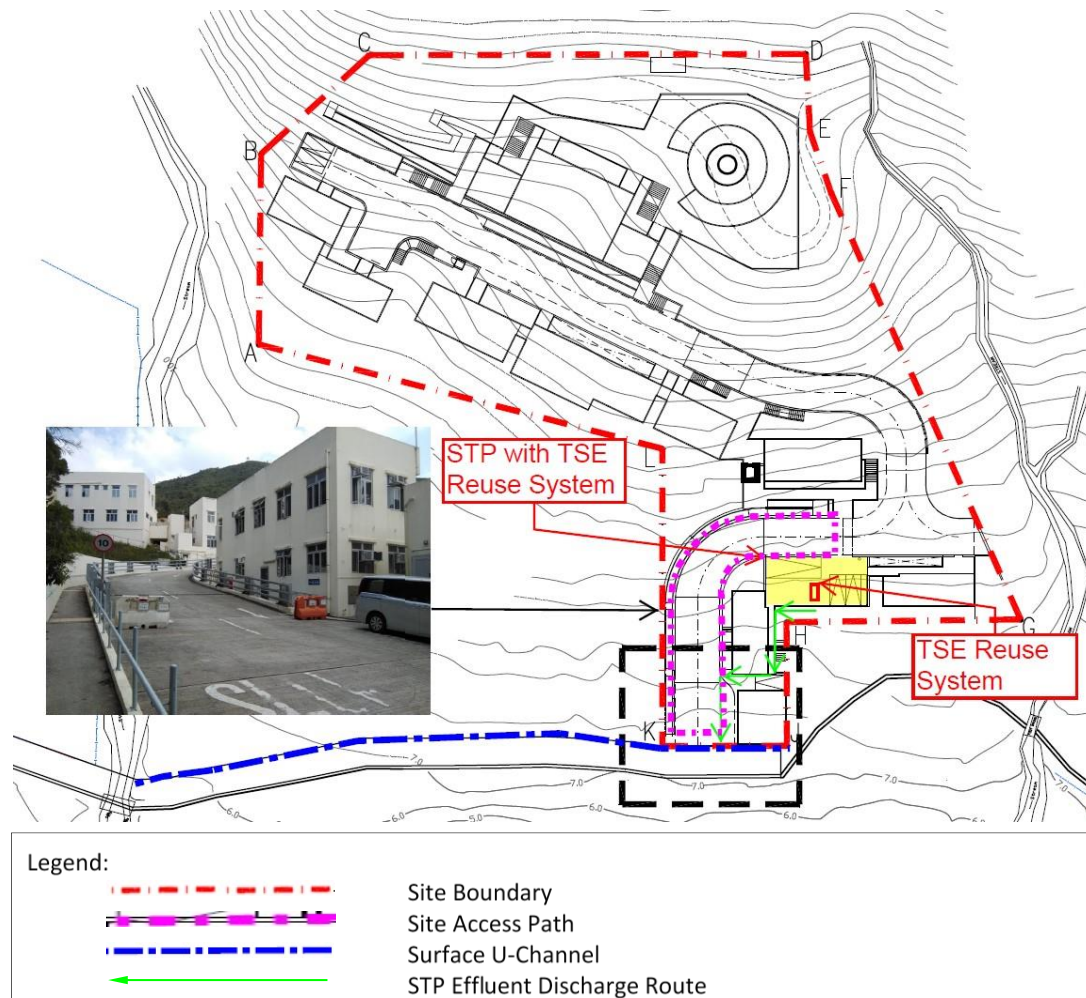


Figure 1: Site Location Plan of VMC

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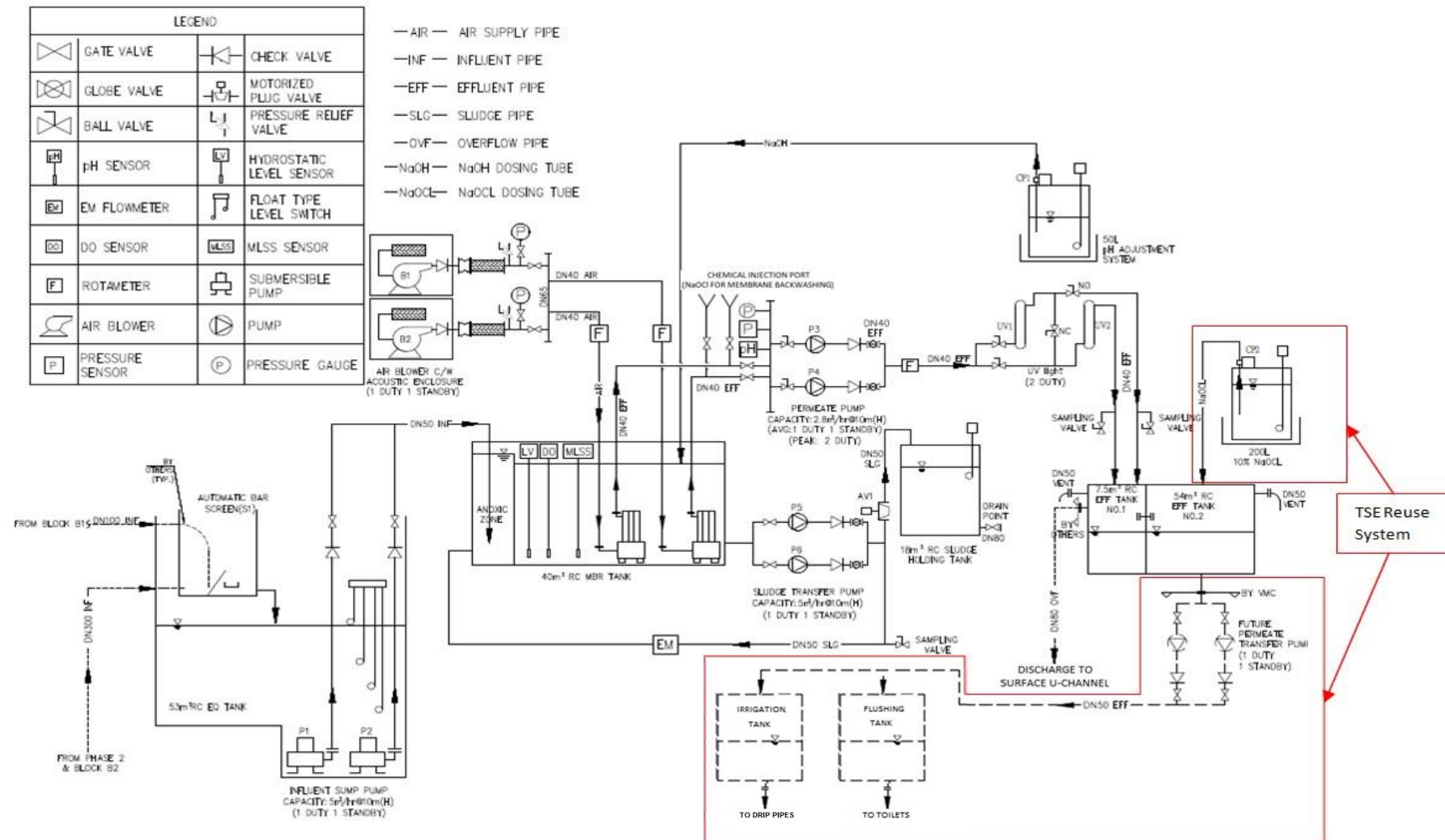


Figure 2: Process Flow Diagram of STP with TSE Reuse System



- ANSR1: Former Mok Law Shui Wah School
- ANSR2: Former Hong Kong Red Cross Shek Pik Youth Camp
- WSR3: Shek Pik Reservoir
- WSR4: Tung Wan
- ANSR5: CSD Staff Quarters
- WSR6: Natural Stream
- ANSR7: Lantau South Country Park
- SR8: Rock Carving at Shek Pik, Lantau Island
- SR9: Tung Wan Site of Archaeological Interest, Shek Pik

Figure 3: Adjacent Sensitive Receivers of VMC



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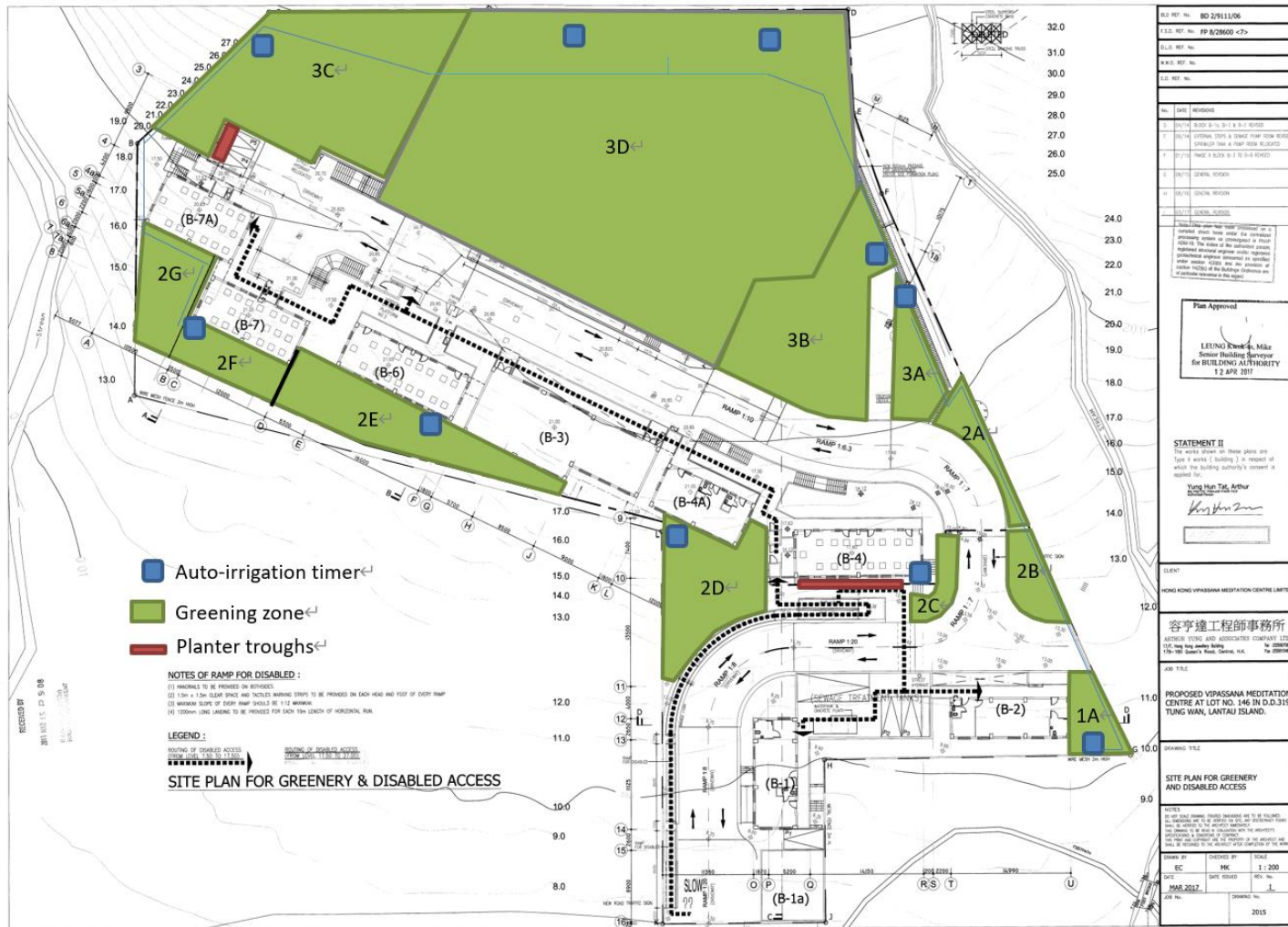


Figure 4: Locations of Greening Zones and Auto-irrigation timer

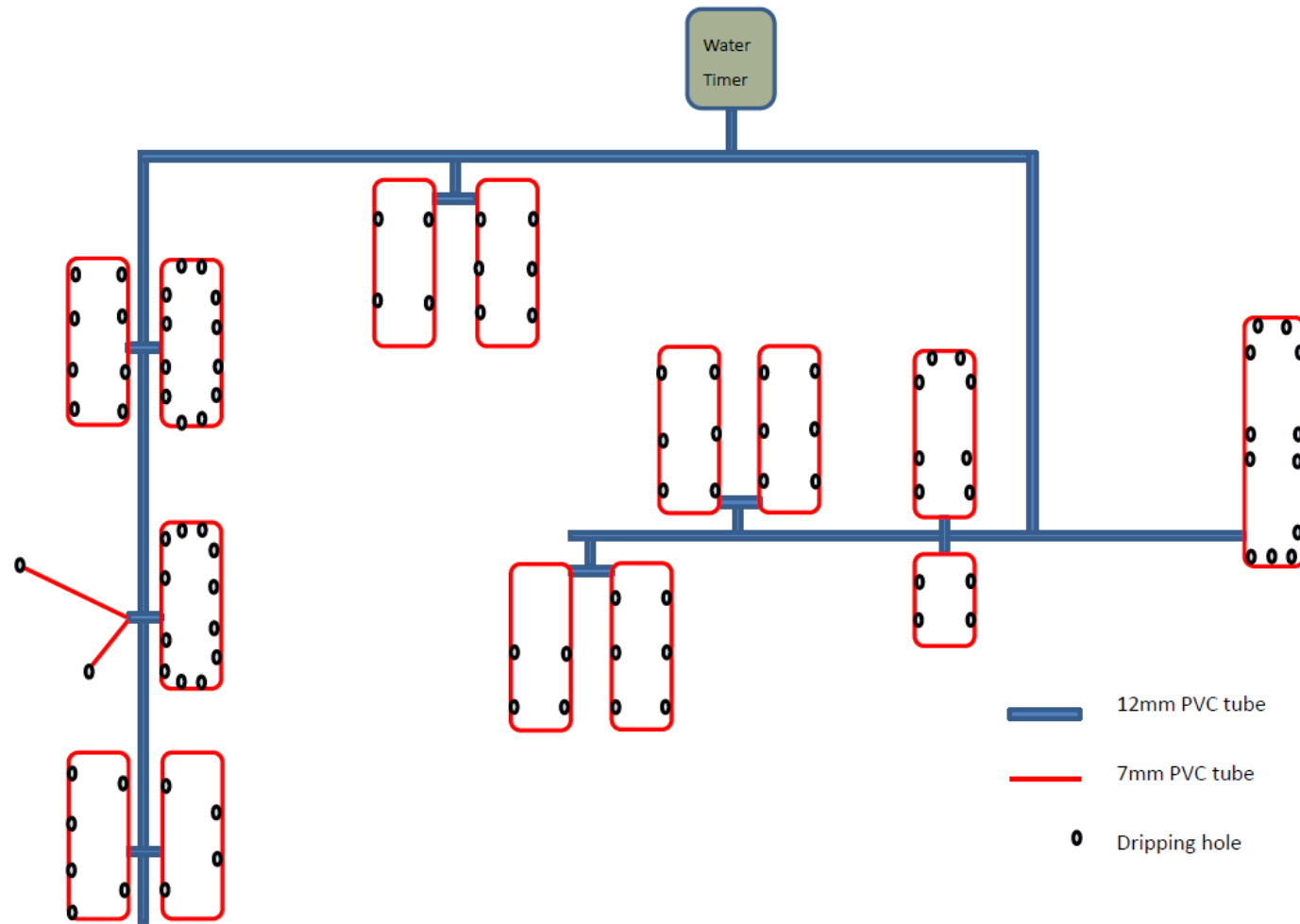


Figure 5: Schematic diagram of the Drip Irrigation System