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## 12 Hazard to Life

### 12.1 Legislation, Standards and Guidelines

#### 12.1.1 General

**12.1.1.1** The relevant legislation and associated guidance applicable to the present study for the assessment of hazard to life include:

- Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM); and
- Dangerous Goods Ordinance (Cap. 295).

#### 12.1.2 Technical Memorandum on Environmental Impact Assessment Process

**12.1.2.1** As set out in Annex 4 of the EIAO-TM, the criterion for hazard to human life is to meet the Hong Kong Risk Guidelines (HKRG). The risk guidelines are expressed in terms of individual and societal risks as shown in **Table 12.1** below.

**Table 12.1** Criteria for Individual and Societal Risks

Risk	Descriptions
Individual Risk	Maximum level of off site individual risk should not exceed 1 in 100,000 per year i.e. $1 \times 10^{-5}$ per year.
Societal Risk	With the population increases, the societal risk will be increased. The societal RG is presented graphically in <b>Appendix 12.1</b> . It is expressed in terms of lines plotting the cumulative frequency (F) of N or more deaths in the population from incidents at the installation. Two F-N risk lines are used in the RG that demark “acceptable” or “unacceptable” societal risks. The intermediate region indicates the acceptability of societal risk is borderline and should be reduced to a level which is “as low as reasonably practicable” (ALARP). It seeks to ensure that all practicable and cost-effective measures that can reduce risk will be considered.

#### 12.1.3 Other Assessment Criteria

**12.1.3.1** The conveyance of explosives by public roads in HKSAR is governed by the Dangerous Goods Ordinance (Cap. 295). A removal permit is required for transport on public roads. Also, the road vehicle carrying explosives should be of an approved type. Storage of explosives is governed by the Dangerous Goods (General) Regulations (Cap. 295B). Under the regulation, a license is required for storage.

## 12.2 Review of Hazard Identifications

- 12.2.1.1** The nearest Potentially Hazardous Installations (PHIs) is Siu Ho Wan Water Treatment Works with 1km consultation zone which is located at more than 3km away and hence the Project does not fall with the respective consultation zone. Therefore, potential risk relating PHI is not anticipated.
- 12.2.1.2** According to the latest design as discussed in **Section 2**, drill-and-blast would be required at 2 possible locations, with one at the EAP/ EEP at west of Shun Tung Road, and another one at the bottom of TCW Station. Only one blast per day will be conducted for each location, i.e. total of two blasts per day for the entire project. The transportation of explosives shall be carried out by Mines Division of CEDD. Mines Division of CEDD will deliver the explosives to a designated spot within the construction site. Overnight storage of explosives on site is not required.
- 12.2.1.3** According to Clause 3.4.13 of the EIA SB No. ESB-329/2020, hazard assessment shall be carried out if there is overnight storage of explosives on site and the storage is in close proximity to populated areas. Hence, Quantitative Risk Assessment (QRA) is not required. However, a qualitative hazard assessment relating to the drill-and-blast will be conducted as below.

## 12.3 Hazard Impact Evaluation

- 12.3.1.1** For the EAP/EEP located at west of Shun Tung Road, drill-and-blast would be required when the construction of the vertical shaft hits the rock at approximately +7mPD. Prior to blasting, all the construction workforces within the EAP/EEP will be evacuated and the impermeable blast cover will be closed. A cross-section diagram is shown in **Appendix 12.2**.
- 12.3.1.2** For the TCW Station construction, the concrete slab would be installed prior to the commencement of excavation underneath the concrete slab. When the excavation reaches the rock at about -17mPD, drill-and-blast may be required. Prior to drill-and-blast underneath the concrete slab, all the construction workforces within the TCW station will be evacuated and the impermeable blast covers at all the mucking out points in TCW Station will be closed. A cross-section diagram is shown in **Appendix 12.2**.
- 12.3.1.3** Drill-and-blast works may be required for the construction of the TCW Station and EAP/ EEP. Details of drill-and-blast works including type and dose of explosive are yet to be determined. However, the transportation of explosives shall be carried out by Mines Division of CEDD.
- 12.3.1.4** In addition, licence, permit and certificate are needed for use of explosive. Project proponent should apply the related licence, permit and certificate for the drill-and-blast works. With the implementation of proposed mitigation measures below, potential risk arising from the use of explosives for the construction of TCW Station and EAP/ EEP is not anticipated.

**12.3.1.5** In addition, since the operation of the Project does not involve any use of explosives, potential risk during operational phase is not envisaged.

## **12.3.2 Mitigation Measures**

**12.3.2.1** In relating to the potential use of explosives for the construction of the EAP/EEP and TCW Station, the following design measures are proposed to reduce the potential risk.

- Implement emergency plan for efficient excavation including good practice;
- Adopt site-sensitised bulk emulsion explosives for blasting;
- No overnight storage of explosives;
- Provide impermeable blast covers for the TCW Station and EAP/ EEP;
- Prior to blasting, all the construction workforce for EAP/EEP and TCW station shall be evacuated and all the impermeable blast covers shall be closed; and
- Limit to one blast per day for each blasting location (i.e. total of two blasts each day for the entire project).

### **Good site practices**

**12.3.2.2** Other than the above design measures, the following general recommendations should be considered for the safe use of explosives.

- Temporary mitigation measures such as blast doors or heavy duty blast curtains should be installed at the access adits, shafts/ portals and at suitable locations underground to prevent flyrock and control the air overpressure;
- Blasting at different locations will be carried out for this project. Good communication and control will need to be adopted in ensuring that the works are carried out safely;
- A Chief Shotfirer and a Blasting Engineer shall be employed in addition to the normal blasting personnel to ensure that the works are coordinated between blasting areas and between adjacent contracts;
- Shotfirer to be provided with a lightning detector, and appropriate control measures should be in place;
- Provide full-time supervision and blast checking by Blast Competent Supervisors (BCS) as mentioned in Project Administration Handbook for Civil Engineering Works;
- Checking (including both document and site checks) for each blast including the installation of protective, precautionary, preventive measures, comply with the Blasting Permit requirements;
- Inspecting the condition of all sensitive receivers before and after each blast;

- Inspecting the construction of preventive works, if required, for the sensitive receivers;
- Monitoring the site operations and working methods to ensure that they meet the safety requirements set out in the Blasting Permit;
- Inspect consequence-to-life category 1 and 2 slopes that are subjected to significant blasting vibration before and after each blast;
- Limit blast charge weight based on the allowable Peak Particle Velocity (PPV) for the controlling sensitive receivers surrounding the site;
- Monitor regularly the condition of all sensitive receivers and carry out inspections and reviews before and after each blast;
- Resolve any stability concerns observed at the slopes (e.g. persistent adverse discontinuity or other adverse geology, or loose boulders or other objects on the slope that could become unstable) before blasting;
- Ensure that any blasting carried out will not adversely affect services, slopes, retaining walls, buildings and structures through ground vibrations or other effects; and
- Ensure that adequate and necessary preventive, protective and precautionary measures are provided to prevent the works from causing injury to workers and the public, significant disruption to traffic, undue vibration and movement to existing structures and services, or undue nuisance to the public

## 12.4 Conclusion

**12.4.1.1** According to Clause 3.4.13 of the EIA SB No. ESB-329/2020, hazard-to-life assessment shall be carried out if there is overnight storage of explosives on site and the storage is in close proximity to populated areas.

**12.4.1.2** According to the latest design, overnight storage of explosives on site is not required. However, drill-and-blast works may be required for the construction of the EAP/EEP and TCW Station. The transport of explosives shall be carried out by Mines Division of CEDD. In addition, with the implementation of proposed mitigation measures, no insurmountable potential risk arising from the transport and use of explosives for the construction of EAP/ EEP and TCW Station is anticipated.

**12.4.1.3** The Project does not fall into consultation zone of any PHIs. Therefore, potential risk relating PHI is not anticipated. In addition, since the operation of the Project does not involve any use of explosives, potential risk during operational phase is not envisaged.