

4 Hazard to Life

4.1 Legislation, Standards and Guidelines

4.1.1 General

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

- Hong Kong Planning Standards and Guidelines (HKPSG); and
- Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO).

Hong Kong Planning Standards and Guidelines (HKPSG)

4.1.1.2 In accordance with the Chapter 12 in HKPSG, a Potentially Hazardous Installation (PHI) is an installation which stores hazardous materials in quantities equal to or greater than a specified threshold quantity, which varies with different substances. Development proposals in the Consultation Zone (CZ) of each PHI will be assessed against the Government risk guidelines to ensure that risks to the public are confined to within acceptable limits. Where the risk guidelines cannot be met, for existing PHIs, The Coordinating Committee on Land-use Planning and Control relating to Potentially Hazardous Installations (CCPHI) will consider the necessary risk mitigation measures to bring the risk level down.

4.1.1.3 A set of Risk Guidelines (RG) has been adopted by CCPHI to assess the off-site risk levels of PHIs. These guidelines are expressed in terms of individual and societal risks.

Table 4.1 Criteria for Individual and Societal Risks

Risk	Description
Individual Risk	It is the predicted increase in the chance of death per year to an individual who lives or works near to a PHI. Maximum level of off-site individual risk associated with PHIs should not exceed 1 in 100 000 per year i.e. 1×10^{-5} /year.

Risk	Description
Societal Risk	It expresses the risks to the whole population living near a PHI. With the population increases, the societal risk will be increased. The societal RG is presented graphically in Figure 4.1 . 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 to determine “acceptable” or “unacceptable” societal risks. The vertical cutoff line at 1,000 fatalities suggested that any hazardous scenarios that could result in more than 1000 fatalities would constitute to “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.

Technical Memorandum on Environmental Impact Assessment Process TM-EIAO

4.1.1.4 In accordance to Annex 4 Section 2 of the TM-EIAO, the criterion for hazard to life is to meet the RG as discussed in **Section 4.1.1.3**.

4.2 Description of the Environment

4.2.1 Existing Environment

4.2.1.1 The Project Site will be located partially within the 1,000m CZ of Tai Po Gas Production Plant (TPGPP) of Hong Kong and China Gas Company Limited (HKCG). The location of the TPGPP is shown in **Figure 4.2**. The distance from the Project Site to TPGPP is around 750m. The existing land use on the Project Site is a golf driving range on top of the Restored Shuen Wan Landfill.

4.2.1.2 Failures associated with the utilities within TPGPP could lead to hazardous outcomes, such as fireball, flashfire, jet fire, etc., which might possibly affect offsite population within the CZ.

4.2.1.3 While all the possible information sources for the Quantitative Risk Assessment (QRA) or Hazard Assessment (HA) findings of TPGPP have been exhausted, there is no information related to the QRA or HA findings of TPGPP available in the public domain based on our review.

4.2.1.4 Nevertheless, the current design of the Project has implemented all practicable design approach to minimise the hazard level as much as

practicable by avoiding / minimising any new population within the CZ as detailed in **Sections 4.4.1** and **4.5.1**.

4.3 Development Plan of Project Site

4.3.1.1 As discussed in **Section 2**, the existing driving range is proposed to be transformed into an 18-hole golf course, where ancillary facilities, access road and utilities have also been included in the plan to support the operation of the Project.

4.3.1.2 Facilities with permanent working population, i.e. office area within the Ancillary Facilities, has been proactively planned outside of the CZ of TPGPP to minimize the potential risks.

4.3.1.3 As the Project Site falls partially within the CZ of the TPGPP, CCPHI has been informed on April 2018 in respect of the Project. Comments of the Government risk advisors have also been considered in **Sections 4.4.1.1** and **4.5.1.3**.

Provision for Staff Quarters and Overnight Accommodations

4.3.1.4 As discussed in **Section 2**, in order to allow for more flexible uses and development of the Project to suit contemporary circumstances and operational requirements, the provision for staff quarters and overnight accommodations have been duly considered. For hazard-to-life assessment, the worst case development scenario with staff quarters and overnight accommodations is presented. Nonetheless, these staff quarters and overnight accommodations have also been proactively located outside the CZ of TPGPP.

4.4 Construction Phase Impact Evaluation

4.4.1 Societal Risks

4.4.1.1 The Project Site falls partially within the CZ of TPGPP, hence the number of population within the CZ will temporarily increase during construction phase (January 2021 to December 2023, tentatively). However, out of the approximate total of 200 workers to be involved in the construction of this Project, no more than 50 construction workers will be allowed at 0700 – 1900 within the Project Site which falls within the CZ of TPGPP. Such requirement shall be included in the Contract Document of the Project, where the future contractor shall be obliged to implement. As a result, although the findings of QRA for TPGPP are not accessible as mentioned in **Section 4.2.1.3**,

having regard to the comments of the Government risk advisors, it is considered that the Project would not induce significant risk within the CZ of TPGPP during the construction phase and the potential impact of societal risk is only temporary and confined within the construction period.

4.4.2 Individual Risks

4.4.2.1 The construction of the Project would not involve the use of explosives, hence no additional risk would be imposed to TPGPP and the prevailing individual risk level will be maintained. The 1×10^{-5} / year individual risk contour will be expected to be contained within TPGPP and is very unlikely to encroach on the Project Site due to substantial separation distance. Thus, it is anticipated the overall risks will comply with the standards.

4.5 Operational Phase Impact Evaluation

4.5.1 Societal Risks

4.5.1.1 An approximate daily average of 150 visitors and 70 staff are estimated to be present within the Project Site during operational phase, although the actual number would be subject to future operation details and requirements. As discussed in **Section 4.3**, the area with permanent working population and the provision for staff quarters and overnight accommodations have been planned outside the CZ of TPGPP. There will only be transient population outside the Ancillary Facilities, including staff and visitors. In order to further minimise the overall potential societal risks, the following population arrangement will be implemented in the Project during operational phase:

- No permanent working / residential population within the CZ;
- Daily average of 20 transient staff within CZ during the operational phase. The Golf Course operator will implement a record system such that the operator would be able to monitor the daily average number of staff within CZ and make sure it would not be exceeded; and
- Daily average of 20 transient visitors within the CZ during the operational phase. The Golf Course operator will implement a booking system such that the operator would be able to monitor the daily average number of visitors within CZ and make sure it would not be exceeded.

4.5.1.2 With regards to all the existing population / planned developments within the CZ, including the working population of some 80 industrial premises in Tai Po Industrial Estate, the existing golf driving range, residential population in Ha Hang Village, Tin Sam Village, Fu Shin Estate etc., the popularly used Tai Po Waterfront Park, transient population at major roads (Ting Kok Road) and cycle track within the area, etc., the additional transient population within the Project would not have significant impact to the prevailing societal risks of TPGPP.

4.5.1.3 As a result, the overall potential impact is only marginal as the contribution from the operation of the Project would be rather insignificant given the substantial separation distance. Hence, having regard to the comments of the Government risk advisors, it is considered that the Project would not induce a significant deviation from the prevailing HA findings and the Project is considered acceptable from the aspect of hazard-to-life although the findings of QRA for TPGPP are not accessible as mentioned in **Section 4.2.1.3**.

4.5.2 Individual Risks

4.5.2.1 The operation of the Project would not involve the use of explosives, hence no additional risk would be imposed to TPGPP and the prevailing individual risk level will be maintained. The 1×10^{-5} / year individual risk contour will be expected to be contained within TPGPP and is very unlikely to encroach on the Project Site due to substantial separation distance. Thus, it is anticipated the overall risks will comply with the standards.

4.6 Mitigation Measures

4.6.1.1 Since the construction and operational phases of the Project would not induce significant impact to the prevailing risks level of TPGPP. No mitigation measures are therefore required.

4.6.1.2 Notwithstanding the above population arrangement, precautionary measures including the provision of emergency plan for efficient evacuation and safety trainings (e.g. fire drills) will be implemented during construction and operational phase of the Project. A communication mechanism would be established between the operator of TPGPP and the Contractor during construction phase as well as the operators of the Golf Course during operational phase to allow evacuation in case of emergency.

4.7 Conclusion

- 4.7.1.1** Based on the estimated number of construction workers, visitors and staff for the Project within the CZ of TPGPP and the analysis mentioned in **Sections 4.4** and **4.5**, it is considered and Director of Environmental Protection agreed that a hazard assessment, in form of Quantitative Risk Assessment specified under Appendix C of the EIA Study Brief, is not required for the Project.
- 4.7.1.2** Both construction and operational phase of the Project is not likely to induce a significant change to the prevailing risks level of TPGPP. No mitigation measure is therefore required.