

14 CONCLUSION

14.1 General

14.1.1 This EIA Report has been prepared to satisfy the requirements given in the EIA Study Brief ESB-247/2012 and the Technical Memorandum on Environmental Impact Assessment Process. All the latest planning information has been incorporated into the EIA process. Aspects that have been considered in this EIA Report include:

- (1) Air quality;
- (2) Noise;
- (3) Water quality;
- (4) Sewerage and sewage implication;
- (5) Waste management implication;
- (6) Land contamination;
- (7) Ecological impact;
- (8) Landscape and visual impact; and
- (9) Environmental monitoring and auditing.

14.1.2 All the existing and planned environmental sensitive receivers within and in the vicinity of the Study Area have been identified by conducting site surveys and reviewing relevant planning information. The receivers identified include residential blocks, educational institutions, clinics and place of worship etc. These receivers have all been considered in this EIA study.

14.2 Air Quality Impact

Construction Phase

14.2.1 Potential dust impact would be generated from the soil excavation activities, backfilling, site erosion, storage of spoil on site, and transportation of soil during the construction phase. Quantitative fugitive dust assessments have therefore been conducted for the construction of ARQ in accordance with Annex 12, Guidelines for Air Quality Assessment, of the TM-EIAO. The assessment result concluded that watering once per hour with hourly equivalent intensity of no less than 1.75 L/m² to on all exposed worksites during working hours (7am – 7pm) will be required to control the fugitive dust impact. With the implementation of recommended mitigation measures, no exceedance of criteria provided by Annex 4, Criteria for Air Quality Assessment, of the TM-EIAO is anticipated during the construction phase.

Operational Phase

14.2.2 Cumulative air quality impact arising from the vehicular emissions from the open roads, tunnel portals and chimney emissions within the assessment area has been assessed according to Annex 12, Guidelines for Air Quality Assessment of the TM-EIAO. The assessment results concluded that all the predicted cumulative 1-hour NO₂, 24-hour and annual RSP and FSP concentrations would comply with the AQOs and Annex 4, Criteria for Air Quality Assessment, of the TM-EIAO during the operational phase.

14.2.3 For annual NO₂, a marginal exceedance (i.e. 41 µg/m³) is recorded at 1.5m of ASMP-34 (Sau Fai House). The ground level of this single aspect building was intentionally designed not for residential purpose, but only for non-sensitive uses such as machinery and transformers plant rooms etc. The assessment result at 1.5m of this ASR is therefore for reference only. The floors occupied by residences are at least 5m above the ground level, and all assessment results at 5m and other higher levels of this ASR comply with the AQOs. Therefore, adverse cumulative air quality impact within and in the vicinity of ARQ during the operational phase is not anticipated.

14.3 Noise Impact

Construction Phase

14.3.1 Construction noise assessment has been conducted. All practicable mitigation measures have been exhausted to minimise the noise impacts. These mitigation measures include the optimisation of construction methodology (i.e. schedule of using PME), quiet plant, temporary noise barrier and good site practices. However, given the site constraints, some of the receivers (See **Table 5.14**) would still be subject to residual impacts exceeding the construction noise criterion.

14.3.2 Residual impacts exceeding the construction noise criterion have been assessed and considered the impacts are temporary and reversible. With all the proposed mitigation measures, the residual impact exceeding the construction noise criterion has been reduced to be minimal.

Operational Phase

14.3.3 For the operational phase, mitigation measures including setback from road, provision of non-openable windows/ maintenance window that are not opened for ventilation, use of non-sensitive structure and building orientation are required to fulfil the EIAO criteria. Besides, a semi-enclosure is also required along Road L4 for mitigating the traffic noise impact, and approximately of 6 floors of planned dwellings and 9 floors of planned classrooms would be benefited from and protected by the semi-enclosure.

14.3.4 Maximum sound power levels allowed to be emitted from louvers of fixed noise sources at pumping station for saltwater and freshwater and planned rock cavern developments were predicted. The public transport terminus would also be designed to no direct line-of-sight of the noise sources at the noise sensitive uses. With the proper selection of plant and adoption of noise control measure such as acoustic silencers, noise barriers, acoustic louvers, the NSRs located in the vicinity of these fixed noise sources would not be affected.

14.4 Water Quality

14.4.1 With full implementation of the mitigation measures, no adverse impact is anticipated. No adverse residual impact and cumulative impact is anticipated during both construction and operational phases of the Project. In order to ensure the effectiveness of the implemented mitigation measures, regular site audit should be undertaken routinely to inspect the construction activities and works areas during construction phase.

14.5 Sewerage and Sewage Treatment Implication

- 14.5.1** After incorporated latest planning information with total 25,000 and 48,600 populations from ARQ and DAR developments in the hydraulic model network, the discharge peak flow from East Kowloon catchment to KTPTW has been evaluated as 10.93m³/s.
- 14.5.2** Based on the latest available development parameters for the on-going projects, the total discharge peak flow to KTPTW will be 12.82m³/s. It shows that KTPTW with 10.92m³/s capacity is inadequate to cater for the predicted peak flow. It is understood that EPD's "Upgrading of Kwun Tong Preliminary Treatment Works – Feasibility Study, Agreement No. CE5/2008(DS)" recommended to upgrade the peak capacity to 13.14m³/s and should be adequate. The anticipated completion date of the KTPTW upgrading works is June 2021, whilst the first population intake of the ARQ is planned in 2022, hence no programme gap is anticipated between the completion of the KTPTW upgrading works and the ARQ development.
- 14.5.3** Two routes are proposed in ARQ sewerage system (total 2.8km long from size 300mm to 450mm diameter) to collect the sewage generated from ARQ development and convey to downstream sewerage system. Sewerage layout plans of the proposed sewerage system are attached in **Appendix 7.2**.
- 14.5.4** Improvement recommendations have been drawn for the surcharged sewers with less than 1 metre freeboard caused by ARQ development. 400m of the downstream sewers at Po Lam Road are recommended to be upgraded from size 225mm to 450mm diameter. In addition, no other further downstream sewers are proposed to be upgraded.

14.6 Waste Management Implication

Construction Phase

- 14.6.1** Potential waste management implications from the generation of waste during the construction phase have been evaluated. Measures, including the opportunity for on-site sorting, reusing C&D materials etc., are devised in the construction methodology to minimise the surplus materials to be disposed. Recommendations have been made for implementation by the Contractor during the construction period to minimise waste generation and off-site disposal.
- 14.6.2** It is estimated that 4,600m³ top soil, 390,000m³ inert soft C&D material and 222,000m³ rock would be generated from the Project. All generated top soil and C&D material would be reused on-site and off-site disposal is not required. On the other hand, 4,000m³ vegetation would also be generated from the Project. 400m³ vegetation would need to be transplanted, and the remaining 3,600m³ vegetation would be disposal of in landfill.

Operational Phase

- 14.6.3** The types of waste that would be generated during the operational phase have been assessed. Recommendations have been made to ensure proper treatment and disposal of these wastes. It is estimated that ARQ at full operation stage would recycle 35.0 tonne per day (tpd) out of 67.2 tpd of municipal solid waste (MSW), leaving 32.2 tpd of MSW that would need disposal to landfill.

14.7 Land Contamination

- 14.7.1** A land contamination assessment has been conducted to examine the potential contaminative land use within the Study Area and their potential impacts to future land use. The assessment involved desktop review, site surveys and proposed environmental SI.
- 14.7.2** The Study Area is located on top of rock surface and fill materials. According to its geological profile, environmental Site Investigation (SI) (i.e. borehole drilling, soil and groundwater sampling and testing) is recommended to be carried out for the areas located on fill material to determine the types and quantities of contaminants. A total of five potentially contaminated areas within the Study Area were proposed for environmental SI.
- 14.7.3** As all areas proposed for environmental SI are privately owned and still in operation, undertaking the environmental SI works at this EIA stage is not feasible. The proposed environmental SI works for these areas should commence once the operation is terminated and the land is resumed.
- 14.7.4** Following the completion of the environmental SI works, a CAR to present the findings and evaluate the level and extent of potential contamination. If land contamination is identified and remediation is required, a RAP will be prepared to recommend specific remediation measures. Upon completion of the remediation works, if any, a RR that demonstrates the clean-up works are adequate would also be prepared. CAR, RAP and RR would be submitted to EPD for approval prior to commencement of any construction / development works.

14.8 Ecological Impact

- 14.8.1** No major ecological impacts are expected of the current project. Habitats (mainly including the existing quarry site and developed area, and small areas of plantation and secondary woodland) would be directly affected by habitat loss, while disturbance impacts are restricted in scope due to the nature of adjacent habitats and their isolation of nearby terrestrial habitats from the proposed development site.
- 14.8.2** A Wooded Area of about 1.2 ha will be provided to compensate the loss of small and young secondary woodlands due to the construction of the proposed road and underpass. An updated vegetation survey identifying any potential presence of floral of conservation importance within the inaccessible secondary woodland and habitats to be directly impacted by the proposed development, as well as transplantation of the affected individuals will be conducted prior to the construction phase. Relocation of Hong Kong Newts (or other species of conservation significance) found in the water channels or streams within the proposed development area will also be carried out as a precautionary measure. Overall, with mitigation measures all ecological impacts of the implementation of the Project will be fully mitigated. Low or insignificant residual impacts are predicted after the implementation of the mitigation measures. In particular, there will be a positive enhancement on the existing habitat with the compensatory planting in the future Quarry Park.

14.9 Landscape and Visual Impacts

- 14.9.1** The scale of ARQ Development, particularly ex-quarry barren land, will inevitably result in some landscape and visual impacts; which have been minimized through

careful consideration of the layout plans for the development incorporate design mitigation measures such as, creation of new Quarry Park, creation of new open space and green spines, creation of, pedestrian corridors and breezeways, retention of views to ridgelines at strategic level, preservation of the Tai Sheung Tok Hill Rock Face as landmark for Kowloon East, aesthetic design of roads and streetscapes and provision of compensatory planting proposals, in the development. It is considered that the urban planning scheme on ARQ Development will have enhancement to both landscape and visual perspective.

- 14.9.2** Based on a very broad brush estimate, approximately 1,100 existing trees will be impacted by ARQ Development, of which approximately 1,021 no. of trees will be felled and 79 no. of trees will be transplanted. Approximately 5,000 nos. of trees will be planted within new open spaces and approximately 1,000 nos. of trees will be planted for new roadside amenity to compensate for the loss of existing trees. The overall residual impact on trees is considered acceptable with mitigation measures and in the longer term beneficial.
- 14.9.3** A Wooded Area of about 1.2 ha will be provided to compensate the loss of semi-natural hillside vegetation due to the proposed road and underpass. The loss of landscape resource will be compensated by the newly created landscape resources, such as buffer planting along new road when the trees in the new landscape resources matured. The permanent loss would be compensated by new trees planting, new recreational space, quarry park, green promenade, civic spine, streetscape and gateway at ARQ development. It is considered that the residual impact on this resource will be reduced to slight with implementation of compensation measures.
- 14.9.4** A series of open space system that create landscape and visual connector with landscape elements to accommodate a number of leisure, recreation and civic activities are proposed in the development layout. These combine different types and character of spaces, comprising Quarry Park, Green Spines, Summit Outlook, Gateway features, Children Playground, Viewing Platform, Civic Square, Viewing Deck, Rock Face, Rock Cavern, Hiking Trail and Green Promenade. Key major open space provided at the close vicinity includes, Jordan Valley Park, Shun Lee Tsuen Sports Centre and Park, Sau Ngau Road Playground, Hong Ning Road Park and Sau Ming Road Park. A total of approximately 25 ha of open space and 37 ha of green belts (mainly on rock face) will be provided within the ARQ development. These open spaces are well connected within the development and to the adjacent surrounding districts. These new open spaces network are provided within ARQ at the close vicinity of the adjacent districts. Therefore the residual impact on LR9 and LR9.1 will be substantially beneficial in the future when all mitigation measures become mature.
- 14.9.5** Quarry Landscape Character Area LCA6 and LCA7 will be significantly enhanced by the proposed ARQ Development after 10 years of operation. As compared with the barren quarry, with little landscape resources/interests, the proposed ARQ Development with new open spaces interconnected with green corridors in a new urban setting. It is considered that the residual impact on LCA6 and LCA7 will be substantially beneficial in the future when all landscape becomes mature.
- 14.9.6** The scale and the extent of ARQ development is extensive and significantly alters the visual context of area, particularly due to partially or fully loss of open view, enclosure and blocking or reduction of depth of current view. There will unavoidably be moderate residual impact on the VSRs in Sau Mau Ping local area (R1.1, R1.2, R1.3, R1.4, R1.5, R1.6, R1.7, R1.8, R1.12, R1.15, O1.4, and P1.1). However, the impact will be slight

after 10 years of operation. With implementation of mitigation measures, there will be new open spaces and visual resources. These visual resources will bring insubstantial visual impact to the VSRs in district and strategic levels.

14.9.7 Overall, the landscape and visual impacts due to the ARQ Development are considered to be acceptable with the implementation of the appropriate mitigation measures, there will be insubstantial impact for visual and in the long term be beneficial in respect of landscape.

14.10 Environmental Monitoring and Audit Requirement

14.10.1 It is recommended to implement an EM&A programme throughout the entire construction period and operation period (i.e. noise commissioning test for fixed noise sources) to monitor the environmental impacts on the neighbouring sensitive receivers regularly. An EM&A Manual was prepared to specify the monitoring requirements for the implementation of the environmental mitigation measures identified in the EIA process. All the requirements specified in the EM&A Manual shall be complied with.

14.10.2 An Environmental Mitigation Implementation Schedule has also been included in the EM&A Manual to summarise all the measures, the implementation locations, timeframe, agency, etc.