

1 INTRODUCTION

1.1 Background

- 1.1.1** The Anderson Road Quarries have been in operation since 1956. In 1998, the Central and East Kowloon Development Statement proposed new housing developments at a platform site covering about 40 ha of Anderson Road Quarries (the upper quarry site, now called the Anderson Road Quarry site, ARQ) and at an area west of Anderson Road covering about 20 ha (the lower quarry site, now called the Anderson Road Development, DAR).
- 1.1.2** The site formation works of the lower quarry site are now in progress under Contract No. CV/2007/03 ‘Development at Anderson Road – Site Formation and Associated Infrastructure Works’.
- 1.1.3** PlanD commissioned Arup on 27 January 2011 under Agreement No. CE 4/2010 (TP) to undertake a Planning Study on Future Land Use at Anderson Road Quarry (the Planning Study) to examine the future land use and explore the development potential of the upper quarry area. The recommendations and the Recommended Outline Development Plan (RODP) proposed under the Planning Study will provide the basis for the development at the ARQ.
- 1.1.4** CEDD commissioned Arup on 26 October 2012 under Agreement No. CE 18/2012 (CE) ‘Development of Anderson Road Quarry – Investigation’ to undertake the engineering feasibility study of the development proposals at the Anderson Road Quarry site recommended in the Planning Study and the associated road improvement works and pedestrian connectivity to Kwun Tong Town Centre and nearby MTR stations.

1.2 Study Area

- 1.2.1** The Study Area, as delineated in **Figure 227724/E/0001**, is located on the south-western slopes of the Tai Sheung Tok at the far north-eastern edge of urban East Kowloon, and lies close to the major population centre of Kwun Tong, Lam Tin and Sau Mau Ping. Specifically, the Study Area covers an area of approx. 86 hectares, which includes a platform area of approx. 40 hectares.

1.3 EIA Study Brief

- 1.3.1** In accordance with the requirements of Section 5(1) of the Environmental Impact Assessment Ordinance (EIAO), a project profile (No. PP-465/2012) for the Development of Anderson Road Quarry (the Project) was submitted to the Director of Environmental Protection (the “DEP”) for application for an EIA Study Brief on 8 May 2012. Pursuant to Section 5(7)(a) of the EIAO, the DEP has issued a Study Brief (No.: ESB-247/2012 dated 19 June 2012) for the EIA study.
- 1.3.2** The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and associated works that will take place concurrently. This information will contribute to decisions by the Director on:

- (1) the overall acceptability of any adverse environmental consequences that are likely to arise as a result of the Project;
- (2) the conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequences wherever practicable; and
- (3) the acceptability of residual impacts after the proposed mitigation measures are implemented.

1.4 Designated Projects

1.4.1 The engineering feasibility study of the Project is a designated project (DP) under item 1 of Schedule 3 of the Environmental Impact Assessment Ordinance (EIAO), which specifies that “Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000”.

1.4.2 On the other hand, the Project also includes the proposed rock cavern development in the Study Area and the road improvement works at junction of (J/O) Lin Tak Road and Sau Mau Ping Road, at J/O Clear Water Bay Road and Road L1 of DAR, as well as at the merging lane at New Clear Water Bay Road near Shun Lee Tsuen Road. Classification of these projects as Schedule 2 DPs under the EIAO is detailed below:

Rock Cavern Developments (Figure 227724/E/0002)

1.4.3 The construction of the rock cavern developments would be a Schedule 2 DP under Item Q.2 of Schedule 2 of the EIAO:

“Item Q.2 – Underground rock caverns”

Road Improvement Works (Figure 227724/E/0002)

J/O Lin Tak Road and Sau Mau Ping Road

1.4.4 The scope of the proposed road improvement works at J/O Lin Tak Road and Sau Mau Ping Road include:

- (1) Widening of Lin Tak Road to single-2 lane with 2 nos. of long lay-by at each bound of the road to allow for kerb side activities (rock slope excavation is required for the road widening works).
- (2) Construction of a new flyover overpassing the junction of Sau Mau Ping Road, Lin Tak Road and Tseung Kwan O Road for the traffic from Lin Tak Road to Sau Mau Ping Road.

1.4.5 One of the key elements of this proposed works is to construct and operate a new vehicular bridge connecting Lin Tak Road and Sau Mau Ping Road and across Tseung Kwan O Road. Since both Lin Tak Road and Sau Mau Ping Road are classified as District Distributor (DD), this proposed new vehicular bridge is also a District Distributor and its construction and operation is therefore a Designated Project (DP) under Item A.1 of Schedule 2 of the EIAO:

“Item A.1 – A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing road.”

J/O Clear Water Bay Road and Road L1 of DAR

1.4.6 The scope of the proposed works include a new westbound carriageway of the Clear Water Bay Road and a new U-turn facility with associated cutting of existing slopes with heavy vegetation.

1.4.7 One of the key elements of the proposed works is to construct and operate a new road section (approximately 200m long) on the westbound carriageway of Clear Water Bay Road to replace the existing road section. Since Clear Water Bay Road is a Primary Distributor, this proposed new road section is also a Primary Distributor and its construction and operation is therefore a DP under Item A.1 of Schedule 2 of the EIAO.

Merging lane at New Clear Water Bay Road near Shun Lee Tsuen Road

1.4.8 The scope of the proposed works is to widen a section of 130m length of the existing New Clear Water Bay Road westbound carriageway opposite to Shun Lee Estate from one lane to two lanes, and to construct a new Shun Lee Tsuen Road slip road within the area of an existing slope to increase the merging length and to improve the sight line for traffic from Shun Lee Tsuen Road. Slope works and retaining walls are required for the new slip road.

1.4.9 One of the key elements of the proposed works is to construct and operate a new slip road (approximately 350m long) and a merging lane (approximately 170m long) extending from the existing Shun Lee Tsuen Road and merging to the westbound carriageway of New Clear Water Bay Road. Since both Shun Lee Tsuen Road and New Clear Water Bay Road are Primary Distributors, the proposed new merging lane is also a Primary Distributor and its construction and operation is therefore a DP under Item A.1 of Schedule 2 of the EIAO.

1.5 Further EIA Study for the Schedule 2 DPs

Rock Cavern Development

1.5.1 A review of the potential environmental impacts of the proposed rock cavern development is given under the section titled “*Environmental Acceptability of Schedule 2 Designated Projects*” in all technical chapters. It is concluded that no insurmountable environmental impacts arise from the rock cavern developments are anticipated. Since the rock caverns are proposed for commercial use (e.g. food and beverage) as well as museum according to the best available information at this stage, the associated environmental impacts due to these commercial activities are also anticipated to be insignificant.

1.5.2 Nevertheless, the detailed environmental implications of this Schedule 2 DP will be further investigated in a separate EIA under EIAO.

Road Improvement Works

1.5.3 A review of the potential environmental impacts of the proposed road improvement works is given under the section titled “*Environmental Acceptability of Schedule 2 Designated Projects*” in all technical chapters. It is concluded that no insurmountable environmental impacts arise from the road improvement works are anticipated.

1.5.4 Nevertheless, the detailed environmental implications of this Schedule 2 DP will be further investigated in a separate EIA under EIAO.

1.6 Pedestrian Connectivity

1.6.1 Under the Planning Study, pedestrian connectivity (as shown in **Figure 227724/E/0008**) with lift tower and escalators have been recommended to connect the proposed development at the ARQ to adjoining districts.

1.6.2 During the construction phase, construction dust and noise would be the major environmental impacts associated with the construction of the pedestrian links. However, since the extents of the works are limited and the works are relatively minor, with the implementation of good site practices (e.g. watering and coverage of dusty materials, use of quiet plant and temporary noise barrier, etc.), no insurmountable environmental impacts are anticipated during the construction phase.

1.6.3 As the proposed pedestrian links are located within developed areas and it is designed for pedestrian use only, no insurmountable environmental impacts are anticipated during the operational phase.

1.7 Objectives of the EIA

1.7.1 The objectives of the EIA study are as follows:

- (1) to describe the Project and associated works together with the requirements and environmental benefits for carrying out the Project and the types of designated projects to be covered by the Project;
- (2) to identify and describe elements of community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project, including natural and man-made environment and the associated environmental constraints;
- (3) to provide information on the consideration of alternative options of the Project including alternative scale/size, extent, layout, configuration/orientation, alignment, design and construction methods with a view to avoiding and minimizing potential environmental impacts to environmentally sensitive areas and sensitive uses, including but not limited to the Development at Anderson Road (DAR), Tai Sheung Tok Hill, the adjacent major population centres of Kwun Tong, Lam Tin and Sau Mau ping; to compare the environmental benefits and dis-benefits of different options; to provide reasons for selecting the preferred option(s) and to describe the part environmental factors played in the selection of preferred option(s);
- (4) to identify and quantify emission sources, including air and gaseous emission, noise emission, sewage and wastewater emission, waste generation, contaminated materials, and determine the significance of impacts on sensitive receivers and potential affected uses;
- (5) to identify and qualify any potential losses or damage to flora, fauna and natural habitats;
- (6) to identify any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (7) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of Project;

- (8) to investigate the feasibility, practicability, effectiveness and implications of the proposed mitigation measures;
- (9) to identify, predict and evaluate the residual environmental impacts (i.e. after practicable mitigation) and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses;
- (10) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these environmental impacts and cumulative effects and reduce them to acceptable levels;
- (11) to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification;
- (12) to identify, any individual project(s) (including road improvement works, rock cavern development and quarry rehabilitation work, etc) that fall under Schedule 2 of the EIAO; to ascertain whether the findings of this EIA study have adequately addressed the environmental impacts of those projects; and where necessary, to identify the outstanding issues that need to be addressed in any further detailed EIA study for application of environmental permits; and
- (13) to design and specify environmental monitoring and audit requirements to ensure the effective implementation of the recommended environmental protection and pollution control measures.

1.8 Structure of this EIA Report

1.8.1 The structure of this EIA report is outlined below for ease of reference.

<u>Section</u>	<u>Title</u>	<u>Aims</u>
1	Introduction	Introduces the background information and the layout of the EIA Report
2	Study Scope	Outlines the objectives and scope for various environmental aspects
3	Alternative Options	Summarises the various options considered and the main reasons for adopting the scheme recommended
4	Air Quality Impact Assessment	Presents the legislation, methodology, assessment and recommendations for air quality impacts
5	Noise Impact Assessment	Presents the legislation, methodology, assessment and recommendations for noise impacts

<u>Section</u>	<u>Title</u>	<u>Aims</u>
6	Water Quality Impact Assessment	Presents the legislation, methodology, assessment and recommendations for water quality impacts
7	Sewerage and Sewage Treatment Implication	Presents the legislation, methodology, assessment and recommendations for sewerage and sewage treatment implications
8	Waste Management Implications	Presents the legislation, methodology, assessment and recommendations for waste management
9	Land Contamination	Presents the legislation, methodology, assessment and recommendations for land contamination
10	Ecological Impact	Presents the legislation, methodology, assessment and recommendations for marine ecological impacts
11	Landscape and Visual Impact Assessment	Presents the legislation, methodology, assessment and recommendations for landscape and visual impacts
12	EM&A Requirements	Presents the EM&A requirements
13	Summary of Environmental Outcomes	Presents a summary of the key environmental outcomes arising from the EIA study
14	Conclusion	Summarises the findings and concludes the overall acceptability of the project

2 SCOPE OF ENVIRONMENTAL IMPACT ASSESSMENT STUDY

2.1.1 According to EIA Study Brief (ESB247-2012), the EIA study shall address the likely key issues described below, together with any other key issues identified during the course of the EIA study:

- (1) the potential air quality impact on sensitive receivers from the construction and operation of the Project and associated works; and the potential air quality impacts on air sensitive uses in the assessment area due to air pollutant emission sources identified according to section 3.4.3.2 of this study brief;
- (2) the potential noise impact on sensitive receivers caused by the Project and associated works, including the impact from construction equipments during construction and operational noise impact from road traffic, fixed noise sources in particular ventilation shafts, pump houses, electricity sub-stations, bus termini, open car/lorry parks, refuse handling areas;
- (3) the potential water quality impact caused by the Project and associated works, such as sewage discharge from construction workforce and the development from the Project and associated works;
- (4) the potential sewerage and sewage treatment implications to cope with discharges from residential, commercial and institutions buildings as well as any development from the Project, taking into account the capacity requirements for the existing, committed and planned developments in the vicinity of the Project;
- (5) the potential waste management implication arising from the construction of the Project, including handling and disposal of construction and demolition materials, chemical waste and general refuse;
- (6) the potential land contamination issue within the Project site;
- (7) the potential landscape and visual impacts caused by construction and operation of the Project and associated works on sensitive receivers in the vicinity, such as those visually sensitive receivers at surrounding public housing estates, Kwun Tong district, northern shoreline of Hong Kong Island, etc.;
- (8) the potential impact on ecological sensitive areas, the assessment of which shall be based on a field survey of at least 4 months; and
- (9) the potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects in the vicinity of the Project, and that those impacts may have a bearing on the environmental acceptability of the Project.

3 PROJECT DESCRIPTION

3.1 General Description of the Project

3.1.1 The Project comprises the development of ARQ into a housing development area, with associated supporting infrastructure within the boundary of ARQ and access roads leading to the adjacent neighbourhood, including but not limited to the new access routes leading to Po Lam Road and DAR.

3.2 Need for the Project

3.2.1 In the Policy Address 2010/11, the Chief Executive expressed Government's intention to make land available for an average of 20,000 new private units per year in the next 10 years and 15,000 Public Rental Housing (PRH) units per year, together with a total of 5,000 "My Home Purchase Plan (MHPP)" units and 5,000 Home Ownership Scheme flats per year. In previous consultation with Kwun Tong and Sai Kung District Councils during the Planning Study, members agreed that residential developments should be provided at the Study Area to meet the need on housing. Since the Study Area consists of a development platform of approximately 40 ha in area and in close proximity to urban area in Kwun Tong, it has a high potential to fulfil the territorial housing demand and can also act as a solution space for accommodating district-wide Government, Institution or Community (G/IC) provision.

Predicted Future Environment without Project

3.2.2 Due to its use as a quarry site, ARQ is a highly disturbed environment where ecological value is considered to be minimal. Under the rehabilitation contract (No. GE/96/10), the landscape of the quarry will be rehabilitated through extensive tree and shrub planting on exposed rock face.

3.2.3 Without the proposed development, the planting established under the rehabilitation contract will, though gradually, begins to mature. Some habitats may be expected to increase in ecological value in future as a result of ecological succession (for example the maturation of shrubland into woodland).

3.2.4 However, without the proposed development, the Study Area will be left as an extensive vacant government land. The opportunity to fulfil the social needs of the local community and to enhance local economy through the creation of recreational space, tourist development and G/IC facilities in the Study Area will be lost. It will also be difficult to meet the housing demand within the urban area for which alternative sites with similar development potential is unlikely to be available in the vicinity.

3.3 Recommended Outline Development Plan

Development Opportunities and Constraints

3.3.1 Development constraints and opportunities of the Study Area are summarised below:

Development Opportunities

3.3.2 The central area of the quarry platform is within easy reach from different parts of the Study Area and is closest to DAR both horizontally and vertically. It has the potential of

becoming the most vibrant part of the Study Area in the future. It is also where the major view corridor between Jordan Valley and Tai Sheung Tok summit runs through. Therefore, both the land uses and the massing of buildings should respond to this specific site context, which include lowering the building height profile to preserve the visual corridor and enhancing spatial and visual connections with the district open space in DAR etc.

3.3.3 The accessible part of the rock face, which includes part of the platform reserved for the Water Supplies Department, the 20m-wide landscape strip at +250mPD, and the 8m-wide landscape strips at +210mPD, +230mPD, +310mPD, +330mPD, and the 1m-wide maintenance access to the Tai Sheung Tok summit, can potentially be served as recreational areas such as hiking trails and viewing platforms.

3.3.4 While the rock face is generally regarded as non-development area, the summit, the 20m-wide bench at +250mPD and the crescent-shape rock face on the north-eastern end of the Study Area are potential sites for minor structures that would enhance the recreational values of the Study Area. The summit offers a panoramic view of Tai Sheung Tok and can potentially serve as the best look-out point in Kowloon East. The 20m-wide bench provides a potential site for recreational uses. With its gentler slope and higher accessibility, the crescent-shape rock face can potentially be developed together with the northern part of the platform in order to create visual, spatial and functional interests.

Development Constraints

3.3.5 The general fill materials above the drop cuts are weaker than in-situ soil and rock materials and hence results in additional costs on foundation structure.

3.3.6 New foundation shall be avoided on the identified fault zone to prevent construction difficulties.

3.3.7 The final faces of the rock slopes are not provided with preventive measures against detachment of loose rock fragments. A buffer zone subject to rock fall assessment, or measures such as rock net shall be considered.

3.3.8 New foundation adjacent to the crests of the slopes along Anderson Road shall be designed with caution to avoid transfer of load to the slope surface and unstabilise the slope.

3.3.9 The development potential of the Study Area is restricted by the capacity of the sewerage system.

3.3.10 There are great concerns regarding the traffic situation in the area, and traffic congestion problems are being experienced at three key junctions i.e. New Clear Water Bay Road/ Lung Cheung Road, New Clear Water Bay Road/ Lee On Road and New Clear Water Bay Road/ Clear Water Bay Road and other local roads in Kwun Tong such as Hip Wo Street. It is generally believed that the road capacity is inadequate to sustain large-scale development unless feasible and acceptable improvement schemes/ road infrastructure can be worked out and implemented.

3.3.11 Accessibility for pedestrian commuting between DAR/ the Study Area and Kwun Tong town centre should also be fully considered with a view to formulating feasible and acceptable proposals to address the public concerns.

3.3.12 Two on-site storage tanks are needed to attenuate the increase in surface runoff due to the development of the Study Area. Additional fresh water and salt water pumping

stations/ service reservoirs will also be required to ensure adequate supply of the potable and salt water supply for the Study Area. Land within the Study Area will need to be reserved for these facilities.

Initial Land Use Options

3.3.13 In light of capitalising on the strategic location and local character, meeting strategic housing demands and enhancing social mix, provision of G/IC facilities to meet existing shortfalls and community aspirations, enhancing recreational, tourism and economic vibrancy, three initial land use options are proposed as summarised below:

- (1) Option 1 can be understood as an “urban oasis”. It has a lower development intensity and population, with a target population of 22,000 and a private-to-subsidised housing ratio of 60:40. However, it has more recreational facilities and greening measures to create a sustainable and liveable community. Moreover, with its sheer size, the Quarry Park is expected to stand out as a major attraction in Hong Kong for both local residents and tourists.
- (2) Option 2 can be understood as an “urban destination”. Its target population is 25,000 and a private-to-subsidised housing ratio of 70:30. Although it has less population than Option 3 (i.e. 30,000), it has a larger private housing population and correspondingly a higher income and expenditure level which is expected to foster local economic development. Besides, the hotel, conferencing, recreational, entertainment and cultural elements are expected to creating a vibrant destination that contributes to both local and territory economic development.
- (3) Option 3 can be understood as an “urban extension”. Its target population is 30,000, and a private-to-subsidised housing ratio of 70:30. This option targets on maximising housing provisions to meet territorial needs. Land is also reserved for a large-scale institutional building such as medical or educational facilities to serve both local and territorial needs. This option represents a pragmatic use of land resources to fulfil immediate societal needs.

3.3.14 The environmental performance of the 3 initial use options has been assessed in the preliminary feasibility assessment under the Planning Study (*Working Paper 4 on Preliminary Feasibility Assessment of Initial Options*), it was concluded that, in terms of environmental performance, Option 2 is the least favourable option whilst Option 1 is the most favourable. This is mainly due to the relatively small population and low development of commercial activities in Option 1. A comparison of the 3 initial land use options in terms of environmental performance is given in **Table 3.1** below.

Table 3.1: Comparison of the environmental performance of the 3 land use options

Environmental Aspects		Land Use Options		
		Option 1	Option 2	Option 3
Conservation, Environment & Agriculture				
Criteria air pollutants	Quantity of gaseous and particulate pollutants emitted per annum	2 Option with the least population (22,000), extensive greening and sizable parkland, low emissions.	3 Option with population of 25,000. Development promotes	3 Option with the highest pop of 30,000. With more GIC facilities such as hospital and community college.
	Sources of air	2	4	3

Environmental Aspects		Land Use Options		
		Option 1	Option 2	Option 3
	pollutants from this project	Option with the lowest development	Option involving the highest commercial activities	Option with the most residential development
Freshwater supplied and consumed	Amount of freshwater supplied and consumed per capita	2 Option with the lowest commercial/ catering activities	4 Option with the most commercial/ catering activities	3 Option with some commercial/ catering activities
Terrestrial habitat	Negative impacts on managed terrestrial habitat for conservation	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained
Toxic air pollutants	Amount of air pollutants that cause serious health risk, e.g. cancer, lung damage	3 Option has no activities involving toxic air pollution	3 Option has no activities involving toxic air pollution	3 Option has no activities involving toxic air pollution
Significant Landscape Features (area-based)	Area of special urban/ rural landscape features affected	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained
Significant Landscape Features (area-based)	Number of special urban/ rural landscape features affected	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained	3 Existing natural setting of quarry face will be maintained
Energy				
CO ₂ emissions	Quantity of CO ₂ emitted per annum	2 Option with the lowest residential and commercial development	4 Option involving mid population size and highest commercial activities	3 Option with the most residential developments and most GIC activities
Transport				
Excessive noise	Percentage of population exposed to excessive noise	3 Mitigation measures will be incorporated into the design if noise becomes an issue	3 Mitigation measures will be incorporated into the design if noise becomes an issue	3 Mitigation measures will be incorporated into the design if noise becomes an issue
Travel distance	Commute distance during morning peak hour	3 The external transport strategy would be the same	3 The external transport strategy would be the same	3 The external transport strategy would be the same for all options

Environmental Aspects		Land Use Options		
		Option 1	Option 2	Option 3
		for all options	for all options	
Travel speed	Negative impacts on the average network speed across all major groups of passenger transport modes during morning peak hour	1 This option offers the least traffic impact during peak hour due to the highest population	3 This option offers some traffic impact during peak hour. Commercial activities are not expected to create significant impact during morning peak hours	5 This option offers the most traffic impact during peak hour due to the highest population
Waste & Wastewater				
Construction waste	Amount of construction waste disposed per capita	2 Option with the lowest residential and commercial development	3 Option involving mid residential and highest commercial activities	3 Option with the most residential developments and most GIC activities
Municipal waste	Amount of municipal waste disposal per capita	1 Option with the lowest residential and commercial development	5 Option involving mid residential and highest commercial activities	3 Option with the most residential development and most GIC activities
Landfill capacity	Waste generation	2 Option with the lowest residential and commercial development	3 Option involving mid residential and highest commercial activities	3 Option with the most residential development and most GIC activities
	Obstacles to incorporating waste recycling facilities	3 Waste recycling should be incorporated into the new development	3 Waste recycling should be incorporated into the new development	3 Waste recycling should be incorporated into the new development
Score of Environmental Indicators		48	66	62

Notes:

- [1] Each option is rated on a scale of 1 to 5 for each indicator, with 1 representing “lowest/ least” and “highest/ most”. In general, a LOWER score corresponds to more favourable performance in a certain aspect and vice versa.

- 3.3.15** Nevertheless, taking into account the various broad technical assessments of the 3 initial land use options, including traffic, engineering and geotechnical aspects, it was concluded that the developments and infrastructures proposed for these initial options are broadly feasible with appropriate improvement/ mitigation measures.
- 3.3.16** Since the variations of the 3 initial land use options (i.e. Options 1, 2 and 3) are not very significant, it was subsequently decided that the 3 initial land use options be consolidated into two modified Initial Options, with population threshold ranging from 22,000 to 30,000 and reduced commercial/ tourism elements. The two modified Initial Options largely represent the simplified versions of Options 1 and 3.
- 3.3.17** As the development parameters of the 2 modified Initial Options are similar to/ smaller than the 3 initial land use options studied, it was decided appropriate to put forward the 2 modified Initial Options for public consultation. The design concepts of the two modified Initial Options are summarised below:

Modified Initial Options

Modified Initial Option 1

- (1) To provide a Quarry Park of more than 15 hectares with different recreational and sports facilities, and a green promenade along the southwestern edge of the Study Area. The Park will provide a good leisure destination for the residents in Kwun Tong, Sai Kung or even the whole Territory during weekends and holidays.
- (2) To create a leisure and entertainment centre with retail, dining and entertainment facilities along the central axis of the Study Area and connected to the Quarry Park. The area will be pedestrianised to avoid conflicts between the pedestrian and vehicular traffic.
- (3) To construct an elevated viewing deck with dining services on the bench at the level of +250mPD to allow visitors to enjoy the spectacular view of Kowloon East and the Victoria Harbour.
- (4) To limit part of the residential district in the northwestern portion of the Study Area to medium-rise buildings to complement the open setting of the Quarry Park.
- (5) To preserve the visual permeability between the Tai Sheung Tok summit and Jordan Valley.

Modified Initial Option 2

- (1) To designate the central part of the Study Area primarily for community facilities and open space, and two sites will be reserved for commercial development. The open-air civic/event plaza at the centre will provide a gathering place for local residents.
- (2) To reserve more land for G/IC facilities to meet the shortfalls in the district in addition to meeting the local needs.
- (3) To incorporate day-to-day shopping and community facilities within the residential developments for the convenience of the local residents.
- (4) To connect major pedestrian paths from DAR to the basement of the G/IC building within the Study Area.
- (5) To preserve the visual permeability between Tai Sheung Tok summit and Jordan Valley.

Stage 1 Community Engagement

3.3.18 The modified Initial Options 1 and 2 were put forward for consultation during the Stage 1 Community Engagement (CE) from August to November 2011. Public views collected are summarised below:

- (1) **Planned Population** – Generally commenters had no strong views on the range of the planned population for the balance between providing housing units and achieving a quality living environment.
- (2) **Housing Mix** – The public called for the provision of residential units to meet the territorial demand. Commenters also sought variety in subsidised housing provision in the Study Area.
- (3) **Land Use** – The majority of commenters supported the land uses for residential, commercial, open space and G/IC uses to be planned in the 40-ha platform area. Among the commenters who made comparison of the two modified Initial Options, more preferred Option 1 with the provision of a quarry park. The idea of setting up a museum showcasing the history of the quarry site was also widely proposed. As for the modified Initial Option 2, which provided more land reserved for G/IC uses, the majority of commenters supported the idea of providing local and regional G/IC uses to address the existing shortage of community facilities and to serve the future needs of residents in the Study Area and Kwun Tong District.
- (4) **Urban Design** – Preservation of the Tai Sheung Tok hill ridgeline was widely supported. The development intensity within the Study Area had to achieve a quality living environment and at the same time create a harmonious built environment with the adjacent DAR.
- (5) **Use of Rock Face** – Commenters agreed that the rock face and the benches on it are the unique geological features of the Study Area. A design competition could be held to invite innovative design proposals for the rock face. Activities such as rock climbing with rock faces as the backdrop were also proposed. Facilities such as viewing decks, restaurants, souvenir shops, etc. could be provided to enhance the attractiveness of this destination.
- (6) **Use of Rock Cavern** – The public suggested two major groups of facilities to be potentially housed in rock caverns i.e. commercial and NIMBY (Not In My Back Yard) type of G/IC facilities e.g. sewage treatment facilities to reduce their impacts on the neighbourhood.
- (7) **Traffic and Transport** – Commenters generally expressed concerns on the worsening traffic conditions in Kwun Tong brought by the proposed developments. In light of the large population in the Study Area and DAR, it was considered justifiable to have a new MTR station serving the surrounding communities. Environmentally-friendly transport modes such as electric vehicles, monorails, etc were also proposed. Traffic management measures should also be introduced to reduce the possible traffic impacts.
- (8) **Pedestrian Connection** – The proposed pedestrian connections between the Study Area and DAR are considered appropriate. To cope with the steep gradient between the two sites, lift towers and escalators were considered important to facilitate the pedestrian flow. Funicular was also proposed to connect between the Study Area and DAR, as well as between the platform area and the benches. In addition, it was opined that pedestrian connections should link the Study Area to

developments further downhill all the way to Kwun Tong MTR Station through escalator systems, travellers, monorails, etc. The proposed new hiking trails from Tai Sheung Tok to the Wilson Trail Stage 3 for strengthening the connection between the Study Area and the countryside in Sai Kung were supported.

Draft Recommended Outline Development Plan (RODP)

3.3.19 Based on the comments from the Stage 1 CE and the subsequent refinements in response to further discussions with several government departments, a draft RODP with the objectives to establish a comprehensive framework to guide future development of the Study Area was formulated based on the following 5 Development Principles:

- (1) Development Principle 1 – Providing a green and sustainable environment
- (2) Development Principle 2 – Capitalising the Study Area to meet territorial needs for housing provision without overburdening the transport and infrastructural capacity
- (3) Development Principle 3 – Enhancing social mix and harmony in Kwun Tong district
- (4) Development Principle 4 – Meeting local aspirations and needs in provision of community facilities
- (5) Development Principle 5 – Respecting local character and making use of existing landform for tourism and recreational development

Delineation of Areas

3.3.20 The land use recommended in the draft RODP is formulated based on the combined considerations of the Development Principles and the urban design concepts and can be broadly divided into four areas i.e. Civic Core, Northern Community, Southern Community, and Recreation Network:

- (1) **Civic Core** – as a communal space for both the Study Area and the wider Sau Mau Ping area. It includes two commercial sites intended for shopping facilities, a government site intended for sport facilities, a pedestrian corridor, and a hard-paved plaza.
- (2) **Northern Community** – formed by six private residential sites surrounding a “communal spine” comprising a primary school, a government or institution/community site of undesignated uses, the upper plaza and a pedestrian corridor.
- (3) **Southern Community** – formed by a mix of three larger private residential sites and a subsidised housing site. These sites are intertwined with a primary school, a secondary school, a community hall cum social service facilities and an open space forming an entry point to the hiking trail network on the rock face. A fire station, a police station and a refuse collection point is also planned in this area.
- (4) **Recreation Network** – The Recreation Network comprises the proposed Quarry Park (both on the platform and the rock face) and the hiking trail network with lookouts, café, restaurants and retail stalls in rock cavern. In addition to the mechanical transport system, a series of hiking trails comprising footpaths and stairs are proposed on the rock face to provide a sequential experience for visitors.

Proposed Development Intensity

3.3.21 A population target of 23,000 is proposed under the draft RODP. In view of the high percentage of PRH in the surrounding of the Study Area including DAR and Sau Mau Ping areas, the proposed private-to-subsidised housing ratio in the Study Area is 80:20 in terms of the number of residents. The proposed housing mix is adopted with a view to providing more private housing and introducing greater social mix to enhance demographic diversity while offering some subsidised housing to meet the territorial housing demand.

3.3.22 Given the height restriction for protecting visual access to the ridgeline, developments for the subsidised housing which has an area of about 1.44 ha are subject to a maximum domestic plot ratio of 6, whilst the maximum domestic plot ratio for private housing is proposed to range from 3.5 – 5.5 with an average of approx. 4.0.

Stage 2 Community Engagement

3.3.23 The draft RODP was subsequently put forward for the Stage 2 CE conducted between June and September 2012. The major public comments received are summarised below:

- (1) **Planned Population and Development Intensity** – There was no strong objection to the proposed development intensity though some consultees opined that the scale of the proposed development should be reduced to lessen future traffic demand. On the other hand, there were also views for increasing the plot ratios of the proposed residential sites to provide more housing supply.
- (2) **Housing Mix** – In general, there was no strong objection to the proposed private-to-subsidised housing ratio of 80:20, though several consultees considered that the ratio for public housing should be increased to help address the need of the low income groups.
- (3) **Land Use and Layout** – The proposed quarry museum was generally supported, and no objection to the proposed Quarry Park was received. Some other land uses were suggested by the members of the public, including more commercial facilities, GIC facilities, tourism facilities, community farm, etc. Also there was a view that commercial facilities should also be provided within the two residential communities instead of concentrating in the Civil Core.
- (4) **Rock Face** – The proposed hiking trails, lookouts and vertical transportation system were supported. Nevertheless, the hiking trails should have more connections with the existing Wilson Trail in Sai Kung while seats with shelters should be provided at the lookouts. Some innovative ideas for the rock face were received though there was also view to preserve the existing rough topography and visual prominence of Tai Sheung Tok. As such, overuse of concrete, exotic rocks and man-made structures on the rock face should be avoided.
- (5) **Traffic Issues** – Many consultees considered that the existing road network in the area would be unable to cater for the cumulative traffic impacts to be generated from DAR and the proposed developments at the Study Area. The proposed pedestrian linkages to Kwun Tong town centre were generally appreciated, though some consultees had reservation on their effectiveness because of the long walking distance.

Finalisation of the RODP

- 3.3.24** In response to the comments received from the Stage 2 CE, some major adjustments to the draft RODP have been made as detailed below.

Major Planning Parameters

- 3.3.25** The target population is increased by 2,000 from 23,000 to 25,000. In order to accommodate the increase in population, the draft RODP was revised based on the increased planned population 25,000. The development intensities of some residential sites are slightly modified including an increase in the domestic plot ratio for subsidised housing site from 6 to 6.3, and in the average plot ratio for private housing sites from 4 to 4.2.
- 3.3.26** Nevertheless, despite the slight increase in development intensity, key government institution and community (G/IC) facilities and open space provision for the local population would be maintained.

Traffic and Transport Facilities

- 3.3.27** A comprehensive pedestrian system with suitable mechanically-assisted facilities is proposed. To enhance the linkage established under the DAR study, this assessment further identified the routes to link up the pedestrian network with Kwun Tong town centre through four new routes of footbridges with lift towers and escalators. These pedestrian linkages supplement the traffic and transport plans to improve access to the external public transport facilities.
- 3.3.28** In meeting the planning and district demand, a Public Transport Interchange (PTI) that could accommodate around 4-6 bus bays, 3-4 GMB bays and 2 taxi bays are proposed. It is estimated that a total site area of around 4,500 sq.m will be required to accommodate this PTI. In order to supplement some of the shortfall in the district in providing terminating facilities for PT services, a road-side public transport termini (PTT) is provided at the road connecting to DAR.

Further Adjustments based on Engineering Investigation Study Findings

- 3.3.29** A RODP was put forward in March 2013 incorporating comments received from the Stage 2 CE. However, during the course of the Investigation Study further adjustment was made to the RODP including modification of the access road to Po Lam Road southeast of the Study Area from open road to underpass and deletion of one of the drainage retention tanks. Detailed justifications for these amendments are given in **Section 3.7**.
- 3.3.30** **Figure 227724/E/0003** presents the final RODP incorporating adjustments based on the Stage 2 CE comments and the findings of the Investigation Study. A summary of the major planning parameters proposed in the final RODP is given in **Table 3.2** below:

Table 3.2: Major planning parameters of the final RODP

Planning Parameters	
Total Population	25,000
Private Housing Population (no. of flat)	7,530
Subsidised Housing Population (no. of flat)	1,880
Residential Mix (Private : Subsidised Housing)	80:20

Planning Parameters	
(based on target population or number of units)	
Average Plot Ratio – Private Housing	4.2
Average Plot Ratio – Subsidised Housing	6.3

3.4 Key Infrastructure

3.4.1 In order to support the future development and population inside the Study Area, the following infrastructures will be required:

- (1) Internal roads with associated public transport terminus in the Study Area;
- (2) Access road for main external access via Po Lam Road;
- (3) Access road for supplementary external access via DAR local road with associated bus bays and semi-enclosure noise barrier;
- (4) Stormwater drainage systems with a retention tank in the Study Area;
- (5) Sewerage systems in the Study Area;
- (6) Water supply systems with salt and fresh water pumping stations and service reservoirs in the Study Area;
- (7) Landscaping works in the Study Area; and
- (8) Viewing platforms.

3.4.2 In addition, two associated infrastructures will also be implemented under this Project, including:

- (1) Rock cavern development; and
- (2) Road improvement works with associated semi-enclosure noise barrier and Bus-Bus Interchange (BBI) outside the Study Area.

3.4.3 As mentioned in **Section 1.4**, the above two associated infrastructures are Schedule 2 DPs and their potential environmental impacts will be addressed in other separate EIA studies. Nevertheless, the potential cumulative environmental impacts of these two DPs to the Project have been assessed and included in this EIA.

Consideration of Feasible Alternative Infrastructures Options

3.4.4 The objective of the Investigation Study is to bring forward the RODP proposed under the Planning Study (i.e. the version in March 2013 as mentioned in **Section 3.3.29**) to implementation stage.

3.4.5 Under the Planning Study, the RODP is more or less fixed and there is limited scope in enhancing the development layout. Nevertheless, the engineering feasibility of the development has been actively assessed and the following improvements have been considered / explored such that the Project will be implemented in a more environmentally friendly manner: -

- (a) Revised alignment of Road L4 of ARQ

3.4.6 This proposal involves realignment of the original scheme, in which viaduct is required to be constructed on top of a rock cut slope with a gradient over 70°. The proposal of realignment can substantially reduce the amount of rock cutting required for

accommodating the foundation of the viaduct. The amount of spoil generation will be reduced and the influence to the adjacent users, in particular to the DOS at the downhill side of the road, will be reduced accordingly. The revised alignment is shown in **Figure 227724/E/0004**.

(b) Alternative construction method of the access road leading to Po Lam Road

3.4.7

Originally, the access road leading to Po Lam Road will be constructed by open cut excavation. Having completed the preliminary ground investigation works, it is noted that the proposed road finish level will be overburden by 30m depth of soft material. If slope cutting method (with very steep slope cutting angle of 55° together with soil nail stabilization works) is employed for the site formation of the road, the extent of the cut slope would be about 100m from the edge of the road. The extent of cut slope is considered to be the minimum extent required should open cut excavation be adopted.

3.4.8

Having further studied on the potential ecological impacts, the proposed cut slope will affect the existing woodland as well as some identified natural habitats. Thus, alternative arrangement has been explored on the configuration of the road, including the alignment as well as the construction method, taking into account the geological condition. The alternative solution utilizes tunneling method. The alignment of the underpass is shown in **Figure 227724/E/0005** and the advantages of this revised configuration are summarized below: -

- Reduction of excavation – the total volume of excavation required for underpass scheme and nature slope cutting scheme will be about 370,500m³ and 715,000m³ respectively. Substantial reduction in the excavation volume can be achieved with the adoption of underpass scheme. After implementation of the underpass scheme, the overall cut-and-fill balance will be changed from exporting surplus materials to importing materials for general filling works where no inert C&D material will be generated for disposal to the public fill bank.
- Woodland affected – With the adoption of the underpass scheme, the area woodland affected will be substantially reduced from approx. 4.5 ha to approx. 1,300m².
- Preservation of natural habitats – given no substantial slope cutting works will be required, the existing natural stream can be maintained. The natural habitats will therefore not be affected and loss of natural habitats is not envisaged.

(c) Discussion with Housing Department and Geotechnical Engineering Office (HD/GEO) on the additional rock breaking for housing development

3.4.9

After the formulation of the RODP for the Development of ARQ, a portion of the area is planned for public housing development. Discussion had been made with HD regarding their requirement on the site formation arrangement and it was concluded that formation level at 2m below the tentative formation level formed under the “Rehabilitation of Anderson Road Quarry” will be required. In order to minimize future further rock excavation, further discussion had been made with the GEO and quarry operator on the additional rock excavation to be carried out under the current Contract of “Rehabilitation of Anderson Road Quarry”. With this arrangement, the rock excavation and the volume of spoil material to be disposed of the site will be reduced. Most importantly, the noise and dust nuisances caused to the new populations in DAR could be kept at minimum.

(d) Deletion of one of the drainage retention tanks

3.4.10 A detailed Drainage Impact Assessment has been carried out for this project and various scenarios had been explored in studying the potential impact(s) on the existing drainage system at the downstream of the development. Given that the Development of ARQ will be at the most upstream of the existing drainage networks, mitigation measures have to be implemented. Otherwise most of the existing trunk drainage pipes at the downstream will have to be upgraded, which will impose substantial nuisances to the residents in the Kwun Tong area.

3.4.11 To minimize the potential drainage impact, two drainage retention tanks was recommended in previous Planning Study, one will be installed at the northern end of the Study Area whilst the remaining one will be installed at the south western side of the Study Area. The main objective of the tanks is to limit the drainage discharge onto the existing drainage networks during and immediately after heavy rainfalls.

3.4.12 A further review on the hydraulic model reveals that one of the tanks can be deleted with the capacity on the remaining one be increased. Taking into account the site formation level of the development, the tank at the northern side of the Study Area is recommended to be deleted (as shown in **Figure 227724/E/0006**). The capacity of the tank at the south western side will be increased to provide a capacity of 70,000m³.

3.4.13 With this revised arrangement, the following could be achieved: -

- Land Use – with deletion of tank at the northern side of the Study Area, the piece of land being reserved for the facility at the northern side of the development could be released and for other development. Besides, the constraints imposed on the land use of the land due to the implementation of the facility could therefore be removed from the land condition.
- Energy consumption – Combination of two facilities into one, can lead to centralization of the associated facilities, such as the ventilation system and deodorizing system. Maintenance, management and operation of the facilities can therefore be more effective.
- Nuisances to the publics – With the deletion of the tank, the excavated spoil materials for disposal offsite can be reduced and nuisances to the publics can therefore be reduced.

(e) Minimize the disruption to the existing road traffic along Po Lam Road

3.4.14 A sewer connection at a terminal manhole at Po Lam Road has been planned and constructed under the DAR project. The alignment of the sewer pipe along Po Lam Road was refined and the proposed sewer pipe will replace an existing pipe, being installed under DAR project, with a larger diameter. The recommended sewer pipe alignment is shown on **Figure 227724/E/0007**.

3.4.15 It was noted that the construction works was just commencement by DAR's contractor by then, discussions were made with DAR project office to explore the possibility in having the works be undertaken in DAR's construction contract after the authority expressed no objection on the refined sewer alignment. After reviewed the construction programme on site, DAR's project office expressed no objection in incorporating the proposed sewer upgrading works, for the portion falls within DAR's project boundary, be undertaken by DAR's construction project. With this coordinated arrangement, the double handling of the proposed sewer pipe networks could be minimised. The most

important is that the excavation of the road and thus the traffic disturbance in future could also be minimised.

3.5 Nature, Benefit and Scope of the Project

Nature of the Project

3.5.1 The Project comprises housing and infrastructure developments at the ARQ with a Study Area of about 86 hectares (including a platform site of approx. 40 hectares). The planning of the developments within the ARQ are broadly divided into four areas, namely the Civic Core, Northern Community, Southern Community, and Recreation Network, and will provide a mix of housing types as well as basic infrastructure and community facilities for a target population of 25,000.

Benefits of the Project

3.5.2 The benefits of the Project, including environmental benefits, are broadly described below:

Land Use Planning

- (1) Provide around 40 ha platform as a solution space to meet housing demand in the urban area.
- (2) Provide an opportunity to create a green and sustainable environment that complements the land uses and urban environment of the surrounding area.

Socio-economic Aspect

- (1) Provide an opportunity to increase housing choices to accommodate younger population and different income level in order to introduce a more balanced demographic mix, enable socio-economic development and thereby build a harmonious community.
- (2) With its unique location, land form, land area and visual resources, the quarry may potentially serve as a new recreational/ leisure/ tourism destination for both local residents and visitors.
- (3) Tourism development will contribute to the development of local economy and provide employment opportunities and, at the same time, improves the amenities and environmental quality of the area.

Engineering

- (1) Provide an opportunity to utilising spaces within rock caverns and drop-cuts to release land resources in other areas, and using the rock face for recreational purposes.

Environmental Benefits

- (1) The Project will provide the opportunity to remove the existing quarry (i.e. a bare site) from the urban area and to enhance the existing landform of the Study Area through greening to create a green and liveable community.
- (2) The Project will greatly enhance the landscape and visual resources/amenity of the existing barren quarry by creation of new open space, green promenade, Quarry Park, and pedestrian corridors which are well connected within the ARQ development and to the adjacent districts.

- (3) The Project will adopt appropriate building and urban design control to create pleasant micro-climate conditions in the Study Area.
- (4) The urban design scheme of the Project encourages the use of public transportation to access the Study Area in order to reduce traffic burden and air/noise pollution.
- (5) The existing rock crushing plant, concrete batching plant and asphalt plant in the existing quarry site can be removed through the Project and there will be opportunity to clean up these potentially contaminated lands.
- (6) As the Project makes use of existing land, rather than carrying out reclamation works, it reduces the need to explore reclamation options which will alter natural waterfront and seawater resources.

Environmental Dis-benefits

- (1) There is a potential for cumulative air and noise impacts arising from the Project. However, mitigation measures have been recommended in this EIA to control any potential impacts to an acceptable level.
- (2) The construction and operation of the proposed development will generate solid waste. However, these solid wastes will firstly be reduced by recycling and reuse initiatives recommended in this EIA. The remaining solid wastes will thereafter be managed in an environmental acceptable manner.
- (3) Construction of the proposed development will introduce transient noise and air quality impacts to existing and future sensitive receivers. The construction programme, however, has aimed to reduce the scale, extent and severity of all such transient impacts to within statutory requirements.

3.5.3

The scope of the Project is summarised in **Table 3.3** below.

Table 3.3: Scope of project

Works Package	Works Components	Works Arrangement
Works Package 1	Site formation at the southern portion of the Study Area	These works components are included in this EIA
	Internal roads at the southern portion of the Study Area	
	Access road for main external access via. Po Lam Rd	
	Access road for supplementary external access via. DAR local road with associated bus bays and semi-enclosure noise barrier	
	Supporting infrastructure works, including two-way escalators and subways, for pedestrian connectivity between development of ARQ and DAR	
	Stormwater drainage systems at the southern portion of the Study Area	
	Sewerage systems at the southern portion of the Study Area	
	Water supply systems at the southern portion of the Study Area	
	Landscaping at the southern portion of the Study Area	
Works Package 2	Site formation at the northern portion of the Study	These works components

Works Package	Works Components	Works Arrangement
	Area	are included in this EIA
	Internal roads with associated public transport terminus at the northern portion of the Study Area	
	Stormwater drainage systems at the northern portion of the Study Area	
	Sewerage systems at the northern portion of the Study Area	
	Water supply systems at the northern portion of the Study Area	
	Landscaping at the northern portion of the Study Area	
Works Package 3	Drainage retention tank in the Study Area	This works component is included in this EIA
Works Package 4	Viewing platforms	This works component is included in this EIA
Works Package 5	Salt and fresh water pumping stations in the Study Area	These works components are included in this EIA
	Service reservoirs in the Study Area	
Works Package 6	Road improvement works at J/O Lin Tak Road and Sau Mau Ping Road, including road widening works at Lin Tak Road and a new vehicular bridge from Lin Tak Road to Sau Mau Ping Road with associated semi-enclosure noise barrier	The environmental acceptability of these works components is addressed in this EIA whilst the detailed environmental implications of these works components will be further investigated in a separate EIA under the EIAO (refer to Sections 1.4 & 1.5 for details)
	BBI at TKO Tunnel Toll Plaza Area	
	Associated site formation works	
Works Package 7	Road improvement works at J/O Clear Water Bay Road and Road L1 constructed under DAR, including provision of u-turn facility.	The environmental acceptability of these works components is addressed in this EIA whilst the detailed environmental implications of these works components will be further investigated in a separate EIA under the EIAO (refer to Sections 1.4 & 1.5 for details)
	Road improvement works at merging lane at Clear Water Bay Road near Shun Lee Tsuen Road, including increase of merging length	
	Associated site formation works	
Works Package 8	Rock cavern development	The environmental acceptability of this works component is addressed in this EIA whilst the detailed environmental implications of these works components will be further investigated in a

Works Package	Works Components	Works Arrangement
		separate EIA under the EIAO (refer to Sections 1.4 & 1.5 for details)

3.6 Construction Method

3.6.1 The preferred construction methods, sequence of works and staged implementation are presented in following sections:

Site Formation Works

3.6.2 The Study Area will be a net fill intake site that will not generate net inert C&D material disposal to the public fill bank. Fill would be imported to the Study Area to fill the area to the site formation level. Appropriate sources of fill material would be identified in consultation with the Public Fill Committee and Environmental Protection Department. Public fill from the fill bank will be adopted as far as available. The trucks logistic route for public fill import will utilize the existing Anderson Road and/or DAR local roads.

3.6.3 In order to avoid secondary environmental impact, external disposal of the spoil material will be minimized as far as technically practicable and subject to works programme. The phasing programme of the site formation has been determined to cope with the population intake programme.

Road Networks of the Study Area

3.6.4 The construction of road networks (including internal roads and access roads) and the associated drainage systems, sewerage networks, water supply networks and utility construction will include earthwork, utilities laying and paving.

Landscaping Works of the Study Area

3.6.5 Landscaping works will be conducted after site formation works. As it will mainly involve planting and minor pedestrian facilities, environmental impact is not anticipated.

Drainage Retention Tank

3.6.6 The area of drainage retention tank will be about 6,600 m². The major construction works will include earthwork and concrete works for the tank and construction of associated facilities including air ventilation ducts, intake fan room and deodorization room and control room, maintenance access road etc.

Service Reservoirs

3.6.7 The area of fresh and salt water service reservoirs will be about 600 m² and 108 m² respectively. The major construction works will include earthwork, slopework, concrete works for service reservoir structure and construction of associated pipeworks and maintenance access road.

Viewing Platforms

- 3.6.8** The major construction activities for the viewing platforms will be platform erection works on existing rock slope.

Rock Cavern Development and Road Improvement Works

- 3.6.9** Construction methods for the two associated infrastructures i.e. the cavern development and the road improvement works are also given below. As mentioned in **Section 1.5**, the detailed environmental implications of these two Schedule 2 DPs will be investigated in separate EIAs under EIAO. Nevertheless, their cumulative environmental impacts to the Project have been assessed and included in this EIA.

Rock Cavern Development

- 3.6.10** The major construction activities for the rock cavern development will be excavation works on existing rock slope.

Road Improvement Works

- 3.6.11** The major construction activities for the road improvement measures, e.g. road widening works and provision of u-turn facility, will include slope works and paving. For the construction of vehicular bridge from Lin Tak Road to Sau Mau Ping Road, in order to maintain the traffic flow and minimize disturbance to the existing traffic on TKO Road and the existing vehicular bridge over TKO Road during the construction of the flyover, balanced cantilever construction method with in-situ adjustable form-travellers might be adopted.

3.7 Implementation Programme

- 3.7.1** The construction of the ARQ development is anticipated to commence in 2016 for completion in 2026. It is anticipated that the development will be commissioned in phases, with half of the population intake expected in 2022 and the final population intake in 2026. The tentative implementation programme is summarised in **Table 3.4** below.

Table 3.4: Summary of the tentative implementation programme

Works Package	Works Components	Time Line
Works Package 1	Site formation at the southern portion of the Study Area	mid 2016 – end 2018
	Internal roads at the southern portion of the Study Area	
	Access road for main external access via. Po Lam Road	
	Access road for supplementary external access via. DAR local road with associated bus bays and semi-enclosure noise barrier	
	Supporting infrastructure works, including two-way escalators and subways, for pedestrian connectivity between development of ARQ and DAR	
	Stormwater drainage systems at the southern portion of the Study Area	
	Sewerage systems at the southern portion of the	

Works Package	Works Components	Time Line
	Study Area	
	Water supply systems at the southern portion of the Study Area	
	Landscaping at the southern portion of the Study Area	
Works Package 2	Site formation at the northern portion of the Study Area	early 2018 – end 2020
	Internal roads with associated public transport terminus at the northern portion of the Study Area	
	Stormwater drainage systems at the northern portion of the Study Area	
	Sewerage systems at the northern portion of the Study Area	
	Water supply systems at the northern portion of the Study Area	
	Landscaping at the northern portion of the Study Area	
Works Package 3	Drainage retention tanks in the Study Area	mid 2016 – mid 2019
Works Package 4	Viewing platforms	early 2018 – end 2020
Works Package 5	Salt and fresh water pumping stations in the Study Area	mid 2018 – end 2020
	Service reservoirs in the Study Area	
Works Package 6	Road improvement works at J/O Lin Tak Road and Sau Mau Ping Road, including road widening works at Lin Tak Road and a new vehicular bridge from Link Tak Road to Sau Mau Ping Road with associated semi-enclosure noise barrier	early 2017 – early 2022 (Separate EIA will be conducted for these works components. Details refer Sections 1.4 & 1.5)
	BBI at TKO Tunnel Toll Plaza Area	
	Pedestrian crossing facilities, including footbridge with lift towers and subway	
	Associated site formation works	
Works Package 7	Road improvement works at J/O Clear Water Bay Road and Road L1 constructed under DAR, including provision of u-turn facility.	early 2017 – early 2021 (Separate EIA will be conducted for these works components. Details refer Sections 1.4 & 1.5)
	Road improvement works at merging lane at New Clear Water Bay Road near Shun Lee Tsuen Road, including increase of merging length	
	Associated site formation works	
Works Package 8	Rock cavern development	early 2018 – end 2020 (Separate EIA will be conducted for this works components. Details refer Sections 1.4 & 1.5)

3.8 Concurrent Projects and Evaluation of Potential Cumulative Impacts

3.8.1 The evaluations of cumulative impacts due to the potential concurrent projects are presented in **Table 3.5**. Locations of the concurrent projects are shown in **Figure 227724/E/0008**.

Table 3.5: Evaluation of cumulative impacts due to concurrent projects

Concurrent Projects		Evaluation
1	Contract No. CV/2007/03 – Development at Anderson Road – Site Formation and Associated Infrastructure Works	Proposed residential developments in the lower Anderson Road Quarry. According to the latest programme advised by Housing Department, the construction works of DAR has commenced in early 2008 and is scheduled for completion in early 2017. Cumulative impact has been assessed for the operational phase (details refer Sections 4.5 and 5.4).
2	Road improvement works at J/O Lin Tak Road and Sau Mau Ping Road, at J/O Clear Water Bay Road and Road L1 of DAR, as well as at the merging lane at New Clear Water Bay Road near Shun Lee Tsuen Road	The road improvement works are tentatively scheduled to commence in early 2017 for completion in mid 2019 to 2022. As the works will be concurrent with the construction of the Project, cumulative impacts have been assessed for both construction and operational phases (details refer Sections 4.5 and 5.4).
3	Proposed rock cavern development	The proposed cavern development is expected to commence in early 2018 for completion in end 2022 which will be concurrent with the construction of the Project. Cumulative impacts have been assessed for the construction phase (details refer Sections 4.5 and 5.4).
4	Pedestrian Connectivities Project	The proposed pedestrian connectivities are scheduled to commence in 2016 for completion in 2020 which will be concurrent with the construction of the Project. Cumulative impacts during the construction phase have been assessed (details refer Sections 4.5 and 5.4).