This Information Note describes the characteristics, key development opportunities and constraints of Strategic Cavern Area No. 01 - Hung Shui Hang (the SCVA). It indicates the potential land uses suitable for cavern development within the area but would not pre-empt other possible land uses put forward by the project proponents with justifications. It also denotes the extent of potential portal locations. The spatial context of the SCVA is illustrated in the Reference Drawing appended to this Information Note.

Reference should be made to the Explanatory Statement of the Cavern Master Plan for its background and purposes, as well as the definition and delineation criteria of SCVAs.

1. Location Plan
2. **Strategic Cavern Area Details**

Outline Zoning Plans (OZPs):
- Draft Lam Tei and Yick Yuen OZP No. S/TM-LTYY/9
- Draft Tong Yan San Tsuen OZP No. S/YL-TYST/11

Area: 133.9 ha

Maximum elevation in SCVA: +297 mPD
Minimum elevation in SCVA: +16 mPD

3. **District Context**

**Location**

The SCVA is located in the western portion of the New Territories. Hung Shui Kiu New Development Area (HSKNDA) is to the northwest of the SCVA, Yuen Long South Development Area (YLSDA) is to the northeast, Tuen Mun New Town is to the southwest and Tai Lam Country Park is to the south.

The SCVA is generally hilly with a maximum elevation of about +297 mPD. It partially overlaps with Lam Tei Quarry in the southwestern side, which has been scheduled to cease operation in 2022. The “Preliminary Land Use Study for Lam Tei Quarry and the Adjoining Areas – Feasibility Study” (the Preliminary Land Use Study) commenced in June 2016. In the southwestern portion of the SCVA there are two Government, Institution and Community (GIC) facilities, namely Yuen Long Fresh Water Service Reservoir and Yuen Long Water Treatment Works. To the northwest of the SCVA across Yuen Long Highway, near the MTR Light Rail Transit (LRT) Nai Wai and Chung Uk Tsuen Stations, there is an existing residential area which consists of a number of local villages and low-rise residential development, including Tan Kwai Tsuen (about 600 m to the west of the SCVA) and Tsoi Yuen Tsuen (about 400 m to the west of the SCVA). This area is under the HSKNDA Planning and Engineering Study, and it is a proposed new development area with about 218,000 population. The HSKNDA is positioned as a “Regional Economic and Civic Hub” for the Northwest New Territories providing about 150,000 jobs. First population intake is expected by 2024 and full development is targeted by 2037/38.\(^1\) To the northeast of the SCVA is the YLSDA which is a proposed extension of the Yuen Long New Town housing a total population of about 88,000, creating about 10,500 jobs and with provisions of supporting community facilities under the Planning and Engineering Study for Housing Sites in Yuen Long South. First population...

\(^1\) Source: Information Digest and Revised Recommended Outline Development Plan (RRODP) for Hung Shui Kiu New Development Area, Hung Shui Kiu New Development Area Planning and Engineering Study, Planning Department and Civil Engineering and Development Department, September 2016.
intake is expected by 2027². To the southwest of the SCVA, Tuen Mun New Town is a local hub of high-density residential developments, e.g. Fu Tai Estate, supported by various GIC facilities (e.g. hospitals, water treatment works, service reservoirs, schools, etc.).

In the proximity of the SCVA, there are a number of key GIC facilities supporting the development in the vicinity of the SCVA and the North West New Territories, including Tan Kwai Tsuen North Fresh Water Service Reservoir (about 20 m to the northwest of the SCVA), Tan Kwai Tsuen South Fresh Water Service Reservoir (about 150 m to the northwest of the SCVA), Tan Kwai Tsuen Salt Water Service Reservoir (about 30 m to the northwest of the SCVA), North West New Territories Refuse Transfer Station (about 30 m to the northwest of the SCVA). According to the Recommended Outline Development Plan (RODP) for the HSKNDA promulgated under the Stage 3 Community Engagement of the HSKNDA Planning and Engineering Study in June 2015, a fresh water service reservoir and a flushing water service reservoir have been proposed to at the northern boundary of the SCVA to support the development of the HSKNDA.

Access

The SCVA is accessed from its northwestern, western and southwestern edges via Shui Fu Road, Shun Tat Street, Fuk Hang Tsuen Path and Fuk Hang Tsuen Road/Tung Fuk Road respectively. Regional connections could be routed through the nearby Yuen Long Highway, Tuen Mun Road, Castle Peak Road and Kong Sham Western Highway.

The MTR LRT serves the northwestern New Territories and the stations in the locality of the SCVA include Nai Wai Station and Chung Uk Tsuen Station, which are at about 1.4 km and 1.1 km to the west of the SCVA respectively. Siu Hong Station of the MTR West Rail Line is located about 1.7 km to the southwest of the SCVA, which provide mass transportation to Kowloon. An additional MTR West Rail Station, Hung Shui Kiu Station, is proposed at the HSKNDA, which is about 1.5 km to the northwest of the SCVA boundary (indicative only and is subject to the study).

² Source: Information Digest, Planning and Engineering Study for Housing Sites in Yuen Long South – Investigation, Planning Department and Civil Engineering and Development Department, August 2017.

Information Note (SCVA01 – Hung Shui Hang)
Land Use Zoning

Under the Draft Lam Tei and Yick Yuen OZP No. S/TM-LTYY/9 and the Draft Tong Yan San Tsuen OZP No. S/YL-TYST/11, the majority of the SCVA is zoned “Conservation Area”. The northwestern and western parts are zoned “Green Belt” and “Government, Institution or Community” (“G/IC”), and the southwestern part zoned “Other Specified Uses” annotated “Quarry”, which is a part of Lam Tei Quarry. Thezonings of the surrounding areas includes “Conservation Area” to the east, “Green Belt”, “G/IC” and “Other Specified Uses” annotated “Refuse Transfer Station” to the north and west, and Tai Lam Country Park to the south.

For details of the latest land usezonings on the OZPs, please refer to the Town Planning Board website (http://www.tpb.gov.hk).

There is currently no existing or planned cavern facility within the SCVA.

4. Summary of Characteristics of Strategic Cavern Area

4.1. Boundary

The northern boundary of the SCVA is defined by some private lots and existing government facilities, including the Tan Kwai Tsuen North & South Fresh Water Reservoirs and the Tan Kwai Tsuen Salt Water Reservoir. The northeastern boundary of the SCVA is defined by burial grounds. The southeastern boundary of the SCVA is defined by an extent at 800 m from the potential portal locations. The western boundary of the SCVA is defined by rock slopes at Lam Tei Quarry, burial grounds, the valley topography and the North West New Territories Refuse Transfer Station. The southern boundary of the SCVA is defined by Tai Lam Country Park.

4.2. Geology

The solid geology of the SCVA is primarily fine-grained and fine- to medium-grained granite with medium-grained granite locally within the northern portion, which belong to Tai Lam Granite. The SCVA is with the rock types that are suitable for cavern development. A number of geological features, such as inferred faults and isolated dykes, are identified within and in the areas surrounding the SCVA. The excavated fine-grained granite, fine- to medium-grained granite and medium-grained granite within the SCVA are suitable for reuse as construction aggregate.

Further geological information of the SCVA can be found in the 1:20,000-scale Geological Map Sheet 6 (Yuen Long) published by the Geotechnical Engineering Office, Civil Engineering and Development Department.

Information Note (SCVA01 – Hung Shui Hang)
4.3. Planning

The SCVA is close to the proposed key development areas (i.e. HSKNDA and YLSDA), Lam Tei Quarry and the adjoining areas and the existing low density residential and village type developments (e.g. Tan Kwai Tsuen). Given the SCVA is well connected to the rest of the territory by several highways and railways, there is potential for the SCVA to support the development of these areas in its vicinity.

The area to the east of Castle Peak Road near the LRT Chung Uk Tsuen Station is a local hub of residential developments to the west of the SCVA supported by various GIC facilities (e.g. refuse transfer station, service reservoirs, schools, etc.). Should there be any need for providing additional land for residential use, the SCVA may provide solution space by relocating some of the suitable infrastructural facilities into caverns (e.g. service reservoirs located close to existing residential developments). By doing so, surface land could be released for other beneficial uses (e.g. residential developments and/or community facilities), and it could also enable more effective utilisation of land resources in this area while preserving the natural landscape adjacent to Tai Lam Country Park.

The SCVA could also be used to house those supporting infrastructure facilities that are required by the existing residential developments in close proximity of the SCVA, and the proposed residential developments in HSKNDA and YLSDA. In particular, it is considered suitable for housing ‘Not-In-My-Backyard’ (NIMBY) type of facilities, such as refuse transfer station or sewage treatment works, to minimise the nuisance to the community.

Since the HSKNDA incorporates proposals for both industrial and logistics developments while YLSDA incorporates proposal for industrial development, the SCVA also has the potential to support the development and future expansion of these activities by providing new space for industrial type of storage/warehouse and logistics uses.

A small portion of the SCVA is within Lam Tei Quarry, which has been scheduled to cease operation in 2022. Project proponents should take into account the findings of the Preliminary Land Use Study. The development of the SCVA could be integrated with that of Lam Tei Quarry to bring about greater synergy effects and opportunities for future development. Given the convenient access provided by the quarry site, there is a potential to carry out underground quarrying in the SCVA if there is a significant time lapse between the cessation of surface quarry operation and planned development of Lam Tei Quarry. The after use of the cavern space formed by underground quarrying should be taken into account at its planning and operation stage. The cavern so formed could be utilised to support future development of Lam Tei Quarry and its adjoining area.
4.4. Environmental

Environmental sensitive receivers to cavern development in the SCVA include the nearby schools (e.g. Po Kok Branch School) and residential areas (e.g. Tan Kwai Tsuen, Tsoi Yuen Tsuen). There are burial grounds, as well as water courses passing through (i.e. Hung Shui Hang Irrigation Reservoir) and in the close proximity (i.e. Lam Tei Irrigation Reservoir). There are also some isolated graves outside the designated burial grounds. Additionally, Fu Tei Ha Site of Archaeological Interest is located to the southwest of the SCVA. Also, patches of pitch plants can be found at the upper section of a water course linking to the Hung Shui Hang Irrigation Reservoir. Preservation and protection of pitcher plants and the associated watercourses shall be considered by the project proponents. As the major stream course of Hung Shui Hang Irrigation Reservoir passes through the SCVA, the impact associated with ground water flow and hence the potential short- to long-term drainage impact of the cavern development should be considered by project proponent. A significant portion of the SCVA is within Major Conservation Area, while the Tai Lam Country Park is located immediately to the south of the SCVA.

All potential environmental constraints, which may impose restrictions on the cavern development, should be identified and taken into account under the Environmental Impact Assessment Ordinance (EIAO) and other relevant ordinances, such as the Country Parks Ordinance. Project proponents are required to take into account the potential environmental constraints when planning each cavern development project and undertaking the environmental impact assessment under the EIAO to determine its environmental acceptability, potential environmental impacts and environmental mitigation measures required.

4.5. Traffic

The SCVA can be accessed from its northwestern, western and southwestern edges via Shui Fu Road, Shun Tat Street, Fuk Hang Tsuen Path and Fuk Hang Tsuen Road/Tung Fuk Road respectively. Existing Shui Fu Road is a hilly road with low traffic flow. The future development of Lam Tei Quarry may provide new access roads reaching the SCVA. In this regard, the development of the SCVA could possibly be integrated with that of the Lam Tei Quarry to minimise the interfacing issues and bring about greater synergy for future development. The project proponent shall assess the combined traffic impact due to the development of Lam Tei Quarry and the SCVA. Further advice on the scope of the Traffic Impact Assessment shall be sought by the project proponents.
The SCVA can also be connected to Yuen Long Highway, Tuen Mun Road, Castle Peak Road and Kong Sham Western Highway through local road networks, which allows for easy connections to different parts of Hong Kong as well as to Shenzhen. In future, further connection to Lantau via the Tuen Mun - Chek Lap Kok Link will be probable.

4.6. Other Key Issues / Constraints on Cavern Development

A Water Supplies Department’s tunnel, the Tan Kwai Tsuen Water Tunnel, is located at approximately 100m to the north of the SCVA. Project proponents should take into account the existing and proposed underground infrastructure when developing cavern projects. Due to its location and the difference in elevations, this tunnel will unlikely pose any insurmountable constraint to cavern development within the SCVA.

The existing rock slopes at Lam Tei Quarry are suitable to be a good potential portal location. However, its access from this locality may be constrained by an existing stream, Hung Shui Hang. Project proponents shall consider the level of access and its impact on the existing stream.

There would be interfacing issues in case the development of the SCVA could not be integrated with that of Lam Tei Quarry. Project proponents should take into account the future development and potential land uses of Lam Tei Quarry under the Preliminary Land Use Study.

5. Potential Land Uses

The potential land uses for the SCVA are as follows:

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<tr>
<th>Land use*</th>
<th>Description</th>
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<tr>
<td>Refuse Transfer Station</td>
<td>The SCVA is strategically located with the potential to serve a wider catchment in a regional context with good road network. There is potential for the SCVA to support the potential expansion and development of the adjacent existing and proposed residential communities, e.g. the area to the east of Castle Peak Road near the LRT Chung Uk Tsuen Station, HSKNDA and YLSDA, by housing suitable ‘NIMBY’ type of facilities, such as refuse transfer station. This can also minimise the nuisance to the existing/future communities. An existing refuse transfer station is found in the vicinity of the SCVA. Relocation of the facility to caverns may be considered, thereby releasing the surface land for other</td>
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<tr>
<td>Land use*</td>
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| **Service Reservoir** | The area to the east of Castle Peak Road near the LRT Chung Uk Tsuen Station is home of various local villages (e.g. Tan Kwai Tsuen). The nearby HSKNDA and YLSDA are also proposed for residential developments as a new community in the district and an extension of Yuen Long New Town respectively. There is thus opportunity to develop suitable land use to support the development of these residential areas, by relocating and/or expanding some of the suitable infrastructural facilities, such as service reservoir, into caverns.  

Existing service reservoirs are found in the vicinity of the SCVA. Relocation of the facilities to caverns may be considered, thereby releasing the surface land for other beneficial uses and for integration with the future development. |
| **Sewage Treatment Plant** | For the same reason as described in the service reservoir land use, the SCVA has the potential to support the development of existing and proposed residential communities, by housing suitable ‘NIMBY’ type of facilities, such as sewage treatment plant, into caverns. This could also minimize the nuisance to the existing/proposed communities.  

Some potential portal locations of the SCVA are away from the existing/proposed residential areas, which make it more compatible with such land use. |
<p>| <strong>Storage / Warehousing</strong> | HSKNDA includes the proposed industrial and logistics developments and YLSDA includes the proposed industrial development. The developments require easy access and extensive land. There is thus potential to develop suitable land use for integration with the future development. |</p>
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<th>Land use*</th>
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<td>uses to support the development and future expansion of these industrial activities, for example, by developing related storage/warehouse facility in caverns. The SCVA is well connected to the rest of the territory as well as across the boundary via major highways including Yuen Long Highway, Tuen Mun Road and Kong Sham Western Highway. This has further enhanced the potential of this potential land use.</td>
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<tr>
<td>Underground Quarrying</td>
<td>The SCVA overlaps with Lam Tei Quarry site at its southern part, and the site setting of which is favourable for underground quarrying operation. The rock type in the area is suitable for aggregate production. Convenient access could be provided via the quarry site if there is a significant time lapse between the cessation of surface quarry operation and planned development of Lam Tei Quarry. If the implementation could be synchronised and integrated with that of the future Lam Tei Quarry development, potential adverse impacts on both developments could be minimised. There is a steady demand for aggregate production in Hong Kong and it is more sustainable to produce aggregate locally than import. The underground space so created could also be utilised for supporting future development of Lam Tei Quarry site.</td>
</tr>
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Note: Zoning amendment/planning application may be required to facilitate the pursuit of the above potential land uses.

* Upon the recommendations of the Preliminary Land Use Study, the list of potential land uses to be accommodated in the SCVA shall be updated.

6. **Extent of Potential Portal Locations**

The extent of potential portal locations is shown on the Reference Drawing.
The SCVA is accessed from potential portals located off Shui Fu Road, Shun Tat Street, Fuk Hang Tsuen Path and Fuk Hang Tsuen Road/Tung Fuk Road. The current accesses to the potential portal locations apparently could only accommodate low traffic flow. As such, the accesses would likely require to be widened and/or upgraded, or establishment of new access roads would be required for supporting the increase of traffic demand associated with the cavern development.

Should any upgrading or widening of road be required within or adjacent to Tai Lam Country Park to meet traffic needs associated with the cavern development, project proponent shall minimise or avoid any proposed works within Tai Lam Country Park as much as practicable. Alternative access outside the country park shall be explored.

The future development of Lam Tei Quarry site may provide new access roads reaching the SCVA. The project proponents shall consider the latest design and capacity of the traffic network at the time of implementation and assess whether road upgrading would be required to support the traffic induced by the activities associated with the cavern developments.

The extent of potential portal locations at the northwestern and western portions of the SCVA are located along with existing cut slopes, or potential new cut slopes are required to be formed for the portals. The extent of potential portal at Lam Tei Quarry at the southwestern portion of the SCVA is located along with an existing rock cut face the quarry. There may be potential natural terrain hazards in the vicinity of the potential portal locations which require further study by project proponents.

Project proponents should carry out further studies on identifying specific locations of portals for the proposed cavern development.

7. Concluding Remarks

The SCVA presents an opportunity for locating suitable land uses in rock caverns to serve the neighbouring existing and proposed residential communities (e.g. by housing service reservoirs) and proposed industrial developments in the key development areas (e.g. by housing storage/warehouses). It also has the potential to house ‘NIMBY’ type of facilities (e.g. by housing sewage treatment plant and refuse transfer station) to minimise the nuisance to the community. The development of the SCVA could be integrated with the development of Lam Tei Quarry site by accommodating underground quarrying which will provide local rock resources. Project proponents for cavern development should take due consideration of the existing and proposed residential developments, environmental sensitive receivers, accessibility for cavern development, and findings of the Preliminary Land Use Study, to minimise the interfacing issues and bring about greater synergy and opportunities.
8. Notes

The Cavern Master Plan and all supporting documents do not exempt project proponents for cavern development from following the relevant statutory and planning procedures. Information including the potential land uses and the extent of potential portal locations indicated in this Information Note should serve as reference materials only. In formulation of development proposals, project proponents should conduct the necessary studies and assessments relevant to each project stage. Reference should be made to the “Implementation” section of the Explanatory Statement of the Cavern Master Plan for further details.