CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

AGREEMENT NO. CE 20/2020 (CE) -
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENTS AT MA ON SHAN TSUEN ROAD – INVESTIGATION, DESIGN AND CONSTRUCTION

Heritage Impact Assessment Report
(Final – Issue3)

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Heritage Impact Assessment Report (Final – Issue 3)

CONFIDENTIAL

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1 INTRODUCTION

1.1 BACKGROUND

1.1.1 WSP (Asia) Ltd. (WSP) is commissioned by the Civil Engineering and Development Department (CEDD) of the Hong Kong Special Administrative Region to undertake this Consultancy of "Site Formation and Infrastructure Works for Public Housing Developments at Ma On Shan Tsuen Road – Investigation, Design and Construction", with Agreement No. CE20/2020 (CE). The commencement date of the Consultancy is 19 February 2021.

1.1.2 In consultation with the Antiquities and Monuments Office (AMO), a Heritage Impact Assessment (HIA) will be prepared pursuant to the Development Bureau Technical Circular (Works) (DEVB TC(W)) No. 1/2022, Guidelines for Built Heritage Impact Assessment as set forth by AMO and Annex 18 and 19 of the Technical Memorandum on Environmental Impact Assessment Process.

1.2 SCOPE OF THIS PROJECT

1.2.1 The Project comprises, including but not limited to, the site formation and infrastructure works as shown on Drawings No. HP1/MOSTR/SK001 and SK002 in Appendix A of the Brief. The relevant Brief Drawings are attached in **Appendix A** of this Report for ease of reference. Main elements of works of this project, which is more specifically described in Clause 2.2.1 of the Brief, include the following:

(a) Site formation work for housing development site in the lower portion of Ma On Shan Tsuen Road (MOSTR). There is an existing pump house within the housing site. According to Clause 2.1.7 of the Brief, demolition of the pump house and the associated site formation works would be undertaken by WSD provided that the handover date of the pump house site to HD would not affect the target commencement and completion date of the building works.

(b) Site formation works for the service reservoir site in the upper portion of MOSTR and the pumping station site in the lower portion of MOSTR.

(c) Roadworks, Waterworks, Drainage, Sewerage, necessary mitigation works and other ancillary works.

(d) Assess historic buildings that may be affected by the construction and operation of site formation and associated infrastructure works.

1.3 OBJECTIVES OF HIA

1.3.1 In accordance with the Heritage Impact Assessment (HIA) Mechanism stipulated in Development Bureau Technical Circular (Works) No. 1/2022, Guidelines for Built Heritage Impact Assessment as set forth by AMO and Annex 18 and 19 of the Technical Memorandum on Environmental Impact Assessment Process, it is considered necessary to conduct a Heritage Impact Assessment (HIA) to assess the heritage implications of the proposed Site Formation and Infrastructure works on graded historic buildings and devise mitigation measures if impact is unavoidable. On-site preservation of the graded historic buildings or any alternative means of preservation will be determined as necessary. The key requirements are further elaborated as follows:-

(a) Conduct a Build Heritage Impact Assessment (BHIA) to identify known and unknown heritage items within the Study Area that may be affected by the construction and operation

of site formation and associated infrastructure works, and to assess the direct and indirect impacts on these heritage items;

(b) Study different options with provision of necessary information including but not limited to elevations, sections, 3D perspective drawings, photomontage, etc, in order to demonstrate the relationship between the historic sites (including all associate structures) and the proposed site formation and associated infrastructure works including the proposed road works and visual impact to the site;

(c) Assist the DR to demonstrate that all reasonable efforts have been made to avoid or keep the adverse impacts of heritage items to the minimum through modification of design of site formation and associated infrastructure works, or use of latest construction / engineering techniques;

(d) Recommend appropriate mitigation measures to be implemented during the construction and operation of site formation and associated infrastructure works, based on the results of BHIA. A checklist including all the affected sites of cultural heritage, impacts identified, recommended mitigation measures, as well as the implementation agent and period.

1.3.2 A field survey to assess condition of structures and identify previously unrecorded resources was undertaken within the Study Area on 26 and 30 June 2021 and additional structures were identified and checked on 3 September 2022.

1.4 AUTHORSHIP

1.4.1 Archaeological Assessments Limited was commissioned on 17 February 2021 by WSP to undertake the HIA. Key personnel in the HIA are:

- Julie Van Den Bergh (Main consultant)
- Kathy Chan and Daniel Canavan (Researchers)

1.5 LIMITATIONS

1.5.1 The works associated with the project are not defined at this stage and consist of preliminary site formation works as mapped on drawings WSP_CE20_SK_029-37 (**Appendix A**). Assessment is based on site formation extents and mapped proposed infrastructure as shown on the drawings.

2 CULTURAL SIGNIFICANCE OF THE SITE

2.1 IDENTIFIED HERITAGE SITES IN STUDY AREA

2.1.1 The Study Area includes, with reference to the Development Bureau Technical Circular (Works) No. 6/2009, an area of 50m from the project site boundary. The EFS determined the majority of the heritage sites identified were part of the Ma On Shan Iron Mining Landscape some of which are located outside the 50m Study Area. The heritage sites within the Study Area will be discussed individually and as part of a larger group outside the Study Area. A heritage field survey was conducted as part of the EFS to identify the individual heritage resources; at this time the HIA Study Area was larger and as such the survey includes heritage sites and potential heritage sites no longer within the HIA Study Area. The survey results are presented below under the following categories with figures shown in **Appendix B**:

- Graded historic buildings within the Study Area **(Figures 1 – 4)**: code GB
- Other built heritage items within the Study Area **(Figures 1-5)**: code HB and described as 'non graded'
- Graves within the Study Area (**Figure 5**): Code G
- Graded historic buildings outside the HIA Survey Area and moveable objects (not mapped)

2.1.2 Built heritage inventory of graded and other built heritage items with full description of heritage resources can be found in Appendix C. Assessment is only provided for heritage sites and potential heritage sites within the HIA Study Area (works area and additional 50m from works boundary).

Graded Historic Buildings identified within the HIA Survey

GB-01 *Serial no. N245 – the Site Structures at Mining Settlement (Shun Yee San Tsuen), Ma On Shan Iron Mine, Sha Tin, N.T. Grade 3 Historic Structure* (**Figure 1**)

2.1.3 Shun Yee San Tsuen was built with Lutheran missionaries' aid to rehouse some miners' families who had been made homeless by heavy rainstorms. Completed in September 1961, Shun Yee San Tsuen comprised eight rectangular blocks subdivided into 16 home units arranged along central pathway. The structures are plain and functional but are an integral part of the Ma On Shan mining story. The structures are occupied.

GB-02 *Serial no. N100 – the Exterior Wall of 110ML (1963) part of Grade 2 Historic Structure Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.* (**Figure 2**)

2.1.4 110 ML tunnel was constructed into the iron ore body in 1963 which allowed for fast delivery of raw ore to the mineral preparation plant which considerably reduced transportation costs and raised productivity. The tunnel portal is sealed off, but the exterior walls still remain in perfect condition and within the immediate vicinity some rails could still be seen. From the tunnel portal the ore would travel by rail to the mineral preparation plant to the southeast and a few remaining pillars connect the portal to the plant. The opening of this tunnel in close proximity of the coast was a significant development with cost saving implication.

2.1.5 The graded historic site includes the following elements within the Study Area:

GB-02-1: 110 ML exterior walls and portal;
GB-02-2: Office;
GB-02-3: Engine room;
GB-02-4: Rail track

GB-03 *Serial no. N101 – Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure (Figures 3 and 4)*(**Figures 3-4**)

2.1.6 The Mineral Preparation Plant was installed in 1954 with expertise from Japan. The Mineral Preparation Plant is where the raw ore underwent crushing, grinding, etc. It transforms ore of low iron content into high grade concentrate ore and represented a significant shift in the mining production process. The reduction of bulk and shipping only the high-quality product resulted in significant reduction of freight cost. A second plant was set up in 1963. The plants have been abandoned, but traces of their structures were found scattered just below Ma On Shan Tsuen Road, it included several structures, pillars, and the upper structure has a chute. The buildings are connected by steps which are still used as a short cut from the Ma On Shan villages to Hang On and Yiu On Estates or Tai Shui Hang.

2.1.7 The graded historic site includes the following elements:

GB-03-1: Main Mineral Preparation Plant building;
GB-03-2: Structure for Stock-piles;
GB-03-3: An office set up there to supervise the operation of the ore-dressing plant;
GB-03-4 and **GB-03-5**: Pillars forming connection between 110ML portal and mineral preparation plant;
GB-03-6: Water tank

Second mineral preparation plant (not within Study Area)

Other built heritage items identified within the HIA Survey

2.1.8 Additional built heritage items, mainly associated with the mining landscape were recorded in the study area. They are (**Figures 2-5**):

- HB-01: Toilet marked on 1969 map (Ordnance survey 1969). (**Figure 2**)
- HB-02: Remains of building/location to store or repair ore bearing carts. (Ordnance survey 1969; Lands Department 1964). (**Figure 2**)
- HB-03: Electric transformer building (**Figure 3**)
- HB-04: Electric Sub-station. (**Figure 3**)
- HB-05: Stone foundation of a temporary structure visible on 1963 and 1964 aerial photos (Lands Dept 1963 and 1964). (**Figure 3**)
- HB-06: Collapsed building, function not known but is visible on 1963 aerial photo (Lands Dept 1963). (**Figure 3**)
- HB-07: Toilet built between 1969 and 1976 (Ordnance survey 1969 &76). (**Figure 3**)
- HB-08: Concrete retaining wall with buttress. (**Figure 3**)
- HB-09A: Another pillar forming connection between 110ML portal and mineral

preparation plant (Part of GB-02 but not graded) (**Figure 3**)

- HB-09B: Another pillar forming connection between mineral preparation plant and water tank (Part of GB-02 but not graded) (**Figure 3**)
- HB-09C: Another pillar forming connection between mineral preparation plant and water tank (Part of GB-02 but not graded) (**Figure 3**)
- HB-10: stone and concrete retaining wall (**Figure 3**)
- HB-11: water tank (**Figure 3**)
- HB-12: Thickener tank (**Figure 3**)
- HB-13: two sets of stairs part of the Mineral preparation plant (**Figure 3**)
- HB-14: Transmission building connected to main MPP by overhead conveyor belt (**Figure 3**)
- HB-15: Concrete solid support for rail track. (**Figures 3-4**)
- HB-16: concrete and stone support for rail track with stone barrier wall. (**Figure 4**)
- HB-17: Stone retaining wall next to main road above water tank. (**Figure 4**)
- HB-18: Small stone building next to water tank. (**Figure 4**)
- HB-19: Pipeline with retaining wall on steep slopes. (**Figure 4**)
- HB-20: Catchwater (**Figure 4**)
- HB-21: Catchwater tank (**Figure 4**)
- HB-22: Ore waste dump (**Figure 5**)
- HB-23a and HB-23b: Village house (**Figure 5**)
- HB-24: Village House (**Figure 5**)
- HB-25: Village House (**Figure 5**)
- HB-26: Village House (**Figure 5**)
- G-01: A Qing dynasty grave dated to 13th year of Guangxu period of (邱) Yau family (**Figure 5**)

Major Graded Historic Buildings part of the Ma On Shan Mining Landscape (not mapped)

2.1.9 The additional mining graded buildings and structures are mentioned here to provide a sense of group value, since the above-mentioned resources are only part of the wider mining landscape. Please note that some of the graded items mentioned here are part of the ones mentioned-above:

- GB-01-A to L: The Site Structures at Mining Settlement (excluding Shun Yee San Tsuen), Ma On Shan Iron Mine, Sha Tin, Grade 3 but including:

A. Two explosives' storerooms

B. Compressed air generator house

C. The security guard post

D. Water tanks

E. Nullah

F. Branch office

G. The mechanical section

H. Technical staff dormitory

I. A clinic

J. Canteen-cum-granary

K. The footbridge

L. Tablet of Ping On Bridge (Bridge of safety)

- GB-02-5: 240ML adit, the other part of Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, Grade 2
- GB-03-5: Second mineral preparation plant, the other part of Mineral Preparation Plant, Ma On Shan Mine, Shan Tin, Grade 3
- GB-04: St. Joseph's Church, Ma On Shan Tsuen Road, Sha Tin, Grade 2
- GB-05: Lutheran Yan Kwong Church, Ma On Shan Tsuen Road, Sha Tin, Grade 3

2.1.10 All of the machinery in the mine, including ventilation fans and winches, as well as other items of value, including most of the railway tracks, were removed after mining was suspended in 1976. The potential for moveable objects and reminders of past mining activity however, were noted during visits and included a Mutual Trust Ltd. Mining helmet, iron bolts and engineering parts, a tin mug and series of ventilation shafts. Potential for further interesting objects both on surface and buried exists.

2.1.11 The mapping of the individual items focused on the tangible aspects of the mining landscape however, the significance should be assessed taking a holistic approach and include social, economic and historical background of the mining operation.

2.2 HISTORY OF MA ON SHAN MINING OPERATION

2.2.1 The mining at Ma On Shan can be considered as one of four major historical mining operations undertaken within the 20th century in Hong Kong. While the oldest mine is located in Lin Ma Hang (1860s), Ma On Shan Iron Mine was the next commercial mining to come into operation in 1906. Further commercial mines in Hong Kong are Needle Hill Tungsten Mine (1935-1967) and West Brother or Tai Mo To Graphite Mine (1952-1971).

2.2.2 The Ma On Shan mining operation commenced in 1906 by Paul Chater's Hong Kong Iron Mining Company Limited as a small-scale opencast mine located on the west facing mid-slopes of Ma On Shan. (**Figure 6**) (AAB Appraisal). The principal iron mineral was magnetite. Initially the process was simple and included the removal of the over-burden and blasting of the ore body with dynamite.

2.2.3 The mine has had a number of owners, including the New Territories Iron Mining Co. Ltd in 1931, South China Iron Smelters Co. Ltd in 1940 (Registered 27th April 1940) and Mutual Trust Co. Ltd in 1949. During World War II, the Japanese sporadically operated the mine and shipped the ore to Japan. (industrialhistoryhk.org)

2.2.4 Two major operational shifts changed the approach to mining and productivity:

(1) in 1953 in collaboration with Nittetsu Mining Company of Japan underground mining began with an adit (tunnel) at 240 meter-level (ML) and the opening of a mineral preparation plant (GB-03-1) a year later, and by 1959 operations had moved entirely underground. The mineral preparation plant was a fully-mechanized ore-dressing machine which became operational in October 1954 (Figure 9). It operated day and night and processed vast quantity of crude ore into high-grade concentrate ore by separating the iron from other useless minerals. The plant was one of the most modern of its kind in Asia at that time. It however, required enormous amounts of water. This was directed from the hill stream by an open channel to a concrete water tank (GB-03-6) which supplied water to the plant; and

(2) in 1963 the expansion included the construction of over 5km of main tunnels and shafts and 3km of sub-levels, including 5 main ore passes. A 2.2-kilometre long haulage drive was constructed at the 110 metre level with a new portal 110 ML (GB-02-01) (Figure 7) near the mineral preparation plant (GB-03-1) (Figure 10). The mining authority also decided on a second dressing plant in 1963 to increase the efficiency of iron ore extraction as the tailing of the mineral preparation plant still contained 10% of iron content. Raw iron ore was transported from 110ML to the mineral preparation plants on an electric tram (Figure 8) and onwards 200 metres to the coast where the ore was transferred onto barges and ocean-going ships.

2.2.5 The process of extracting iron from the ore included (1) crushing, (2) grinding, and (3) desiccating (AAB Appraisal):

(1) The raw ore travelled from the train to a 'bin' which included a series of crushers. The bin reduced in three steps the ore size to 75mm, below 50mm, and to 14mm or below, which was the required size of the ore entering the next stage;

(2) The crushed ore was then transported to a mill in which the ore, repeatedly if necessary, was mixed with water and grinded to fine ore pulp. The pulp which measured less than 65 mesh was separated into "iron concentrates", "middling" or "tailing". The tailings are ground rock and process effluents were disposed of. The middling was pumped back to be further concentrated and the iron concentrates with 54 percent iron content went to dry magnetic separators where their iron content was raised to 57 percent.

(3) In the last stage the iron concentrates were de-magnetized, desiccated and stockpiled ready for shipping.

2.2.6 During the 1950s and 1960s, six thousand miners were employed and in excess of 400,000 tons of ore were extracted annually. This all came to an end in March 1976 when a worldwide weakening demand for iron ore, high operation cost, and the termination of a contract to supply Japan, led to the end of the mining activity at Ma On Shan.

2.3 EARLY SETTLEMENT IN MA ON SHAN

2.3.1 Ma On Shan New Village, which is now known as Ma On Shan Upper Village, was established in 1949 by the miners working for Ma On Shan Mine (Wai 1987:64). After the Second World War refugees from all over China provided workforce for the growing mine and relocated with their families in the small village of Ma On Shan Tsuen. Since the early 1950's, the mountain village in Ma On Shan was catered to by two churches – one Catholic and one Lutheran, which offered aid to the miners and their families. Both churches provided much needed support in the form of free food, supplies and education, a clinic, and even film evenings. (AAB 2016)

2.3.2 While Ma On Shan Upper Village was built specifically for the mine, Ma On Shan (Lower) Village was first established by the Hakka Wan clan during Qing period. According to Leung (2002), prior to 1970s, the village was sub-divided into four areas based on its geographical settings, which were Ma On Shan Ma Tau Tsuen (later demolished for the construction of Hang On Estate), Pun Shan Tsuen, Ma On Kiu Tsuen and Shan Teng Tsuen (later renamed as Ma On Shan Upper Village) respectively.

2.3.3 According to the genealogical records of the Wan clan of Tai Po Tsai Tsuen in Sai Kung, the 8th generation of Wan clan—Wan Wai-bun—left Baoan for Tai Po and Cheung Shue Tan. His eldest grandson—10th generation Wan Siu-hing—established Ho Chung village, whilst the second grandson— Wan On-hing—established Ma On Shan village (CUHK 2009). Both villages were related to Tai Po Tsai Tsuen, which was established by the 13th generation Wan Foon-tai, possibly shortly after the rescission of the Coastal Evacuation Verdict (1662-1669) (CUHK 2009), although none of the above-mentioned Wan villages were listed in the 1688 Xinan gazetteer (Ng 1983: Map 7).

2.3.4 Apart from the genealogical records, Ma On Shan village was also listed in the 1819 Xinan gazetteer (Ng 1983: Map 8). The Wan clan mainly settled in the south-facing mid-levels of Ma On Shan (Leung 2002:52), which was also known as the 'old village' comprising two rows of village houses. Farming (**Figure 11**) and collecting fire-woods were the major subsistence of the villagers until the irrigation channel was blocked by the development of Ma On Shan Mine (Wai 1987:64).

2.3.5 In addition to the two village and within the Study Area is the settlement of Shun Yee San Tsuen (**GB-01**). It was purposely built in 1960s by Lutheran missionaries to lodge miners who had lost their housing during heavy rainstorms.

2.3.6 The workforce for the extraction of deposits in the early-post war period was chiefly derived from Chinese refugees, some of them brought their families to work and live in Ma On Shan. In the early 1950s the mining community numbered some 4,000 people.

2.4 EXISTING CONDITION

2.4.1 The mine ceased operation in March 1976 and with the decommissioning and the removal of machinery and items of value, including most of the railway tracks occurred. Some deliberate destructions of buildings were undertaken to prevent use.

2.4.2 No alternative use of the 110 ML portal area or around mineral preparation plant was noted during the field visit. Locals reported using the path next to the mineral preparation plant to walk from Ma On Shan villages to Hang On and Yiu On Estates or Tai Shui Hang. Some modern rubbish and debris, and possible squatter place were found near portal of 110ML, but overall, the structures and buildings associated with the mining process were abandoned and suffer from benign neglect.

2.4.3 The overall impression is one of a well-preserved industrial mining landscape albeit neglected.

2.4.4 Within the Study Area, the structures are with exception of Shun Yee San Tsuen unused, ruinous and abandoned; the main existing impacts recorded are associated decommissioning and neglect after the decommissioning. At Shun Yee San Tsuen, people are still occupying the buildings and some air-conditioner units, minor landscaping, and new roof coverings were noted.

2.4.5 Although some areas have been reused such as the ore dump deposits, the Ma On Shan mining landscape remains largely underdeveloped and intact.

3 CONSERVATION POLICIES AND GUIDELINES

3.1 INTRODUCTION

3.1.1 The conservation policies and tools presented in this section are to develop guiding principles for conservation and development at the subject site. The guiding principles should safeguard the identified cultural significance and relationship to its immediate surroundings. Few guidelines exist which incorporate conservation of heritage and development but broad approach to preservation and inclusion into development can be gleaned.

3.2 HONG KONG LEGISLATION AND GUIDELINES

3.2.1 In Hong Kong, only Declared Monuments have statutory protection. A place, building, site or structure is after consultation with the Antiquities Advisory Board and by notice in the Gazette declared to be a monument and henceforth protected under the Antiquities and Monuments Ordinance (Cap. 53). There are no Declared Monuments within the current study, three groups of Graded Historic Buildings are identified. A grading system has been in place as a government administration mechanism for classifying historic buildings based on heritage significance since the 1980's. It has no legal basis but highlights buildings and structures of particular heritage interest which should be considered for preservation. The significance assessment is based on six criteria: historical interest, architectural merit, group value, social value and local interest, authenticity and rarity.

3.2.2 The three grades are defined as follows;

(1) Grade 1. Grade-1 buildings are those of outstanding merits, of which every effort should be made for preservation if possible;
(2) Grade 2. Grade-2 buildings are those of special merits, of which efforts should be made for selective preservation; and
(3) Grade 3. Grade-3 buildings are those of some merits, of which preservation in some form would be desirable and alternative means could be considered if preservation is not practicable.

3.3 INTERNATIONAL CONSERVATION GUIDELINES AND BEST PRACTICES

3.3.1 Internationally, conservation principles which may be applied include the Burra Charter (2013), Hoi An Protocols (2009) and English Heritage (2008) China Principles for Conservation of Heritage Sites in China (2002 and 2015), of interest in impact assessments is also ICOMOS guidelines on HIA for Cultural World Heritage Properties (2011).

BURRA CHARTER. THE AUSTRALIA ICOMOS CHARTER FOR PLACES OF CULTURAL SIGNIFICANCE (2013)

3.3.2 The Burra Charter applies to Australia but can easily be adopted for Hong Kong. The following paragraph paraphrases why the Burra Charter is of importance in this study:

3.3.3 Places of cultural significance enrich people's lives, often providing a deep and inspirational sense of connection to community and landscape, to the past and to lived experiences. They are historical records that are important expressions of [Hong Kong] identity and experience. Places of cultural significance reflect the diversity of our communities, telling us who we are and the past that has formed us and the [Hong Kong] landscape. They are irreplaceable and precious.

3.3.4 The Charter defines cultural significance as embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. It advocates cautious approach on change and warns on placing emphasis on single values of heritage. The latter is particularly important when considering the cultural significance of the Ma On Shan Mining Landscape and the three identified Graded Historic Buildings within the mining landscape and Study Area.

HOI AN PROTOCOLS FOR BEST CONSERVATION PRACTICE IN ASIA. PROFESSIONAL GUIDELINES FOR ASSURING AND PRESERVING THE AUTHENTICITY OF HERITAGE (2009)

3.3.5 The Hoi An Protocols put forward the idea that heritage conservation is essential to the preservation of cultural identity and the basis to sustained and equitable social and economic development. It builds on not only Nara Document of Authenticity (1994) but takes in account national charters including China Principles for Conservation of Heritage Sites in China (2002), Burra Charter, ICOMOS New Zealand for the Conservation of Places of Cultural Heritage Value (1992), Indonesia Charter for Heritage Conservation (2003), and INTACH Charter for the Conservation of Unprotected Architectural Heritage and Sites in India (2004). The authenticity of a heritage should be understood in terms of location and setting, form, materials and design, use and function, and immaterial or essential qualities. The Hoi An Protocols note that rapid development often threatens the survival and compromises the authenticity of cultural heritage in the region.

3.3.6 The Protocols are divided into five heritage resources, including Cultural Landscapes which is relevant to this study. Ma On Shan Mining Landscape can be understood as an economically evolved landscape responding to opportunities, technological advances and made possible by the influx of cheap labour.

ENGLISH HERITAGE. CONSERVATION PRINCIPLES, POLICIES AND GUIDANCE (2008)

3.3.7 English Heritage or Historic England as they rebranding themselves, set forth six guiding principles it believes is important to sustainably manage an historic environment. In doing so however, there is a prime understanding that the historic environment is being conserved which for Ma On Shan Mining Landscape is not yet the case as only individual buildings have been identified for preservation.

3.3.8 There are some interesting observations however, in the documents which are particular relevant to the Ma On Shan Mining Landscape, such as:

> *Experience shows that judgements about heritage values, especially those relating to the recent past, tend to grow in strength and complexity over time, as people's perceptions of a place evolve. It is therefore necessary to consider whether a place might be so valued in the future that it should be protected now. [Para. 67 of Conservation Principles, Policies and Guidance (2008)]*
>
> *Value-based judgements about elements of the historic environment have implications both for places and for everyone with an interest in them. Such judgements provide the basis for decisions about whether, or to what extent, a place should be conserved, …. It may have important financial and other consequences for owners, while the refusal to designate may mean the loss of a place to which some people attached considerable significance. Consistency of judgement is therefore crucial to the public acceptability and fairness of the process. [Para. 80 of Conservation Principles, Policies and Guidance (2008)]*

3.3.9 And regarding enabling development Historic England states the following:

> *Enabling development that would secure the future of a significant place, but contravene other planning policy objectives, should be unacceptable unless:*
> *a. it will not materially harm the heritage values of the place or its setting*
> *b. it avoids detrimental fragmentation of management of the place;*
> *c. it will secure the long term future of the place and, where applicable, its continued use for a sympathetic purpose;*
> *d. it is necessary to resolve problems arising from the inherent needs of the place, rather than the circumstances of the present owner, or the purchase price paid;*
> *e. sufficient subsidy is not available from any other source;*
> *f. it is demonstrated that the amount of enabling development is the minimum necessary to secure the future of the place, and that its form minimises harm to other public interests;*
> *g. the public benefit of securing the future of the significant place through such enabling development decisively outweighs the disbenefits of breaching other public policies. [157]*
> *h. Enabling development is development that would deliver substantial benefit to a place, but which would be contrary to other objectives of national, regional or local planning policy. It*

is an established planning principle that such development may be appropriate if the public benefit of rescuing, enhancing, or even endowing a significant place decisively outweighs the harm to other material interests. Enabling development must always be in proportion to the public benefit it offers. [Para. 158 of Conservation Principles, Policies and Guidance (2008)]

CHINA PRINCIPLES- PRINCIPLES FOR THE CONSERVATION OF HERITAGE SITES IN CHINA (2002 AND UPDATED IN 2015)

3.3.10 The updated China Principles recognize industrial heritage and the fact that significance of industrial heritage carries the same importance as other categories of heritage site. It, furthermore, states that the industrial development era is an important period in China's history. The China Principles strongly link the local community to the industrial heritage and list structures and buildings, landscape and its setting and important pieces of equipment as components of industrial heritage.

AUSTRALIAN HERITAGE COUNCIL. RUINS: A GUIDE TO CONSERVATION AND MANAGEMENT (2013)

3.3.11 This document is of particular interest as a number of the structures within the mining landscape are in poor condition.

3.3.12 Cultural significance is defined as one or all of the following; aesthetic, historic, scientific, social or spiritual value for past, present or future generations. For Ma On Shan Mining Landscape the historic and social value are of particular relevance, whereby;

3.3.13 -Ruins are sometimes the only remaining physical evidence of significant historical events, phases, activities or way of life. p.15; and

3.3.14 -The strong and special associations between a community or cultural group and a place are the essence of social significance. Such attachments are felt by people alive today and often endure across generations.p.16

3.3.15 Section 4.2 and to some extent sections 4.3 to 4.8 of the document talk about the need for management of the heritage:

3.3.16 In many cases ruins lack a management regime and may have no group or individual with a direct interest in their survival. Until a decision is made about their management, they are in a dynamic state and will continue to deteriorate through natural attrition and other impacts.

3.3.17 Decisions may therefore need to be made by a government authority on behalf of the wider public. A management regime for a ruin needs to reflect its values, location, condition and the community's management expectations.

3.3.18 Section 6.10 offers advice on when the decision is made to remove the ruin. This decision is appropriate when the heritage is completely lost due to natural process; letting the ruin go aids the preservation of more significant elements; when the condition of the ruin is an unacceptable risk to public safety or where the significance of the place does not warrant the investment of substantial resources required to make them safe (old mining sites are specifically mentioned); or where pressure for alternative use of the site is deemed to outweigh the heritage significance of the place.

ICOMOS GUIDELINES ON HERITAGE IMPACT ASSESSMENT FOR CULTURAL WORLD HERITAGE PROPERTIES (2011)

3.3.19 In general, it can be stated that the AMO Guidelines for Cultural Heritage Impact Assessment are in line with the ICOMOS Guidelines. The ICOMOS Guidelines are highlighted here for two reasons; firstly, there is an emphasis on (stating and agreeing) a clear definition of the heritage significance of the property and secondly, an understanding that an overall assemble of attributes of significance should be preserved rather than individual items.

3.3.20 In addition, guidelines and charters relevant to protection, conservation and adaptive reuse of industrial heritage exist; they include the three following:

THE NIZHNY TAGIL CHARTER FOR THE INDUSTRIAL HERITAGE (2003)

3.3.21 Charter provides guidelines on recording, protection and recognition, but provides little proactive suggestions for integrating industrial heritage into development. The document identifies four values for industrial heritage including:

i. **The industrial heritage is the evidence of activities which had and continue to have profound historical consequences. The motives for protecting the industrial heritage are based on the universal value of this evidence, rather than on the singularity of unique sites.**
ii. **The industrial heritage is of social value as part of the record of the lives of ordinary men and women, and as such it provides an important sense of identity. It is of technological and scientific value in the history of manufacturing, engineering, construction, and it may have considerable aesthetic value for the quality of its architecture, design or planning.**
iii. **These values are intrinsic to the site itself, its fabric, components, machinery and setting, in the industrial landscape, in written documentation, and also in the intangible records of industry contained in human memories and customs.**
iv. **Rarity, in terms of the survival of particular processes, site typologies or landscapes, adds particular value and should be carefully assessed. Early or pioneering examples are of especial value.**

THE DUBLIN PRINCIPLES. JOINT ICOMOS – TICCIH PRINCIPLES FOR THE CONSERVATION OF INDUSTRIAL HERITAGE SITES, STRUCTURES, AREAS AND LANDSCAPES (2011)

3.3.22 The Dublin Principles provides the broad definition of industrial heritage and ways to document and understand industrial structures, sites, areas, and landscapes. The Principles suggest ways to effectively conserve and protect the heritage, specifically adaptive re-use is mentioned in each of the documents on industrial heritage.

TAIPEI DECLARATION FOR ASIAN INDUSTRIAL HERITAGE (2012)

3.3.23 The Declaration identifies the strong ties between industrial heritage and the local people. It recognizes the intangible and well and tangible aspects of the heritage. The Declaration clearly states that industrial heritage in Asia contributes to the identity of regions and countries and forms an integral part of the history. Furthermore, the achievement of industrialization in Asia is always achieved with the help of hard-working local people. Industrial heritage is closely associated with the life history, memories, and stories of local people and social changes. Finally, Point 8 is interesting as it recognizes flexibility in the strategies and methods for conservation is needed in Asian contexts to ensure sustainable development of the industrial heritage.

3.3.24 In China, little regarding industrial heritage is formalized although inroads to appreciate, protect and preserve have been made, including the following;

WUXI INITIATIVE-ATTACHING IMPORTANCE TO THE PROTECTION OF INDUSTRIAL HERITAGE DURING HIGH-SPEED ECONOMIC DEVELOPMENT (2006)

3.3.25 The **Wuxi Initiative** does not provide guidelines in the strict sense. It recognizes that the main part of China's industrial heritage has witnessed and or is part of the changes and developments of China's modern and contemporary societies and outlines necessary changes to acknowledge industrial heritage and part of the country's heritage.

3.4 GUIDING CONSERVATION PRINCIPLES

3.4.1 The grading assessment of Ma On Shan Mining Landscape by AAB provided grading for individual structures. The AAB evaluation does indicate that the structures should be viewed as having group value but stops short of making evaluation of Ma On Shan mine as a heritage landscape.

3.4.2 The charters and guidelines on industrial heritage recognize the role of the local communities in the industrial heritage and the industrial heritage's contribution to the development of [Hong Kong] the area. There is a strong emphasis on adaptive re-use of the sites with the input of local communities.

3.4.3 The Guiding Conservation Principles for Ma On Shan Mining Landscape and individual heritage resources have been distilled from the above identified relevant grading appraisals, guidelines and best practices. They can be summarised as follows:

- Grade 2 buildings are understood to be of special merits and efforts should be made for selective preservation (AAB appraisal 2016)
- Grade 3 buildings are understood to have some merits and preservation in some form would be desirable but alternative means could be considered if preservation is not practicable (AAB appraisal 2016)
- The local communities are likely to have a close attachment and should be involved in the decision of preservation and management of the heritage (Nizhny Tagil Charter 2003, Dublin Principles 2011; Taipei Declaration 2012; Australian Heritage Council 2013: section 7.6, English Heritage 2008: Burra Charter 2013: article 26.3)
- Industrial heritage includes site itself, its fabric, components, machinery and setting, in the industrial landscape, in written documentation, and also in the intangible records of industry contained in human memories and customs (Nizhny Tagil Charter 2003)
- Heritage conservation is essential to the preservation of cultural identity and the basis to sustained and equitable social and economic development (Wuxi Initiative 2006; Burra Charter 2013:1; Burra Charter 2013: Article 24, Hoi An Protocols 2009:2; Australian Heritage Council 2013: section 3.6)
- Overall assemble of attributes of significance should be preserved rather than individual items (Burra Charter 2013: article 5; ICOMOS 2011:1-2)
- The proposed development is necessary or outweighs the heritage significance (Australian Heritage Council 2013: section 6.10 and AMO Guidelines on CHIA: section 2.2.3, and English Heritage 2008:157-158)
- Heritage should not be un-managed and preservation should be financial realistic (Australian Heritage Council 2013: sections 2.1, 4.3)

3.4.4 In summary, Ma On Shan Mining Landscape should be considered as a whole and not as a collection of individual resources and includes structures, buildings, places and landscape. The mining landscape includes tangible and intangible aspects which relate to economic and social development of Hong Kong and has strong ties to the local community.

3.4.5 A decision to protect and preserve Ma On Shan Mining Landscape or part thereof, however, should be accompanied by management, purpose and funding. The development has the opportunity to include the industrial heritage to the benefit of the community (see **Appendix D**) and recognition of the hard work of the common man in developing Hong Kong. If select preservation is opted for, the benefits of proposed development should outweigh the heritage significance lost and mitigate heritage

where possible. The community of Ma On Shan is a large part of an industrial heritage, and can and should play a role.

4 HERITAGE IMPACT ASSESSMENT

4.1 UNDERSTANDING THE CULTURAL SIGNIFICANCE OF THE STUDY AREA

4.1.1 The values of industrial heritage are similar to values of cultural heritage, namely, historical, artistic, technical or scientific values, but the protection of technical and scientific values is the key to the protection of industrial heritage.

4.1.2 The Ma On Shan Mining Landscape covers a large area on the mountainside of Ma On Shan. It involves all aspects relating to iron mining starting 1906 to 1977, including but not limited to open cast mine, tunnel/adits and associated portals, administrative buildings, processing plant and associated structures, dump areas, paths, roads, residential housing, village with church, mining and miners 'stories, documentation regarding the mining activities and operation. The Study Area covers the structures and buildings connected to the mineral processing plant, a portal with railway inside the mountain and out, residential housing, paths and staircases, and few administrative buildings. These elements belong to the first and second major development stages of Ma On Shan mining with major innovations, such as the first electric train in Hong Kong and mineral extraction plan, leading to an increased efficiency. It is a good example of industrialization in the 1950's and booming economy in 1960's in Hong Kong.

4.1.3 Architecturally, the structures within the Study Area are described as functional and utilitarian. Public tours to the mining structures and landscape are occasionally organized by the local villagers who feel connected to the mine and its past through their ancestors.

4.2 UNDERSTANDING THE DEVELOPMENT CONSTRAINTS, REQUIREMENTS AND CONCERNS

4.2.1 The Project consists of the site formation and the infrastructure works within the lower part of Ma On Shan Mining Landscape and in particular around the mineral processing plant and Shun Yee San Tsuen housing units. The purpose of the site formation works is to provide formed sites to facilitate housing developments.

4.2.2 The project is further constraint by the adjacent Country Park. *Drawings WSP_CE20_SK_029 to WSP_CE20_SK_037* are the work details provided to conduct the HIA assessment.

4.2.3 The Housing Development Site comprises the public housing development with ancillary non-domestic facilities, education and welfare facilities.

4.2.4 The works include proposed limit of site formation works, road, roundabout construction, fencing, retaining walls, bored pile wall, cut slopes, site for relocation of Ma On Shan Tsuen Fresh Water Pumping Station, proposed site for Fresh and Salt Water Service Reservoirs, and check dam.

4.2.5 Existing Ma On Shan Tsuen Fresh Water Pump House will be relocated to the southwest side of existing Ma On Shan Salt Water Service Reservoir (*Drawing WSP_CE20_SK_032*). Site Formation Works is optimized with consideration of the proposed road alignment and existing topography.

4.2.6 The fresh water and salt water service reservoirs are proposed near the existing pavilion (*Drawing WSP_CE20_SK_037*).

4.2.7 In addition to the above, other associated infrastructure works include the followings.

- Major utilities including drainage works, sewerage and waterworks are proposed to connect with the existing networks via the existing and upgraded Ma On Shan Tsuen Road.

4.3 IDENTIFICATION OF POTENTIAL IMPACTS, ASSESSMENT AND RECOMMENDED MITIGATION MEASURES

4.3.1 Potential impacts arising for the proposed site formation and infrastructures works for the housing development may include:

- Adverse physical impacts on mining related structures during construction phase from works; and
- Beneficial impacts from developing area for visitors, community and upgrade of industrial heritage environment.

4.3.2 The assessment of impacts on individual heritage sites is based on a number of factors including the heritage's significance. The definitions of level of significance for the individual heritage elements are based on Conservation Plan: A Guide to the Preparation of Conservation Plans for Places of European Cultural Significance by Kerr (2013) and taken from Heritage Impact Assessment Conservation Management Plan Revitalisation of the Rear Portion of the Cattle Depot at To Kwa Wan (AGC Design Ltd 2015:54-55) and includes six levels: exceptional, high, moderate, low, neutral and intrusive. The following table describes the definition of the levels (taken from AGC Design Ltd 2015:54-55):

Table 4.1 Definition for Level of Significance for Heritage Elements

Level of Significance	Definition
Exceptional	Where an individual space or element is assessed as displaying a strong contribution to the overall significance of the place. Spaces, elements or fabric exhibit a high degree of intactness and quality, though minor alterations or degradation may be evident.
High	Where an individual space or element is assessed as making a substantial contribution to the overall significance of the place. Space, elements of fabric originally of substantial quality, yet may have undergone considerable alteration or adaptation resulting in presentation, which is either incomplete or ambiguous. The category also includes spaces, elements or fabric of average quality in terms of design and materials, but which exhibit a high degree of intactness.
Moderate	Where an individual space or element is assessed as making a moderate contribution to the overall significance of the place. Spaces, elements or fabric originally of some intrinsic quality, and may have undergone alteration or degradation. In addition, elements of relatively new construction, where the assessment of significance is difficult, may be included. This category also includes original spaces, elements or fabric of any quality, which have undergone extensive alteration or adaptation.
Low	Where an individual space or element is assessed as making a minor contribution to the overall significance of the place, especially when compared to other features. Spaces, elements or fabric originally of little intrinsic quality, any may have undergone alteration or degradation. This category also includes original spaces, elements or fabric of any quality which have undergone extensive alteration or adaptation to the extent that only isolated remnants survive (resulting in a low degree of intactness and quality of presentation).

Neutral	Where an individual space or element is assessed as having an unimportant relationship with the overall significance of the place. Spaces elements or fabric are assessed as having little or no significance.
Intrusive	Where an individual space or element detracts from the appreciation of cultural significance, by adversely affecting or obscuring other significant areas, elements or items.

4.3.3 The impact assessment levels are based on the AMO issued *Guidelines for Cultural Heritage* Impact Assessment and include five evaluated impact levels (Beneficial, Acceptable, Acceptable with Mitigation Measures, Unacceptable and Undetermined).

4.3.4 The HIA study provides an opportunity to develop a sustainable development project which integrating with heritage (See **Appendix D**). The following table, Table 4.2, summarises the assessment of the impacts on the mining landscape as a whole and on individual Graded and other built heritage items.

Table 4.2 Evaluation of Proposed Work Impacts on Identified Heritage Sites

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
Ma On Shan Mining Landscape	The industrial landscape has been affected by removal of structural elements at the end of operations in 1970's and benign neglect since. It concerns the second oldest commercial mining operation in Hong Kong and the landscape has remained largely intact. In addition, several buildings have been graded and revitalized and popular public tours are organized by local villagers which showcase the mining operations.	Site formation and associated infrastructure The works will occur adjacent and within the south of the Ma On Shan Mining area.	The integrity of the Ma On Shan Mining area has been retained to a large degree and while the authenticity of the individual elements was affected by the removal of machinery etc. it retains a high degree due to the many elements of the mining operation which have survived and are present. The proposed works under the project will affect a number of Graded and non graded Historic Structures and Buildings and will further separate the tunnel portal from the mineral processing plant. The significance of the study area within the Ma On Shan Mining area is deemed **HIGH** due to the fact that the portal, electric railway to the mineral processing plant and the plant itself are part of a major innovation stage in the mining process.	Ma On Shan Mining Landscape has the potential to be integrated into the proposed housing development and be rehabilitated or repurposed with input from the community. As part of the proposed development encroaches the structures, some structures will have to be removed or partly removed to allow for the works. The public housing development are deemed necessary however, and hence impact on the below-mentioned sites is unavoidable.
GB-01 *Serial no. N245 – the Site Structures at Mining Settlement in Shun Yee San Tsuen, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure* Grade 3				

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
(Figure 1)				
	Shun Yee San Tsuen comprises eight rectangular residential units in two rows. With each unit consisting of two homes. They were built in the 1961 by the Lutheran missionary to rehouse some church members who were miners and had their houses destroyed by heavy rainstorms. The residential units are connected to the Graded Lutheran Yan Kwong Church and the mining landscape. The use continues to be residential.	Works are proposed to the north, west and south of the settlement. Platform and retaining wall works at a minimum distance of 14m (to west of heritage site), bored pile wall to northwest at 64m and slope and bored pile wall work to north at 67m. Drawing No. CE20/ 00/GN/1013	The residential housing has group value with the Church and mining structures. The significance of the Grade 3 the Site Structures at Mining Settlement (Shun Yee San Tsuen) is deemed **MODERATE**.	The proposed works are located in very close proximity of the residential settlement and the setting of the units may be degraded. Visual impacts will not be able to be avoided due to the proximity of the housing development. The slope cutting works are in close proximity of the settlement units, in addition access to the units may be limited during construction phase. Potential impacts may arise from major earthworks and general construction, causing vibration, tilting and settlement and safe access issues. ***Acceptable impact with mitigation***
GB-02 *Serial no. N100 – the Exterior Wall of 110ML (1963) part of Grade 2 Historic Structure Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.* Grade 2 (Figure 2)				

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
GB-02-1 110 ML exterior walls and portal Grade 2 (Figure 2)	110 ML tunnel was constructed in 1963 which allowed for fast delivery of raw ore to the mineral preparation plant which considerably reduced transportation costs and raised productivity. The tunnel portal is sealed off, but the exterior walls still remain in perfect condition.	Closest proposed works involve road widening works including cutting of slope at 39m, construction of flexible barrier at 9m, bored pile wall at 51m and dam barrier at 6.5m. Drawing No. CE20/ 00/GN/1014	The portal is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The heritage site is in close proximity of the proposed infrastructure works but will not be directly affected by proposed works. The individual significance of the heritage site will not be affected. The significance of the Grade 2 110 ML exterior walls and portal is deemed **HIGH**.	The 110 ML exterior walls and portal is of high significance in the mining operation and is in good condition. The works, in particular the construction of the dam barrier is in very close proximity of the portal and walls. Potential impacts arising from vibration, settlement and tilting may occur. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. The construction method of the dam barrier should take in account the nearby heritage site and avoid major works and use of machinery. Provision of access to the heritage sites during construction phase and after should be part of the design of the housing development. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
				Acceptable impact with mitigation
GB-02-2 Office Grade 2 (Figure 2)	The office building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine. The building was constructed at the same time as the exterior walls of 110 ML in 1963. The construction is a plain utilitarian architecture and is semi abandoned and in use for storage.	Closest proposed works involve road widening works including cutting of slope at 25m, bored pile wall at 36m construction of flexible barrier at 4m and dam barrier at 25m. Drawing No. CE20/ 00/GN/1014	The office building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The significance of the Grade 2 office building is deemed **MODERATE**.	The office building is in the middle of the works, and has the potential to be affected by vibration, settlement and tilting, in particular by the slope cutting works and bored pile wall. The condition of the office is fair. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. ***Acceptable impact with mitigation***
GB-02-3 Engine room Grade 2	The engine room building is part of the ore extraction technology innovation push at Ma On Shan	Closest proposed works involve road widening works	The engine room building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s.	The engine room is in the middle of the works, and has the potential to be affected by vibration, settlement and tilting. The

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
(Figure 2)	Iron Mine. The former engine room also likely constructed in 1963, produced electricity and regulated lighting. The construction is a plain utilitarian architecture and is in a ruinous condition. It is currently used for storage.	including cutting of slope at 32m, bored pile wall at 45m construction of flexible barrier at 15m and dam barrier at 9m. Drawing No. CE20/ 00/GN/1014	The significance of the Grade 2 engine room is deemed **MODERATE**.	condition of the engine room is ruinous and therefore precarious. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Remedial actions may be needed to prevent the further decay of the Engine room. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. ***Acceptable impact with mitigation***
GB-02-4 Rail tracks Grade 2 (Figure 2)	The rail tracks are part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s, including the first electric train operation in Hong Kong. A length of 14 m of tracks associated with sharp increase of	Closest proposed works involve road widening works including cutting of slope at 4.5m, construction of flexible	The tracks are part of the first electric train operation in Hong Kong of which little remains. The proposed works The significance of the Grade 2 rail tracks is deemed **HIGH**.	The works, in particular the construction of the slope cutting and bored pile wall is in very close proximity of the rail alignment. Potential impacts arising from vibration, settlement and tilting may occur.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
	productivity owing to ore extraction technology innovation in Ma On Shan Iron Mine and the **first electric train in Hong Kong**.	barrier at 7.5m and bored pile wall at 8m. Drawing No. CE20/ 00/GN/1014		Potential for the discovery of further rail alignment towards pillars and Mineral Processing Plant during works is possible. The importance of this is high as it is related to the first electric train in Hong Kong. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. ***Acceptable impact with mitigation***
GB-03 *Serial no. N101 – Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure* Grade 3 Figures 3-4				

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
GB-03-1 Main Mineral Preparation Plant (MPP) building Grade 3 (Figure 3)	The Mineral Preparation Plant consists of a complex of concrete engineering structures connected to each other and constructed to transport and process the ore. This allowed maximum iron ore extraction and was a major step in the mining process. The first Mineral Preparation Plant building is the largest structure and is connected to ttructure for Stock-piles and the 110 ML exterior portal (latter by pillars). The plant was constructed by 1954. Although the plant was stripped of machinery at the end of operation, the building remains in good condition.	Outside HIA Study Area	The Main Mineral Preparation Plant (MPP) building reflects the technical advancement of mining industry in the early post-war times. The significance of the Grade 3 main Mineral Preparation Plant (MPP) building is deemed **HIGH**.	Outside HIA Study Area
GB-03-2 Structure for Stock-piles Grade 3 (Figure 3)	The structure for Stock-piles was part of the transmission of ore from portal and MPP building by overhead conveyor belts. It was built directly on hill slope, by using cement pavement to cover the natural landscape. The building once had a second storey or platform on inside, but now it has collapsed.	Outside HIA Study Area	The structure for Stock-piles is part of the ore extraction technology innovation push at Ma On Shan Iron Mine. The significance of the Grade 3 structure for Stock-piles is deemed **MODERATE**.	Outside HIA Study Area

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
GB-03-3 An office set up there to supervise the operation of the ore-dressing plant Grade 3 (Figure 3)	The building consists of a rectangular concrete structure with pitched roof. It has rectangular opening at facade, windows and a door at back, windows at side wall, and also has a small room on its right side. Function of this building is unclear. It is possible this building is not associated with the mining complex as the architecture of the structure differs.	Closest proposed works involve road works at a distance of 75m. Drawing No. CE20/ 00/GN/1015	The office supervised the operation of the ore-dressing plant and is connected to the mining landscape, the significance of the Grade 3 building is deemed **LOW**.	The building is deemed sufficient distance from the proposed road works. ***Acceptable impact***
GB-03-4 **GB-03-5** Pillars forming connection between 110ML portal and mineral preparation plant Grade 3 (Figure 3)	Two graded pillar structures which together with HB-01 connected the rail from portal over the current road to Mineral Preparation Plant building. The pillars are part of the first electric train operation in Hong Kong. The condition of **GB-02**-4 and **GB-02**-5 is fair.	Outside HIA Study Area	The pillars together with the rail tracks are part of the last remains of first electric train operation in Hong Kong. Potential for the discovery of further rail alignment towards pillars and Mineral Processing Plant during works is possible. The importance of this is high as it is related to the first electric train in Hong Kong. The significance of the Grade 3 pillars forming connection between 110ML portal and mineral preparation plant is deemed **HIGH**.	The graded structures are outside HIA Study Area, however, potential for further rail tracks is possible and should be recorded during the construction phase (none are visible at the moment, but they may be potentially buried). If noted, works should cease and AMO notified.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
GB-03-6: Water tank (Figure 4)	The rectangular concrete water tank was used to collect water from hill stream and supply water to the plant. It is part of the technological innovation push in the 1960's which brought the mining activity lower down the hill.	Outside HIA Study Area	The water tank is part of the ore mineral extraction plant set up in 1963. The significance of the Grade 3 water tank is deemed **MODERATE**.	Outside HIA Study Area
Other built heritage items				
HB-01 Toilet marked on 1969 map. **Non graded** (Figure 2)	Forms part of Mineral Preparation Plant. Toilet building near portal area.	Within limits of works area Closest proposed works involve earth works at a distance of 3.7m and 3.5m from flexible barrier installation. Drawing No. CE20/ 00/GN/1014	The toilet building is part of the daily operations around the 110ML portal area. The condition of the toilet building is good and the toilet has group value as part to the mining operations and its value is deemed **MODERATE.**	The toilet building is in good condition but the works are in close proximity and have the potential to cause vibration, settlement and tilting impacts or indirect physical contact impacts. ***Acceptable impact with mitigation***
HB-02 Remains of building/location to store or repair ore bearing carts. **Non graded**	Forms part of Mineral Preparation Plant. Area part of the first electric train operation in Hong Kong	Within limits of works area Closest proposed works involve road widening works including cutting of slope at 11m,	The remains of building/location to store or repair ore bearing carts is part of the first electric train operation in Hong Kong of which little remains. The significance of the Non graded remains of building/location to	The site is related to pillars and support structures for the railway. The works, in particular the construction of the slope cutting and bored pile wall is in very close proximity of the rail repair, storing area. Potential impacts arising from vibration, settlement and tilting may occur.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
(Figure 2)		construction of flexible barrier at 16.5m and bored pile wall at 25m. Drawing No. CE20/ 00/GN/1014	store or repair ore bearing carts is deemed **HIGH**.	Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. ***Acceptable impact with mitigation***
HB-03 Electric transformer building. **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Electric transformer building used in the mining operations.	Within limits of works area the closest proposed works involve road relocation works at a distance of 14m and bored pile wall at 22m Drawing No. CE20/ 00/GN/1014	The electric transformer building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The condition of the building is poor and the machinery has been removed. Together with the nearby sub-station and other buildings the area has group value. The significance of the electric transformer building is deemed **MODERATE.**	If direct impacts are avoided, further impacts such as vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. ***Acceptable impact with mitigation***

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
HB-04 Electric Sub-station. **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Electric substation used in the mining operations.	Closest proposed works involve road construction works at a distance of 18m, bored pile wall at 28.5m Drawing No. CE20/ 00/GN/1014	The electric sub-station is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The condition of the building is fair while the machinery has been removed. The significance of the electric sub-station is deemed **MODERATE.**	The building is in relatively good condition and forms part of the innovative operation of Ma On Shan mining, while the proposed works are within vicinity they have the potential to indirectly affect through vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. ***Acceptable impact with mitigation***
HB-05 Stone foundation of a temporary structure visible on 1963 and 64 aerial photos **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Stone foundation for building likely part of the mining landscape.	Closest proposed works involve bored pile wall at a distance of 42m and 32m from road construction works. Drawing No. CE20/ 00/GN/1014	The collapsed building is part of the daily operations of the Ma On Shan Iron Mine. The condition of the building is poor but it has group value as part to the mining operations and its value is deemed **LOW.**	The condition of the building is poor and the proposed works are at sufficient distance and not expected to make a significant impact on the structure. ***Acceptable impact***

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
HB-06 Collapsed building, function not known but is visible on 1963 aerial photo **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Building with unknown function but built with same materials as other mining landscape buildings.	Closest proposed works involve proposed bored pile wall at a distance of 50m and 43m from road construction works. Drawing No. CE20/ 00/GN/1014	The collapsed building is part of the daily operations of the Ma On Shan Iron Mine. The condition of the building is poor but it has group value as part to the mining operations and its value is deemed **LOW.**	The condition of the building is poor and the proposed works are at sufficient distance and not expected to make a significant impact on the structure. ***Acceptable impact***
HB-07 Toilet built between 1969-76 **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Toilet building near buildings in lowest part of mining landscape	Closest proposed works involve proposed bored pile wall at a distance of 68m and 61m from road construction works. Drawing No. CE20/ 00/GN/1014	The toilet building is part of the daily operations of the Ma On Shan Iron Mine in the 1960s until closure. The condition of the toilet building is good and the toilet has group value as part to the mining operations and its value is deemed **MODERATE.**	The toilet building is in good condition and deemed at sufficient distance from the proposed works. ***Acceptable impact***
HB-08 Concrete retaining wall with buttress. **Non graded**	Forms part of Mineral Preparation Plant. Retaining wall is part of the mining landscape	Within limits of works area Closest proposed works involve flexible barrier installation at 10m, slope works at 23m, bored pile wall at a distance of 34m and	The retaining wall is part of the mining landscape. It is a plain concrete retaining wall with buttress and has some value as part of the landscape. Overall, the significance is deemed **LOW.**	No direct impacts are expected on this low significance plain retaining wall and indirect impacts are considered at sufficient distance of this retaining wall. ***Acceptable impact***

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
(Figure 3)		35m from road construction works. Drawing No. CE20/ 00/GN/1015		
HB-09A Another pillar forming connection between 110ML portal and mineral preparation plant (Part of **GB-03** but not graded) **Non graded** Figure 3	Forms part of Mineral Preparation Plant. The pillar structures together with **GB-03**-4 and **GB-03**-5 connected the rail from portal over the current road to Mineral Preparation Plant building. The pillar is part of the first electric train operation in Hong Kong. The condition of the pillar is poor with the upper structure removed.	Closest proposed works involve flexible barrier installation at 2m, slope works at 75m, bored pile wall at a distance of 83m. Drawing No. CE20/ 00/GN/1015	The pillar together with the other pillars and rail tracks are part of the last remains of first electric train operation in Hong Kong. The significance of the pillar forming connection between 110ML portal and mineral preparation plant is deemed **HIGH**.	The condition of the pillar is poor, but it its significance is derived from being part of the rail alignment carrying the first electric train in Hong Kong. The works, with exception of the flexible barrier are located at sufficient distance and no impacts are expected. When installing the flexible barrier some care will have to be taken. ***Acceptable impact with mitigation***
HB-09B and **HB-09C** Two further pillars recorded to the west of the Mineral Preparation Plant. **Non graded** Figure 3	Forms part of Mineral Preparation Plant. The pillars have high significance due to the fact that they are part of HK's first electric train operation. The location of pillars indicates the railway alignment continued beyond the Mineral Processing Plant to unspecified location to the west.	Outside HIA Study Area	The pillar together with the other pillars and rail tracks are part of the last remains of first electric train operation in Hong Kong and their significance is deemed **HIGH**. These pillars connect MPP building to unspecified location to the west.	Outside HIA Study Area

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
HB-10 Stone and concrete retaining wall **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant Fragment of retaining wall constructed with stones and concrete.	Within limits of works area Closest proposed works involve flexible barrier installation at 2m, slope works at 8m, bored pile wall at a distance of 20m. Drawing No. CE20/ 00/GN/1015	The remains of stone and concrete retaining wall is part of the environment of the ore mineral extraction plant set up in 1963. The significance of the non graded retaining wall is deemed **LOW**	The stone and concrete retaining wall is partially broken and although its significance overall is low it may be impacted from nearby works. Potential impacts such as vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. ***Acceptable impact with mitigation***
HB-11 Water tank **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant Rectangular water tank made of stone and concrete and with pipe fixtures	Closest proposed works involve flexible barrier installation at 25m, slope works at 50m, bored pile wall at a distance of 65m and 65m from road construction works. Drawing No. CE20/ 00/GN/1015	The water tank is part of the ore mineral extraction plant set up in 1963. The significance of the non graded water tank is deemed **MODERATE**	The water tank is in good condition and is at sufficient distance from proposed works. No impacts are expected. ***Acceptable impact***
HB-12 Former thickener tank **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. The remains of a circular concrete structure, which likely represent the foundation of the former thickener tank located adjacent to the MPP building.	The former thickener tank is at the edge of the HIA Study Area. Closest proposed works such as bored	The former thickener tank is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s.	The thickener tank only partially remains and is deemed located at sufficient distance from the proposed works.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
		pile wall works is at a distance of over 100m. Drawing No. CE20/ 00/GN/1015	Its condition is poor but the Non graded former thickener tank has significance as group value and part of the mineral preparation plant and is deemed **MODERATE**.	***Acceptable impact***
HB-13 Two sets of stairs part of the Mineral preparation plant **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. The stairs served as a foot path connecting the MPP buildings of the plant. they are built of concrete and reinforced steel. They have group value as part of the mining landscape and the mineral preparation plant. They continue to be used by locals.	The stairs descend from the current road down the slope and is situated at the edge of the HIA Study Area. Closest proposed works such as bored pile wall works is at a distance of over 100m Drawing No. CE20/ 00/GN/1015	The significance of the stairs is tied to group value with mining landscape and mineral preparation plant and is deemed **MODERATE.**	The stairs are deemed located at sufficient distance from the proposed works ***Acceptable impact***
HB-14 Transmission building connected to main MPP by overhead conveyor belt **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. The transmission building is a rectangular concrete structure and was part of the transmission of ore from portal and MPP building by overhead conveyor belts. The building is largely obscured by vegetation and is abandoned.	Outside HIA Study Area	The transmission building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. Its condition is poor but the Non graded transmission building has significance as group value and part of the mineral preparation plant and is deemed **MODERATE**.	Outside HIA Study Area

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
HB-15 Concrete solid support for rail track. **Non graded** (Figures 3-4)	Forms part of Mineral Preparation Plant. Support part of the first electric train operation in Hong Kong	Outside HIA Study Area	The support together with the other pillars and rail tracks are part of the last remains of first electric train operation in Hong Kong and their significance is deemed **HIGH**.	Outside HIA Study Area
HB-16 Concrete and stone support for rail track with stone barrier wall. **Non graded** (Figure 4)	Forms part of Mineral Preparation Plant. Support part of the first electric train operation in Hong Kong	Outside HIA Study Area	The support together with the other pillars and rail tracks are part of the last remains of first electric train operation in Hong Kong and their group value is deemed **HIGH**. The concrete and stone support for rail track with stone barrier wall however, is badly damaged or preserved.	Outside HIA Study Area
HB-17 Stone retaining wall next to main road above water tank. **Non graded**	Forms part of Mineral Preparation Plant. Retaining wall part of the mining landscape.	Outside HIA Study Area	The retaining wall is part of the mining landscape. It is a plain stone retaining wall and has some value as part of the landscape. Overall, the significance is deemed **LOW.**	Outside HIA Study Area

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
(Figure 4)				
HB-18 Small stone building next to water tank. **Non graded** (Figure 4)	Forms part of Mineral Preparation Plant. Building part of the mining landscape.	Outside HIA Study Area	The small stone building is part of the daily operations around the 110ML portal area. The condition of the small stone building is good and the building has group value as part to the mining operations and its value is deemed **MODERATE.**	Outside HIA Study Area
HB-19 Pipeline with retaining wall on steep slopes. **Non graded** (Figure 4)	Forms part of Mineral Preparation Plant. Pipeline part of the mining operations.	Outside HIA Study Area	The pipeline is part of the ore mineral extraction innovation at Ma On Shan mining operations and appears in good condition. The significance of the pipeline is deemed **MODERATE**.	Outside HIA Study Area
HB-20 Catchwater **Non graded** (Figure 4)	Forms part of Mineral Preparation Plant. Catchwater partly lined with stone and following contour of the slopes; part of the mining operations. Condition hard to	Outside HIA Study Area	The catchwater is part of the ore mineral extraction innovation at Ma On Shan mining operations and appears in good condition. The significance of the catchwater is deemed **MODERATE**.	Outside HIA Study Area

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
	assess due to inaccessible slopes.			
HB-21 Catchwater tank **Non graded** (Figure 4)	Forms part of Mineral Preparation Plant. Catchwater tank part of the mining operations. Condition hard to assess due to inaccessible slopes.	Outside HIA Study Area	The catchwater tank is part of the ore mineral extraction innovation at Ma On Shan mining operations and appears in good condition. The significance of the catchwater tank is deemed **MODERATE**.	Outside HIA Study Area
HB-22 Ore waste dump **Non graded** (Figure 5)	The ore waste dump is associated with treatment of ore deposits before Japanese technical support and this too forms part of (activities on) the mining landscape.	Within limits of works area Near the works area of construction of service reservoir at 8m distance. Drawing No. CE20/ 00/GN/1016	The ore waste dump is part of the wider landscape, further dumps may be identified and therefore the significance of the dump is considered **LOW.**	The ore dump area is interesting and forms part of the mining activities and this report locates its position within the mining landscape. It, however, has been built on and has largely disappeared. ***Acceptable impact***
HB-23a and HB-23-b Village houses **Non graded** (Figure 5)	Village houses Associated with mining landscape. Plain, functional architecture.	Partially within limits of works area Near the works area of construction of service reservoir over 64m distance.	Houses initially settled by miner and part of the wider mining landscape. Houses are plain, remain occupied and has seen modifications over the years. Significance of the house is deemed **LOW**.	Houses are occupied and have been modified/modernized over the years and no longer have a strong associated with mining. The houses will not be impacted. ***Acceptable impact***

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
		Drawing No. CE20/ 00/GN/1016		
HB-24 Village house **Non graded** (Figure 5)	Village house Associated with mining landscape. Plain, functional architecture.	Near the works area of construction of service reservoir at 70m distance. Drawing No. CE20/ 00/GN/1016	House initially settled by miner and part of the wider mining landscape. House is plain, remains occupied and has seen modifications over the years. Significance of the house is deemed **LOW**.	House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house will not be impacted. ***Acceptable impact***
HB-25 Village house **Non graded** (Figure 5)	Village house Associated with mining landscape. Plain, functional architecture.	Within limits of works area Near the works area of construction of service reservoir at 5m distance. Drawing No. CE20/ 00/GN/1016	House initially settled by miner and part of the wider mining landscape. House remains occupied and has seen modifications over the years. Significance of the house is deemed **LOW**.	House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house is located in close proximity of construction of service reservoir. ***Acceptable impact with mitigation***
HB-26 Village house **Non graded** (Figure 5)	Village house Associated with mining landscape. Plain, functional architecture.	Within limits of works area Within the works area of construction of service reservoir. Drawing No. CE20/ 00/GN/1016	House initially settled by miner and part of the wider mining landscape. House remains occupied and has seen modifications over the years. Significance of the house is deemed **LOW**.	House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house can not be retained under the design. Considering the low heritage significance preservation by record is deemed acceptable.

Heritage Site	Heritage significance	Potential works and distance from heritage site	Significance of affected heritage elements	Assessment
				Acceptable impact with mitigation
G-01 A Qing dynasty grave dated to 13th year of Guangxu period of (邱) (1884) Yau family **Non graded** (Figure 5)	Qing dynasty grave part of the settlement of communities around the mining landscape. Concrete covered graves set into the surrounding area.	Near the works area of construction of service reservoir at 64m distance. Drawing No. CE20/ 00/GN/1016	The grave does not have special architectural features, age or associations and is therefore deemed to be of **LOW** significance.	The grave will not directly be impacted and is considered at sufficient distance from works. ***Acceptable impact***

4.4 RECOMMENDED MITIGATION MEASURES

4.4.1 Mitigation recommendations are necessary as potential adverse and direct or indirect impacts on graded and other built heritage items during the site formation and infrastructure works have been identified. The proximity of works to mining structures including Graded building and structures is not fully defined at this stage. The earthworks, have the potential to adversely impact heritage items.

4.4.2 Not only direct impacts should be avoided but also degradation of setting and safe public access. The mining landscape suffers from neglect and the project has the opportunity to integrate and publicize this rather unique heritage. Studies on integration, adaptive reuse in communication with local communities should be undertaken. Table 4.3 below recommends mitigation measures for the heritage sites identified as having acceptable impact with mitigation.

4.4.3 Mitigation measures for built heritage may include a range of measures. In general, works boundary should be set away from the heritage sites as far as practical and physical barrier should be provided to fence off heritage sites from the works area. Excavation works in close vicinity to the heritage sites should not jeopardize stability of the historic structures. It should not undermine or cause damage to foundation of the historic structures. Foundation information of the historic structures shall be verified on site if needed, sufficient lateral support should be provided and de-watering (if required) should be carried out with great cautions to control ground movement and change of ground water regime at the heritage sites. Any vibration and building movement induced from the proposed works should be strictly monitored to ensure no disturbance and physical damages made to the heritage sites during the course of works. Monitoring proposal for the heritage sites, including checkpoint locations, installation details, response actions for each of the Alert/ Alarm/Action (3As) levels and frequency of monitoring should be submitted for AMO's consideration.

4.4.4 The installation of monitoring checkpoints shall be carried out in great care and adequate protection shall be provided so as to avoid unnecessary disturbance / damage to nearby historic fabrics. Photo records of monitoring checkpoints shall be submitted upon installation for AMO's records. Monitoring records should be submitted to AMO on regular basis and alert AMO should the monitoring reach Alert/ Alarm/ Action levels. Pre-and post-condition survey should be carried out to record conditions of the heritage sites and survey reports should be submitted for AMO's record.

4.4.5 The descriptions below will provide the detailed requirements for recommended mitigation actions in this report.

Redesign of works to avoid heritage sites (RW)

4.4.6 The Ma On Shan mining landscape has a high level of authenticity and integrity and retention *in situ* of the elements should be the first option for preservation. During the redesign of the works and if proposed works are necessary overhead, design should take in account an overhead buffer zone as large as possible but no less than 1m in addition to a buffer zone around the heritage site of 5m or as large as possible, construction works, including associated vibration should be kept to a minimum, possible contact with machinery should be avoided, etc.

Condition Survey (CS)

4.4.7 A condition survey will be carried out by qualified building surveyor or engineer in advance of works for identified heritage sites that may be affected by ground-borne vibration, settlement and tilting or may be structurally stressed by works. The Condition Survey Report should contain descriptions of the structure, identification of fragile elements, an appraisal of the condition and working methods for any proposed monitoring and precautionary measures that are recommended.

4.4.8 The condition survey report for the identified heritage sites must be submitted to AMO for comment before construction activities commence. The location of proposed monitoring points in the building/structure should avoid damaging the historic fabric, and any other remedial actions (such as

possible structural support of buttress and southeast corner during construction phase) should be agreed by AMO prior to implementation. The contractor should conduct the approved monitoring and precautionary measures.

Vibration Monitoring (VM)

4.4.9 Monitoring of vibrations should be undertaken during the construction works to ensure that safe levels of vibration are not exceeded. The relevant levels of acceptable vibration, a monitoring schedule, the location of monitoring equipment, the frequency of monitoring, reporting requirements and format will depend on the structural condition of the heritage site and will be evaluated and recommended in the Condition Survey Report. Provisionally an Alert, Alarm and Action (AAA) vibration limit of 5 / 6 / 7.5 mm/s should be adopted. The AAA level may be revised pending recommendations of the Condition Survey Report. A list of action upon reaching each of the AAA level will be implemented, including site inspection, assessment of effect on the heritage site, review of works being undertaken in vicinity, prediction of further responses, agreement of further action plan to control vibration, etc. The location of any monitoring equipment must be approved by AMO before installation. Reinstatement to all affected areas is required.

Settlement Monitoring (SM)

4.4.10 Mechanical subsidence of structural heritage remains may arise during construction phase. Monitoring should be carried out by the Contractor using crack gauges to monitor horizontal or vertical movement across a crack on a flat surface. A monitoring schedule, the location of monitoring equipment, the frequency of monitoring, reporting requirements will be evaluated and recommended in the Condition Survey Report. Provisionally AAA standards of 6/8/10 mm are recommended. A list of action upon reaching each of the AAA level will be identified in the Condition Survey Report and implemented, including site inspection, assessment of effect on the heritage site, review of works being undertaken in vicinity, prediction of further responses, agreement of further action plan to control settlement, etc.

Tilt Monitoring (TM)

4.4.11 The Condition Survey Report will recommend equipment, frequency and AAA standards to monitor any discernible tilting at the identified heritage sites as a result of their exposure and /or due to nearby works. Provisionally AAA standards of 1/2000. 1/1500 and1/1000 are recommended.

Provision of Buffer Zones (BZ)

4.4.12 A buffer zone should be provided to separate the structure from the construction works. The buffer zone will act as a 'reminder' to the construction workers and site personnel that care should be taken when working near these structures. The buffer zone should be clearly marked out by temporary fencing. The buffer zone should be made at least 1m from the proposed works or if this is not possible as large as the site restrictions allow.

Provision of Protective Covering (PC)

4.4.13 Protective covering in the form of geotextile sheeting and sandbag covering should be provided for external walls and surfaces (that contain historical elements) in close proximity to works areas, i.e. areas where a buffer zone alone cannot provide protection from equipment and works activities.

Provision of Public Access (PA)

4.4.14 Any proposed works in close proximity to buildings or structures used by the public have the potential to create an unsafe environment for members of the public.

4.4.15 The contractor should ensure that current public access is retained, if possible, through provision of clearly marked divisions (such as fencing, signs), which separate construction works areas from heritage site and public area.

Preservation by Record (PR)

4.4.16 A full cartographic and photographic survey should be conducted for identified heritage sites or part thereof and which will be demolished during works or relocated prior to the construction works. The survey report should be submitted to AMO for review once ready.

Summary on Recommended Mitigation Measures

4.4.17 Following the above assessment mitigation measures may be required during different stages of the proposed development. Summaries on recommended mitigation measures during different stages of the development are presented next.

Mitigation before and during construction phase

4.4.18 Mitigation measures required for the Graded and Other built heritage items (non graded) are presented in **Table 4.3**.

Table 4.3 Summary of mitigation before and during construction phase

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
Ma On Shan Mining Landscape	The industrial landscape has been affected by removal of structural elements at the end of operations in 1970's and benign neglect since. It concerns the second oldest commercial mining operation in Hong Kong and the landscape has remained largely intact. In addition, several buildings have been graded and revitalized and popular public tours are organized by local villagers which showcase the mining operations. **<u>High Significance</u>**	Public housing development and associated infrastructure The works will occur adjacent and within the south of the Ma On Shan Mining area.	Ma On Shan Mining Landscape has the potential to be integrated into the proposed housing development and be rehabilitated or repurposed with input from the community. Examples of use of old industrial heritage areas for recreational and educational purposes have been put forward in the baseline review report.	The integration of the Ma On Shan Mining Landscape into the housing development should be explored as sustainable development goal to the benefit of the local community and appreciation of industrial heritage within Hong Kong as a whole. The project has the opportunity to regenerate the area, using the mining history and tangible remains for recreational and educative purposes within the housing complex and for the community, local and at-large See below for individual mitigation recommendations
Individual structures belonging to the Ma On Shan Mining Landscape within Study Area				
ID	Graded Historic Buildings			
GB-01 Grade 3 (Figure 1)	*Serial no. N245 – the Site Structures at Mining Settlement in Shun Yee San Tsuen, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure*			
	Shun Yee San Tsuen comprises eight rectangular residential units in two rows. With each unit consisting of two homes. They were built in the 1961 by the Lutheran missionary to rehouse some church members who were miners and	Works are proposed to the north, west and south of the settlement. Works include: Platform and retaining wall works at a minimum	Landscaping works to ensure the setting of the settlement is not affected by the proposed housing development needs to be developed.	

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
	had their houses destroyed by heavy rainstorms. The residential units are connected to the Graded Lutheran Yan Kwong Church and the mining landscape. The use continues to be residential. **Moderate Significance/ Grade 3**	distance of 14m (to west of heritage site), bored pile wall to northwest at 64m and slope and bored pile wall work to north at 67m. Drawing No. CE20/ 00/GN/1013	CS	VM, SM, TM SPA BZ
GB-02 Grade 2	*Serial no. N100 – the Exterior Wall of 110ML (1963) part of Grade 2 Historic Structure Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.*			
GB-02-1 110 ML exterior walls and portal (Figure 2)	110 ML tunnel was constructed in 1963 which allowed for fast delivery of raw ore to the mineral preparation plant which considerably reduced transportation costs and raised productivity. The tunnel portal is sealed off, but the exterior walls still remain in perfect condition. **High Significance/ Grade 2**	Closest proposed works involve road widening works including cutting of slope at 39m, construction of flexible barrier at 9m, bored pile wall at 51m and dam barrier at 6.5m. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ
GB-02-2 Office (Figure 2)	The office building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The building was constructed at the same time as the exterior walls of 110 ML in 1963. The construction is a plain	Closest proposed works involve road widening works including cutting of slope at 25m, bored pile wall at 36m construction of flexible barrier at 4m and dam barrier at 25m.	CS	VM, SM, TM SPA BZ

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
	utilitarian architecture and is semi abandoned and in use for storage. **Moderate Significance/ Grade 2**	Drawing No. CE20/ 00/GN/1014		
GB-02-3 Engine room (Figure 2)	The engine room building is part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s. The former engine room also likely constructed in 1963, produced electricity and regulated lighting. The construction is a plain utilitarian architecture and is in a ruinous condition. It is currently used for storage. **Moderate Significance/ Grade 2**	Closest proposed works involve road widening works including cutting of slope at 32m, bored pile wall at 45m construction of flexible barrier at 15m and dam barrier at 9m. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ
GB-02-4 Rail tracks (Figure 2)	The rail tracks are part of the ore extraction technology innovation push at Ma On Shan Iron Mine in the 1960s, including the first electric train operation in Hong Kong. A length of 14 m of tracks associated with sharp increase of productivity owing to ore extraction technology innovation in Ma On Shan Iron Mine and the first electric train in HK. **High Significance/ Grade 2**	Closest proposed works involve road widening works including cutting of slope at 4.5m, construction of flexible barrier at 7.5m and bored pile wall at 8m. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ PC Potential for the discovery of further rail alignment towards pillars and Mineral Processing Plant during works is possible although none was visible during the conducted site visits. The importance of this is high as it is

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
				related to the first electric train in Hong Kong. If rail tracks are noted, AMO should be notified immediately and appropriate follow up action discussed with the relevant parties.
Other built heritage items				
HB-01 Toilet marked on 1969 map. **Non graded** (Figure 2)	Forms part of Mineral Preparation Plant. Toilet building near portal area. **Moderate Significance/ Non graded**	Within limits of works area Closest proposed works involve earth works at a distance of 3.7m and 3.5m from flexible barrier installation. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ
HB-02 Remains of building/location to store or repair ore bearing carts. **Non graded** (Figure 2)	Forms part of Mineral Preparation Plant. Area part of the first electric train operation in Hong Kong **High Significance/ Non graded**	Within limits of works area Closest proposed works involve road widening works including cutting of slope at 11m, construction of flexible barrier at 16.5m and bored pile wall at 25m. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
HB-03 Electric transformer building. **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Electric transformer building used in the mining operations. **<u>Moderate Significance/ Non graded</u>**	Within limits of works area The closest proposed works involve road relocation works at a distance of 14m and bored pile wall at 22m Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ
HB-04 Electric Sub-station. **Non graded** (Figure 3)	Forms part of Mineral Preparation Plant. Electric substation used in the mining operations. **<u>Moderate Significance/ Non graded</u>**	Closest proposed works involve road construction works at a distance of 18m, bored pile wall at 28.5m. Drawing No. CE20/ 00/GN/1014	CS	VM, SM, TM SPA BZ
HB-09A Another pillar forming connection between 110ML portal and mineral preparation plant	Forms part of Mineral Preparation Plant. The pillar structures together with **GB-03**-4 and **GB-03**-5 connected the rail from portal over the current road to Mineral Preparation Plant building. The pillar is part of the first electric train operation in Hong Kong. The condition of the pillar is poor with the upper structure removed.	Closest proposed works involve flexible barrier installation at 2m, slope works at 75m, bored pile wall at a distance of 83m.	CS	VM, SM, TM SPA BZ

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
(Part of **GB-03** but not graded) **Non graded** (Figure 3)	**High Significance/ Non graded**	Drawing No. CE20/ 00/GN/1015		
HB-10 Stone and concrete retaining wall part of Mineral Preparation Plant	Forms part of Mineral Preparation Plant Fragment of retaining wall constructed with stones and concrete. **Low Significance/ Non graded**	Within limits of works area Closest proposed works involve flexible barrier installation at 2m, slope works at 8m, bored pile wall at a distance of 20m. Drawing No. CE20/ 00/GN/1015	CS	VM, SM, TM SPA BZ
HB-25 **Village house** Associated with mining landscape (Figure 3)	Village house Associated with mining landscape. Plain, functional architecture. **Low Significance/ Non graded**	Within limits of works area Near the works area of construction of service reservoir at 5m distance. Drawing No. CE20/ 00/GN/1016	CS	VM, SM, TM SPA BZ
HB-26 **Village house**	Village house Associated with mining landscape. Plain, functional architecture.	Within limits of works area Within the works area of construction of service reservoir.	PR	--

Heritage Site/ID	Heritage significance/Grading	Potential works and distance from heritage site	Recommended mitigation measures	
			Prior to construction phase	During construction
Associated with mining landscape (Figure 5)	**Low Significance/ Non graded**	Drawing No. CE20/ 00/GN/1015		

Mitigation during operational phase and cumulative impacts

4.4.19 Upon development of the housing sites, without action the continued neglect and disrepair of the heritage sites is anticipated. Proposals to integrate the industrial heritage into the housing development should be undertaken following international examples such as H-line in New York, USA, C-Mine in Genk, Belgium, and Landscaftspark Duisburg-Nord, Germany.

4.4.20 A study 'Conservation of Industrial Heritage at the Ma On Shan Iron Mine' was undertaken by Institute of future cities/CUHK in June 2020. This study puts forward a proposal for MOS Iron Mine Landscape with vision for a living museum. The proposal focusses on a more intense preservation of the upper mining sites, while allowing for development at the 110ML portal and mineral mining plant:

> *The Peak District in relatively high ground and has the highest number of heritages is suggested to be conserved in totality whereas the conservation of Cluster 2 at the foothill of the Hunch Back at around 100ML near the MOS New Town may be integrated with possible future development. Cluster 3 in between may need further research and documentation. Future development should provide options for existing residents, especially active farmers, to continue with their life and livelihood.*

5 CONCLUSION OF HIA FINDINGS

5.1.1 The Ma On Shan Mining Landscape has educational, public and historic value as the one of the first commercial mining landscape to be developed in Hong Kong. The mining landscape still has strong ties to the local community who organizes sporadically guided tours. The focus of the report is on the buildings and structures associated with the first and second innovative expansions of the mine and include the mineral extraction plant and first electric train in Hong Kong, leading to an increased efficiency. It is a good example of the industrialization in the 1950's and booming economy in 1960's in Hong Kong. The condition of the buildings and structures ranges from very good (portal) to poor (thickener tank for instance). They were functional buildings and do not have architectural embellishments, although some slogans commemorating mining history have been painted onto them. The buildings were stripped of the machinery, but elements remain such as the railway and further elements are likely to be buried or hidden. The baseline review identified three Graded Historic Building groups covering nineteen building and structures, a further twenty-six other built heritage items and a grave within the HIA Survey Area. Of these, six Graded and eighteen other built heritage items are within the HIA Study Area.

5.1.2 The necessity of proposed public housing development is considered in the interest of the community as a whole and the development has the opportunity to integrate the industrial heritage in housing complex. The site formation and infrastructure works for the housing development reviewed in this report identifies non graded structure village house HB-26 is within the works area for service reservoir and can under the current design not be *preserved in situ*.

5.1.3 In addition, works will be close to Graded Buildings and Structures: the Site Structures at Mining Settlement in Shun Yee San Tsuen (GB-01), 110 ML exterior walls and portal (GB-02-1), Office (GB-02-2), Engine room (GB-02-3), Rail tracks (GB-02-4), and non graded buildings and structures: Toilet building (HB-01), Remains of building/location to store or repair ore bearing carts (HB-02), the Electric Sub-station (HB-04), railway pillar (HB-09A), Stone and concrete retaining wall (HB-10), and Village house (HB-25).

5.1.4 Recommendations for condition surveys before the construction phase and monitoring of vibration, settlement and tilting, as well as setting up of buffer zones and use of protective covering have been added for the Graded and non graded buildings and structures near the works. Access to the heritage sites outside the works areas should be retained and construction areas clearly marked to avoid endangering the public during the construction phase.

5.1.5 Summary of the findings and mitigation recommendations for the Graded and other built heritage items are presented in **Table 5.1**.

Table 5.1 Summary of assessment and recommended mitigation measures

Heritage Site	Heritage significance	Works	Assessment	Mitigation actions
Ma On Shan Mining Landscape	The industrial landscape has been affected by removal of structural elements at the end of operations in 1970's and benign neglect since. It concerns the second oldest commercial mining operation in Hong Kong and the landscape has remained largely intact. In addition, several buildings have been graded and revitalized and popular public tours are organized by local villagers which showcase the mining operations.	Public housing development and associated infrastructure The works will occur adjacent and within the south of the Ma On Shan Mining area.	Ma On Shan Mining Landscape has the potential to be integrated into the proposed housing development and be rehabilitated or repurposed with input from the community. As part of the proposed development some structures will have to be removed or partly removed to allow for the works. The public housing development is deemed necessary however, and hence impact on the said sites is unavoidable.	Mitigation actions for the individual buildings and structures is provided below. The integration of the Ma On Shan Mining Landscape into the housing development should be explored as sustainable development goal to the benefit of the local community and appreciation of industrial heritage within Hong Kong as a whole. The project has the opportunity to regenerate the area, using the mining history and tangible remains for recreational and educative purposes within the housing complex and for the community, local and at-large.

ID	Structure	Grading	Works	Assessment	Mitigation actions
GB-01	**Serial no. N245 – the Site Structures at Mining Settlement in Shun Yee San Tsuen, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure**	**Grade 3**	Works are proposed to the north, west and south of the settlement. Works include: Platform and retaining wall work at a minimum distance of 14m	The slope cutting works are in close proximity of the settlement units, in addition access to the units may be limited during construction phase.	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring

ID	Structure	Grading	Works	Assessment	Mitigation actions
	Figure 1		(to west of heritage site), bored pile wall to northwest at 64m and slope and bored pile wall work to north at 67m. Drawing No. CE20/00/GN/1013	Potential impacts may arise from major earthworks and general construction, causing vibration, tilting and settlement and safe access issues. Acceptable impact with mitigation	of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
GB-02	**Serial no. N100 – the Exterior Wall of 110ML (1963) part of Grade 2 Historic Structure Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.**				
GB-02-1	110 ML exterior walls and portal Figure 2	**Grade 2**	Closest proposed works involve road widening works including cutting of slope at 39m, construction of flexible barrier at 9m, bored pile wall at 51m and dam barrier at 6.5m Drawing No. CE20/00/GN/1014	The 110 ML exterior walls and portal is of high significance in the mining operation as part of the expansion of the mine and is in good condition. The works, in particular the construction of the dam barrier is in very close proximity of the portal and walls. Potential impacts arising from vibration, settlement and tilting may occur. Furthermore, access to the heritage sites during	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to

ID	Structure	Grading	Works	Assessment	Mitigation actions
				the construction phase cannot be guaranteed. The construction method of the dam barrier should take in account the nearby heritage site and avoid major works and use of machinery. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. Acceptable impact with mitigation	be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
GB-02-2	Office Figure 2	**Grade 2**	Closest proposed works involve road widening works including cutting of slope at 25m, bored pile wall at 36m construction of flexible barrier at 4m and dam barrier at 25m.	The office building is in the middle of the works, and has the potential to be affected by vibration, settlement and tilting, in particular by the slope cutting works. The condition of the office is fair.	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in

ID	Structure	Grading	Works	Assessment	Mitigation actions
			Drawing No. CE20/00/GN/1014	Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. Acceptable impact with mitigation	the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
GB-02-3	Engine room Figure 2	**Grade 2**	Closest proposed works involve road widening works including cutting of slope at 32m, bored pile wall at 45m construction of flexible barrier at 15m and dam barrier at 9m. Drawing No. CE20/00/GN/1014	The engine room is in the middle of the works, and has the potential to be affected by vibration, settlement and tilting. The condition of the engine room is ruinous and therefore precarious. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed.	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to

ID	Structure	Grading	Works	Assessment	Mitigation actions
				Remedial actions may be needed to prevent the further decay of the Engine room. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. Acceptable impact with mitigation	be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
GB-02-4	Rail tracks Figure 2	**Grade 2**	Closest proposed works involve road widening works including cutting of slope at 4.5m, construction of flexible barrier at 7.5m and bored pile wall at 8m. Drawing No. CE20/00/GN/1014	The works, in particular the construction of the slope cutting is in very close proximity of the rail alignment. Potential impacts arising from vibration, settlement and tilting may occur. Potential for the discovery of further rail alignment towards pillars and Mineral Processing Plant during works is possible. The importance of this heritage site is high as it is	Redesign of the works to avoid potential direct impacts on the heritage site. Further mitigation will be necessary to avoid indirect impacts such as contact with equipment, vibration, etc.

ID	Structure	Grading	Works	Assessment	Mitigation actions
				related to the first electric train in Hong Kong. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the possibility to integrate the heritage sites as part of a design for the development. Acceptable impact with mitigation	
GB-03	**Serial no. N101 – Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T., Grade 3 Historic Structure**				
GB-03-1	Main Mineral Preparation Plant (MPP) building Figure 3	**Grade 3**	Outside HIA Study Area		

ID	Structure	Grading	Works	Assessment	Mitigation actions
GB-03-2	Structure for Stock-piles Figure 3	**Grade 3**	Outside HIA Study Area		
GB-03-3	An office set up there to supervise the operation of the ore-dressing plant Figure 3	**Grade 3**	Closest proposed works involve road works at a distance of 75m. Drawing No. CE20/00/GN/1015	The building is deemed sufficient distance from the proposed road works. Acceptable impact	No mitigation required but safe public access to the heritage sites is expected to be ongoing during construction phase and after.
GB-03-4 **GB-03-5**	Pillars forming connection between 110ML portal and mineral preparation plant Figure 3	**Grade 3**	Outside HIA Study Area		
GB-03-6	Water tank Figure 4	**Grade 3**	Outside HIA Study Area		
HB-01	Toilet building near portal area. Figure 2	**Non graded**	Within limits of works area Closest proposed works involve earth works at a distance of 3.7m and 3.5m from flexible barrier installation. Drawing No. CE20/00/GN/1014	The toilet building is in good condition but the works are in close proximity and have the potential to cause vibration, settlement and tilting impacts or indirect physical contact impacts. Acceptable impact with mitigation	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during

ID	Structure	Grading	Works	Assessment	Mitigation actions
					the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-02	Area part of the first electric train operation in Hong Kong Figure 2	**Non graded**	Within limits of works area Closest proposed works involve road widening works including cutting of slope at 11m, construction of flexible barrier at 16.5m and bored pile wall at 25m Drawing No. CE20/00/GN/1014	The site is related to pillars and support structures for the railway. The works, in particular the construction of the slope cutting is in very close proximity of the rail repair, storing area. Potential impacts arising from vibration, settlement and tilting may occur. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Access to the heritage sites outside the construction areas will try to retain during the construction period, and the construction areas will clearly be marked to avoid endangering the public. The proposed housing development could explore the	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.

ID	Structure	Grading	Works	Assessment	Mitigation actions
				possibility to integrate the heritage sites as part of a design for the development. Acceptable impact with mitigation	
HB-03	Electric transformer building used in the mining operations. Figure 3	**Non graded**	Within limits of works area The closest proposed works involve road relocation works at a distance of 14m and bored pile wall at 22m Drawing No. CE20/00/GN/1014	If direct impacts are avoided, further impacts such as vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. Acceptable impact with mitigation	Further mitigation will be necessary to avoid indirect impacts such as contact with equipment, vibration, etc.
HB-04	Electric substation used in the mining operations. Figure 3	**Non graded**	Closest proposed works involve road construction works at a distance of 18m, bored pile wall at 28.5m. Drawing No. CE20/00/GN/1014	The building is in relatively good condition and forms part of the innovative operation of Ma On Shan mining, while the proposed works are within vicinity they have the potential to indirectly affect through vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. Furthermore, access to the heritage sites during the construction phase cannot be guaranteed. Acceptable impact with mitigation	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be

ID	Structure	Grading	Works	Assessment	Mitigation actions
					provided during construction phase and after.
HB-05	Stone foundation of a temporary structure Figure 3	**Non graded**	Closest proposed works involve proposed bored pile wall at a distance of 42m and 32m from road construction works. Drawing No. CE20/00/GN/1014	The condition of the building is poor and the proposed works are at sufficient distance and not expected to make a significant impact on the structure. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-06	Collapsed building, function not known Figure 3	**Non graded**	Closest proposed works involve proposed bored pile wall at a distance of 50m and 43m from road construction works. Drawing No. CE20/00/GN/1014	The condition of the building is poor and the proposed works are at sufficient distance and not expected to make a significant impact on the structure. Acceptable impact	No mitigation required but safe public access to the heritage sites is expected to be ongoing during construction phase and after.
HB-07	Toilet built between 1969-76 Figure 3	**Non graded**	Closest proposed works involve proposed bored pile wall at a distance of 68m and 61m from road construction works. Drawing No. CE20/00/GN/1014	The toilet building is in good condition and deemed at sufficient distance from the proposed works. Acceptable impact	No mitigation required but safe public access to the heritage sites is expected to be ongoing during construction phase and after.
HB-08	Concrete retaining wall with buttress. Figure 3	**Non graded**	Within limits of works area Closest proposed works involve flexible barrier installation at 10m, slope works at 23m, bored pile wall at a distance of 34m	Direct impacts cannot be avoided on this low significance, plain retaining wall, while it had a function in the overall mining	No mitigation necessary, but ongoing safe public access to the heritage site should be

ID	Structure	Grading	Works	Assessment	Mitigation actions
			and 35m from road construction works. Drawing No. CE20/00/GN/1015	landscape the retaining wall does not have special features. Acceptable impact	provided during construction phase and after.
HB-09A	Another pillar forming connection between 110ML portal and mineral preparation plant (Part of GB-02 but not graded) Figure 3	**Non graded**	Closest proposed works involve flexible barrier installation at 2m, slope works at 75m, bored pile wall at a distance of 83m. Drawing No. CE20/00/GN/1015	The condition of the pillar is poor, but it its significance is derived from being part of the rail alignment carrying the first electric train in Hong Kong. It can not be retained at its current position as it falls within a cut slope area. Acceptable impact with mitigation	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-09B and C	Two further pillars recorded to the west of the Mineral Processing Plant.	**Non graded**	Outside HIA Study Area		

ID	Structure	Grading	Works	Assessment	Mitigation actions
	Figure 3				
HB-10	Stone and concrete retaining wall part of Mineral Preparation Plant Figure 3	**Non graded**	Within limits of works area Closest proposed works involve flexible barrier installation at 2m, slope works at 8m, bored pile wall at a distance of 20m. Drawing No. CE20/00/GN/1015	The stone and concrete retaining wall is partially broken and although its significance overall is low it may be impacted from nearby works. Potential impacts such as vibration, settlement or tilting, and proximity of the equipment may cause physical impacts. Acceptable impact with mitigation	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-11	Water tank part of Mineral Preparation Plant Figure 3	**Non graded**	Closest proposed works involve flexible barrier installation at 25m, slope works at 50m, bored pile wall at a distance of 65m and 65m from road construction works. Drawing No. CE20/00/GN/1015	The water tank is in good condition and is at sufficient distance from proposed works. No impacts are expected. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.

ID	Structure	Grading	Works	Assessment	Mitigation actions
HB-12	Former thickener tank Figure 3	**Non graded**	The former thickener tank is at the edge of the HIA Study Area. Closest proposed works such as bored pile wall works is at a distance of over 100m. Drawing No. CE20/00/GN/1015	The thickener tank only partially remains and is deemed located at sufficient distance from the proposed works. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-13	Two sets of stairs part of the Mineral preparation plant Figure 3	**Non graded**	The stairs descend from the current road down the slope and is situated at the edge of the HIA Study Area. Closest proposed works such as bored pile wall works is at a distance of over 100m Drawing No. CE20/00/GN/1015	The stairs are deemed located at sufficient distance from the proposed works. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-14	Transmission building connected to main MPP by overhead conveyor belt Figure 3	**Non graded**	Outside HIA Study Area		
HB-15	Support structure of the first electric train operation in Hong Kong Figures 3-4	**Non graded**	Outside HIA Study Area.		
HB-16	Support structure of the first electric train operation in Hong Kong	**Non graded**	Outside HIA Study Area		

ID	Structure	Grading	Works	Assessment	Mitigation actions
	Figure 4				
HB-17	Retaining wall part of the mining landscape Figure 4	**Non graded**	Outside HIA Study Area		
HB-18	Small stone building next to water tank. Figure 4	**Non graded**	Outside HIA Study Area		
HB-19	Pipeline part of the mining operations. Figure 4	**Non graded**	Outside HIA Study Area		
HB-20	Forms part of Mineral Preparation Plant. Catchwater part of the mining operations. Figure 4	**Non graded**	Outside HIA Study Area		
HB-21	Forms part of Mineral Preparation Plant. Catchwater tank part of the mining operations.	**Non graded**	Outside HIA Study Area		

ID	Structure	Grading	Works	Assessment	Mitigation actions
	Figure 4				
HB-22	The ore waste dump is associated with treatment of ore deposits before Japanese technical support and this too forms part of (activities on) the mining landscape. Figure 5	**Non graded**	Within limits of works area Near the works area of construction of service reservoir at 8m distance. Drawing No. CE20/00/GN/1016	The ore dump area is interesting and forms part of the mining activities and this report locates its position within the mining landscape. It, however, has been built on and has largely disappeared. Acceptable impact	No mitigation required.
HB-23a and HB-23b	Village houses Figure 5	**Non graded**	Partially within limits of works area Near the works area of construction of service reservoir over 64m distance. Drawing No. CE20/00/GN/1016	Originally part of the mining settlement. Houses are occupied and have been modified/modernized over the years and no longer have a strong associated with mining. The houses will not be impacted. ***Acceptable impact***	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-24	Village house Figure 5	**Non graded**	Near the works area of construction of service reservoir at 70m distance. Drawing No. CE20/00/GN/1016	Originally part of the mining settlement. House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house will not be impacted. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.

ID	Structure	Grading	Works	Assessment	Mitigation actions
HB-25	Village house Figure 5	**Non graded**	Within limits of works area Near the works area of construction of service reservoir at 5m distance. Drawing No. CE20/00/GN/1016	Originally part of the mining settlement. House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house is located in close proximity of construction of service reservoir. Acceptable impact with mitigation	Prior to the construction phase a condition survey needs to be conducted. Vibration, settlement and tilting monitoring of levels identified in the condition survey report and a buffer zone separating the works from the heritage site needs to be implemented during the construction phase. Ongoing safe public access to the heritage site should be provided during construction phase and after.
HB-26	Village house Figure 5	**Non graded**	Within limits of works area Within the works area of construction of service reservoir. Drawing No. CE20/00/GN/1016	Originally part of the mining settlement. House is occupied and has been modified/modernized over the years and no longer has a strong associated with mining. The house can not be retained under the design. Considering the low heritage significance	Preservation by record for the building which can not be retained under the design.

ID	Structure	Grading	Works	Assessment	Mitigation actions
				preservation by record is deemed acceptable. Acceptable impact with mitigation	
G-01	A Qing dynasty grave dated to 13th year of Guangxu period of (邱) (1884) Yau family Figure 5	**Non graded**	Near the works area of construction of service reservoir at 64m distance. Drawing No. CE20/00/GN/1016	The grave will not be impacted and is deemed at sufficient distance from proposed works. Acceptable impact	No mitigation necessary, but ongoing safe public access to the heritage site should be provided during construction phase and after.

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Old Maps (taken from www.hkmaps.hk) and Aerial Photographs:

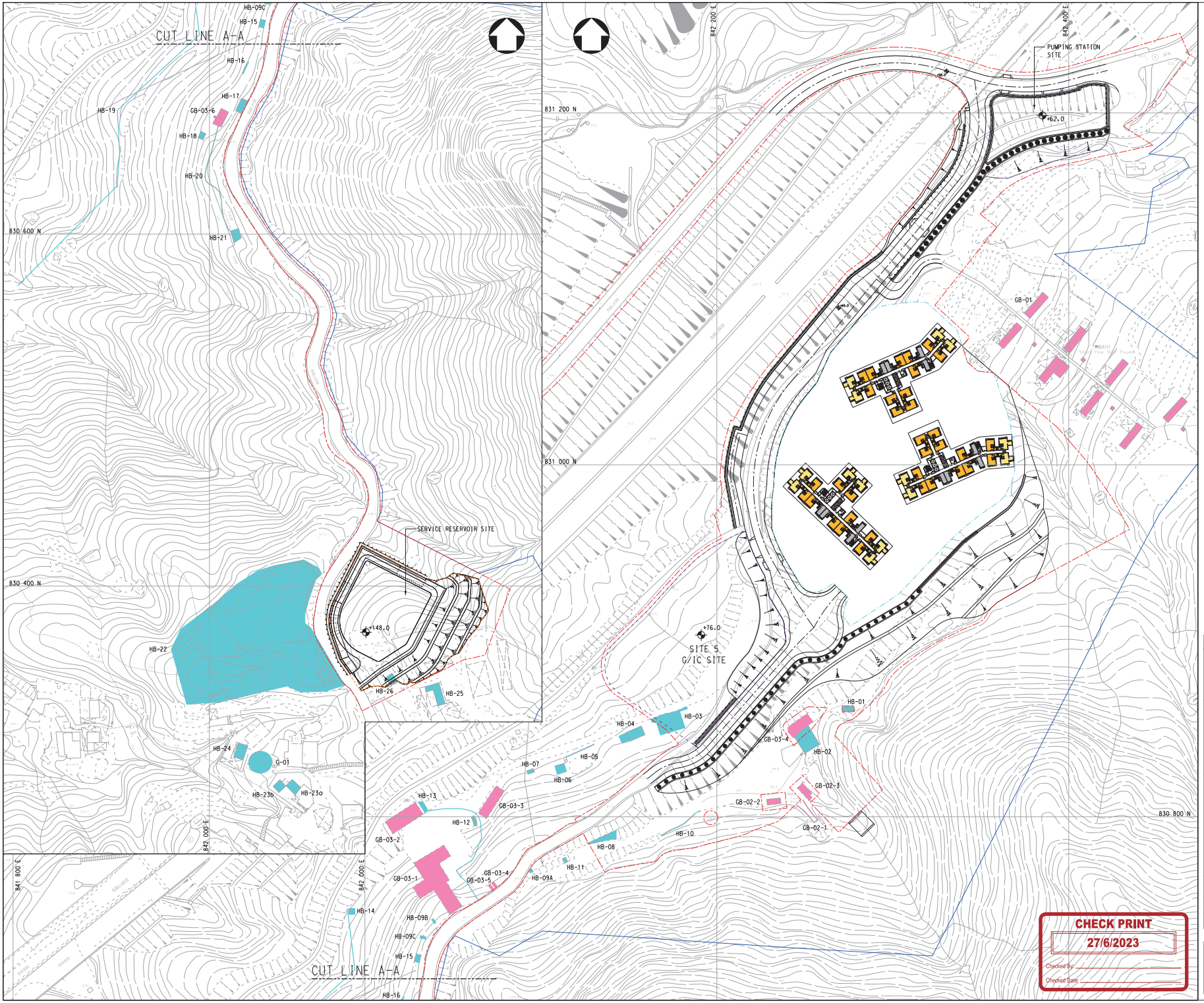
Topographical Map 1913; scale: two inches to mile

Topographical Map 1957; scale: 1:25 000

Aerial Photo 1963; Mapping office ref. 5310

Aerial Photo 1963; Mapping office ref. 5465

APPENDIX A
DRAWINGS



NOTES :

1. FOR SUMMARY OF ASSESSMENT AND RECOMMENDED MITIGATION MEASURES, REFER TO TABLE 5.1 OF HERITAGE ASSESSMENT REPORT.

LEGEND :

- LIMIT OF WORKS AREA
- HOUSING SITE BOUNDARY (BY OTHERS)
- COUNTRY PARK BOUNDARY
- GRADED HISTORIC BUILDING
- HISTORIC BUILDING
- PROPOSED CHECK DAM (SUBJECT TO DETAILED DESIGN)
- PROPOSED FLEXIBLE BARRIER (SUBJECT TO DETAILED DESIGN)
- SOIL CUT SLOPE
- FILL SLOPE
- RETAINING WALL
- BORED PILE WALL
- SOLDIER PILE WALL

0 10 20 30 40 50
METRES
1 : 1000

Rev	Description	By	Date

Consultant

wsp

Project title

AGREEMENT NO. CE20/2020 (CE)
SITE FORMATION AND INFRASTRUCTURE WORKS FOR PUBLIC HOUSING DEVELOPMENTS AT MA ON SHAN TSUEN ROAD - INVESTIGATION, DESIGN AND CONSTRUCTION

Drawing title

MASTER LAYOUT PLAN FOR GRADED & NON-GRADED HISTORIC BUILDINGS

Drawing no.	Rev.
CE20/PR/AAB/0001	-

Drawn	Date	Checked	Approved
-	-	-	-

Scale	Status
1 : 1000 (A1)	-

CHECK PRINT
27/6/2023
Checked by:
Checked date:

土木工程拓展署
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
土木工程處
CIVIL ENGINEERING OFFICE

Filename : X:\2512216A (CE20_20 CEDD MOSTR)\02_Drawing\05-Detail Design\CE20_PR_AAB_0001.dgn
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Date : 27/6/2023 Print time : 5:10:32 pm Printed by : tin-ngok.ng

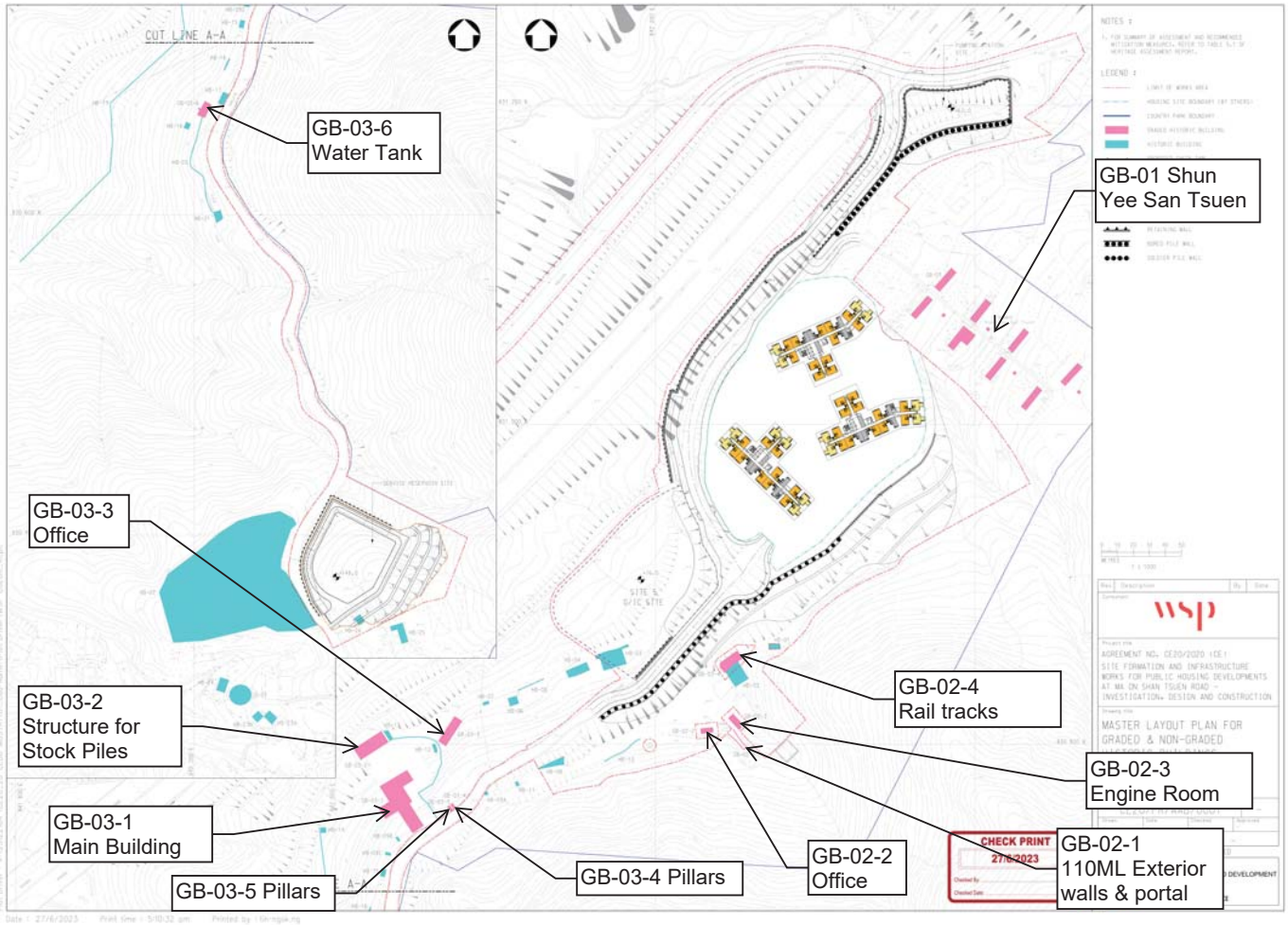
Location Plan of Graded Historic Building

GB-02-4 Rail Tracks

GB-03-1 Main Building, Mineral Preparation Plant

GB-03-2 Structure for Stock Piles, Mineral Preparation Plant

GB-03-3 Office to Supervise Operation of Ore-dressing Plant



GB-03-4 Pillars, Mineral Preparation Plant

GB-03-5 Pillars, Mineral Preparation Plant

GB-03-6 Water Tank, Mineral Preparation Plant

GB-01 Shun Yee San Tsuen

GB-02-1 110ML Exterior walls & portal

GB-02-2 Office

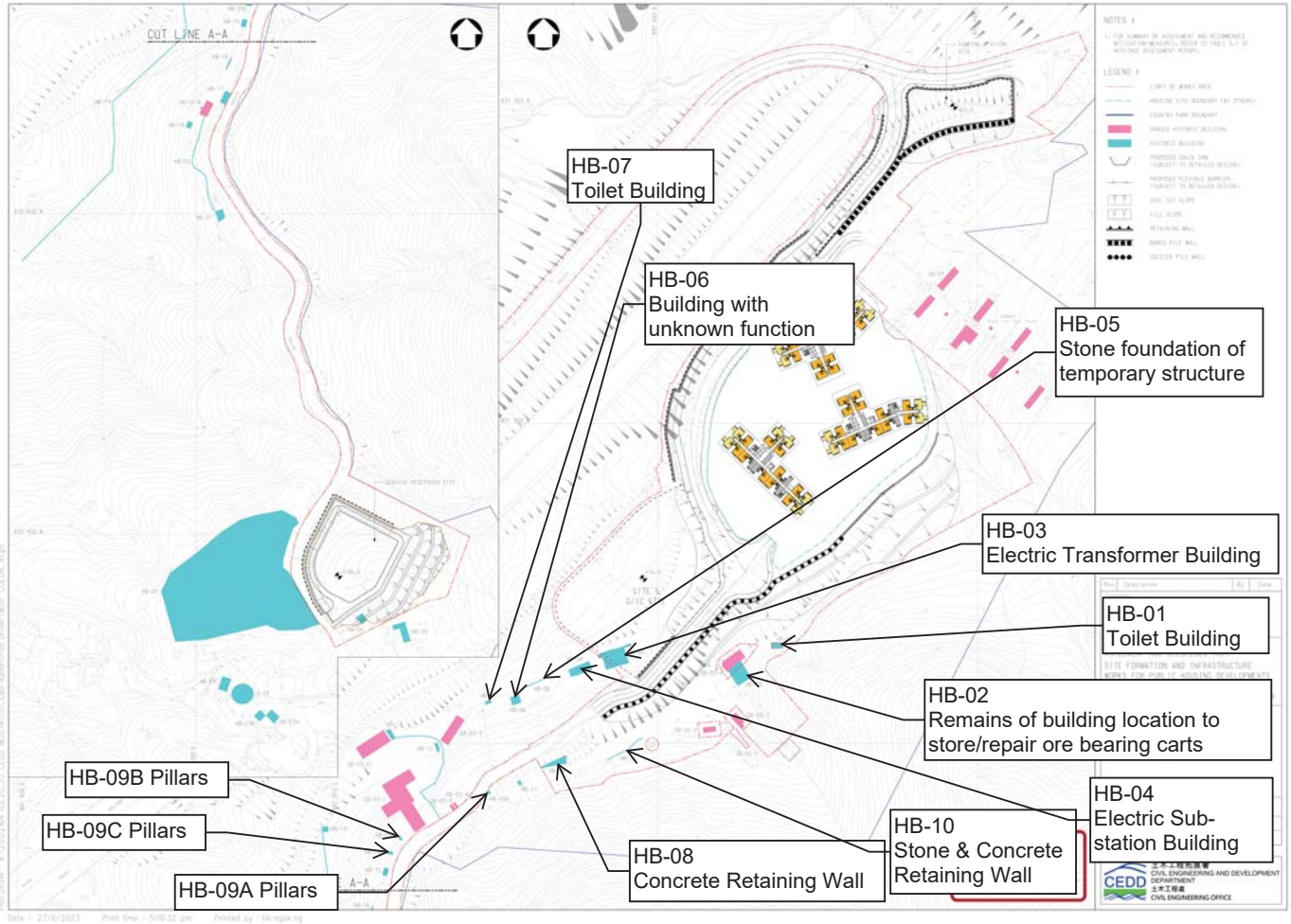
GB-02-3 Engine Room

Location Plan of Non-Graded Historic Building

HB-09C Pillars,
Mineral Preparation Plant

HB-09B Pillars,
Mineral Preparation Plant

HB-09A Pillars,
Mineral Preparation Plant



HB-01 Toilet Building

HB-02 Remains of building location to store/repair ore bearing carts, Mineral Preparation Plant

HB-03 Electric Transformer Building,
Mineral Preparation Plant

HB-04 Electric Sub-station Building,
Mineral Preparation Plant

HB-10 Stone & Concrete Retaining Wall,
Mineral Preparation Plant

HB-08 Concrete Retaining Wall,
Mineral Preparation Plant

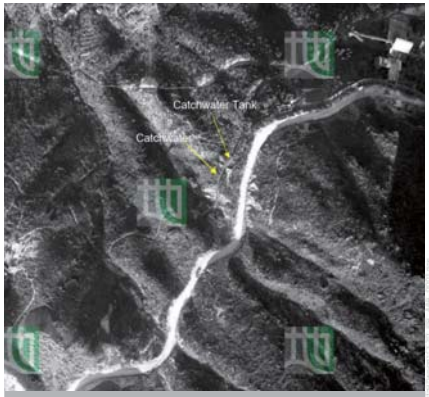
HB-07 Toilet Building,
Mineral Preparation Plant

HB-06 Building with unknown function,
Mineral Preparation Plant

HB-05 Stone foundation of temporary
structure, Mineral Preparation Plant

Location Plan of Non-Graded Historic Building

HB-22 Secondary ore deposit location, MOS Mining Landscape



HB-20 & HB-21 Catchwater & catchwater tank, Mineral Preparation Plant

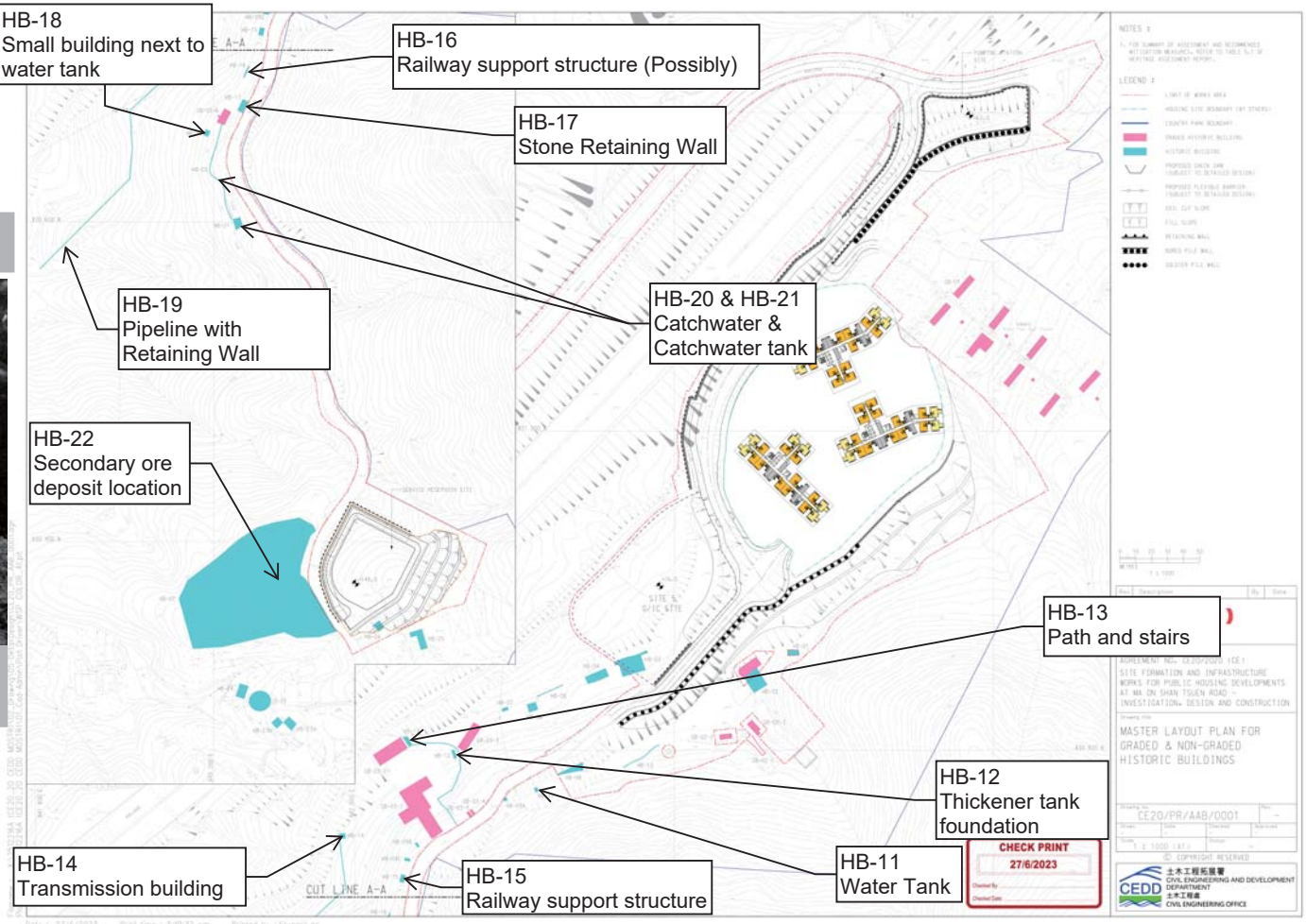
HB-19 Pipeline with retaining wall, Mineral Preparation Plant

HB-18 Small building next to water tank, Mineral Preparation Plant

HB-17 Stone Retaining Wall, Mineral Preparation Plant

HB-16 Railway support structure (Possibly), Mineral Preparation Plant

HB-15 Railway support structure, Mineral Preparation Plant



HB-11 Water Tank, Mineral Preparation Plant

HB-12 Thickener tank foundation, Mineral Preparation

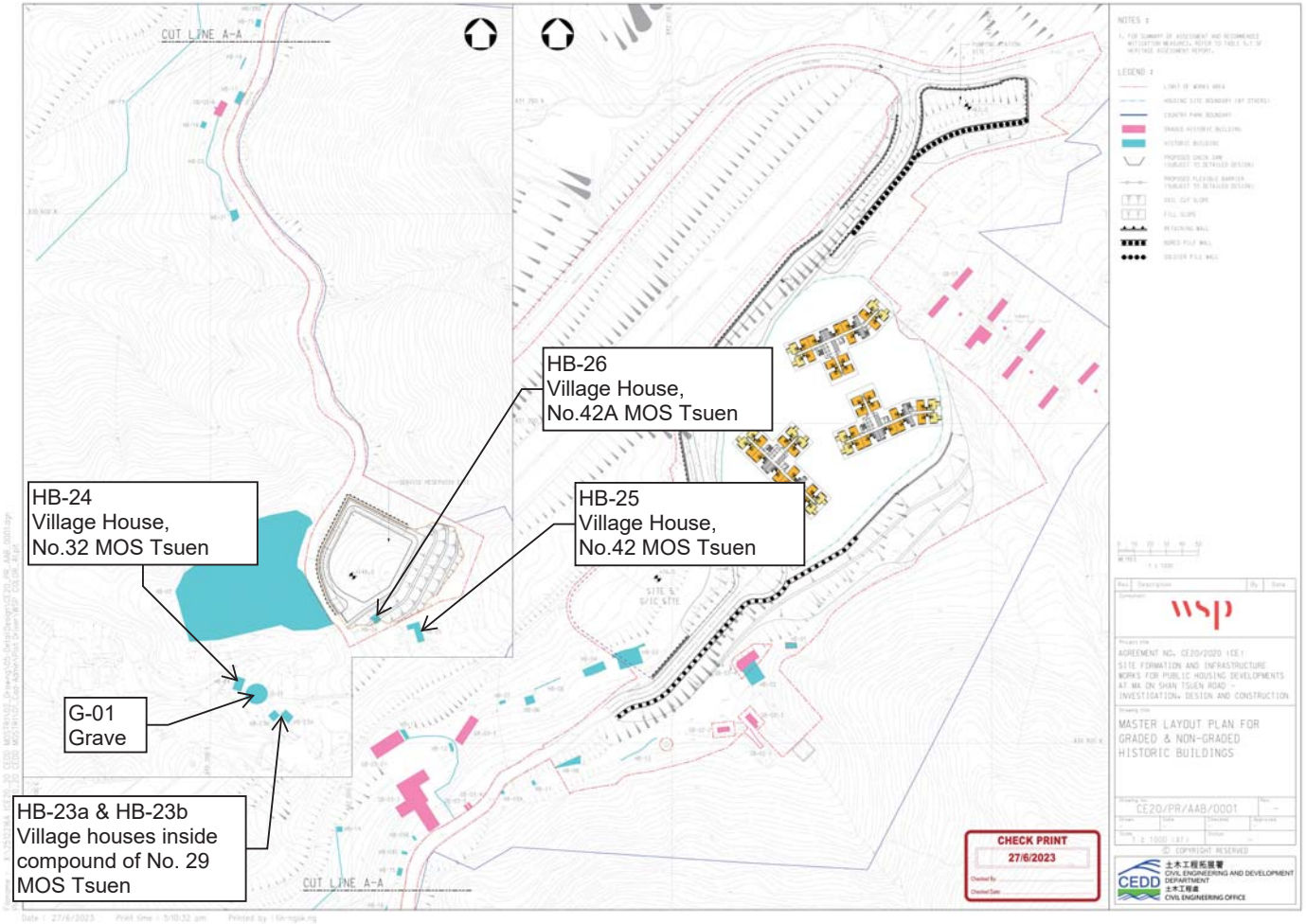
HB-13 Path and stairs, Mineral Preparation Plant

HB-14 Transmission Building, Mineral Preparation Plant

Location Plan of Non-Graded Historic Building

HB-26 Village House,
No.42A MOS Tsuen

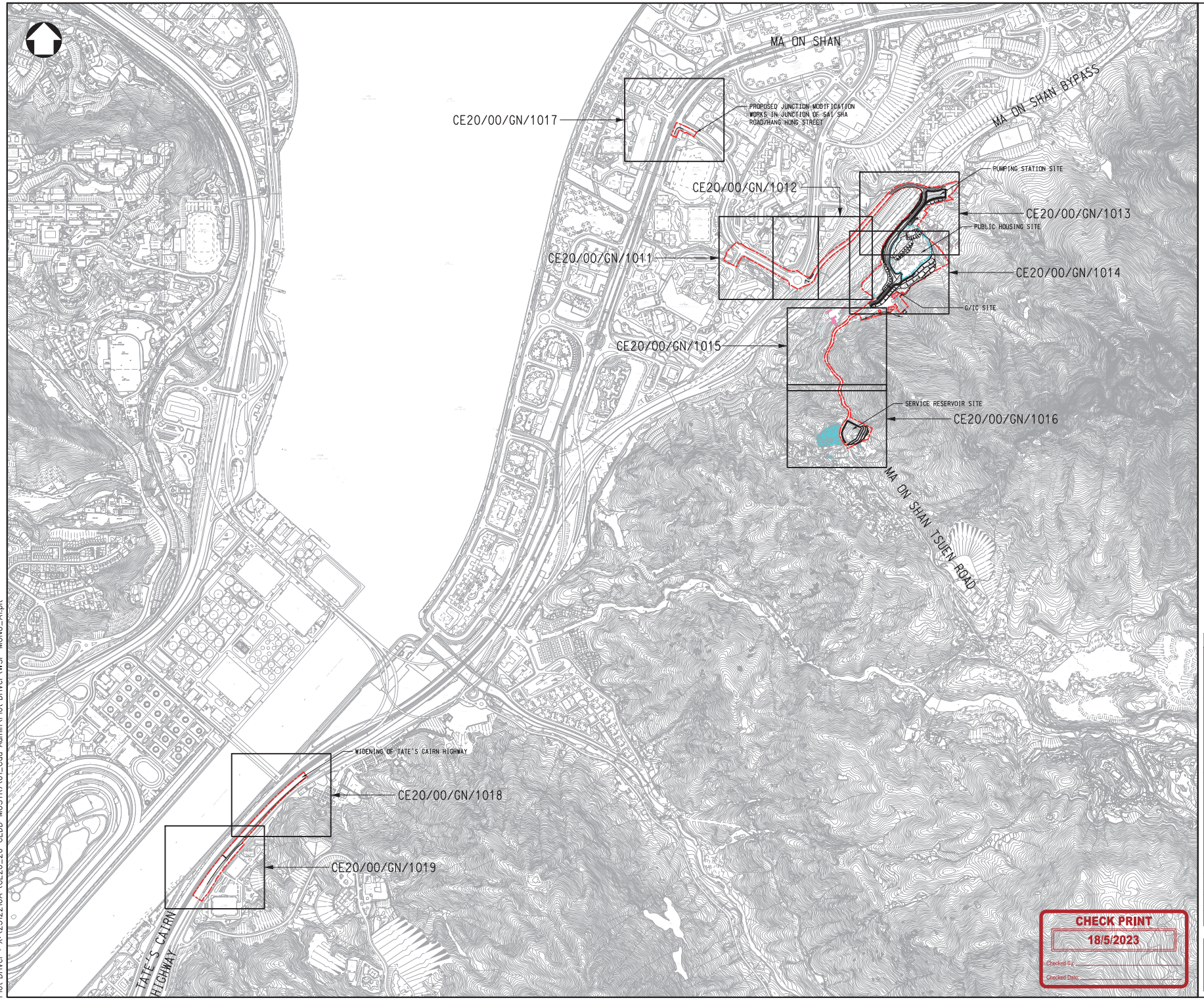
G-01 Grave



HB-23a & HB-23b Village houses inside
compound of No.29 MOS Tsuen

HB-24 Village House,
No.32 MOS Tsuen

HB-25 Village House,
No.42 MOS Tsuen



LEGEND :

- LIMIT OF WORKS AREA
- HOUSING SITE BOUNDARY (BY OTHERS)
- COUNTRY PARK BOUNDARY
- GRADED HISTORIC BUILDING
- HISTORIC BUILDING
- PROPOSED CHECK DAM (SUBJECT TO DETAILED DESIGN)
- PROPOSED FLEXIBLE BARRIER (SUBJECT TO DETAILED DESIGN)
- SOIL CUT SLOPE
- FILL SLOPE
- RETAINING WALL
- BORED PILE WALL
- SOLDIER PILE WALL
- PROPOSED ROAD LIGHTING
- PROPOSED FIRE HYDRANT
- EXISTING ROAD LIGHTING TO BE RELOCATED

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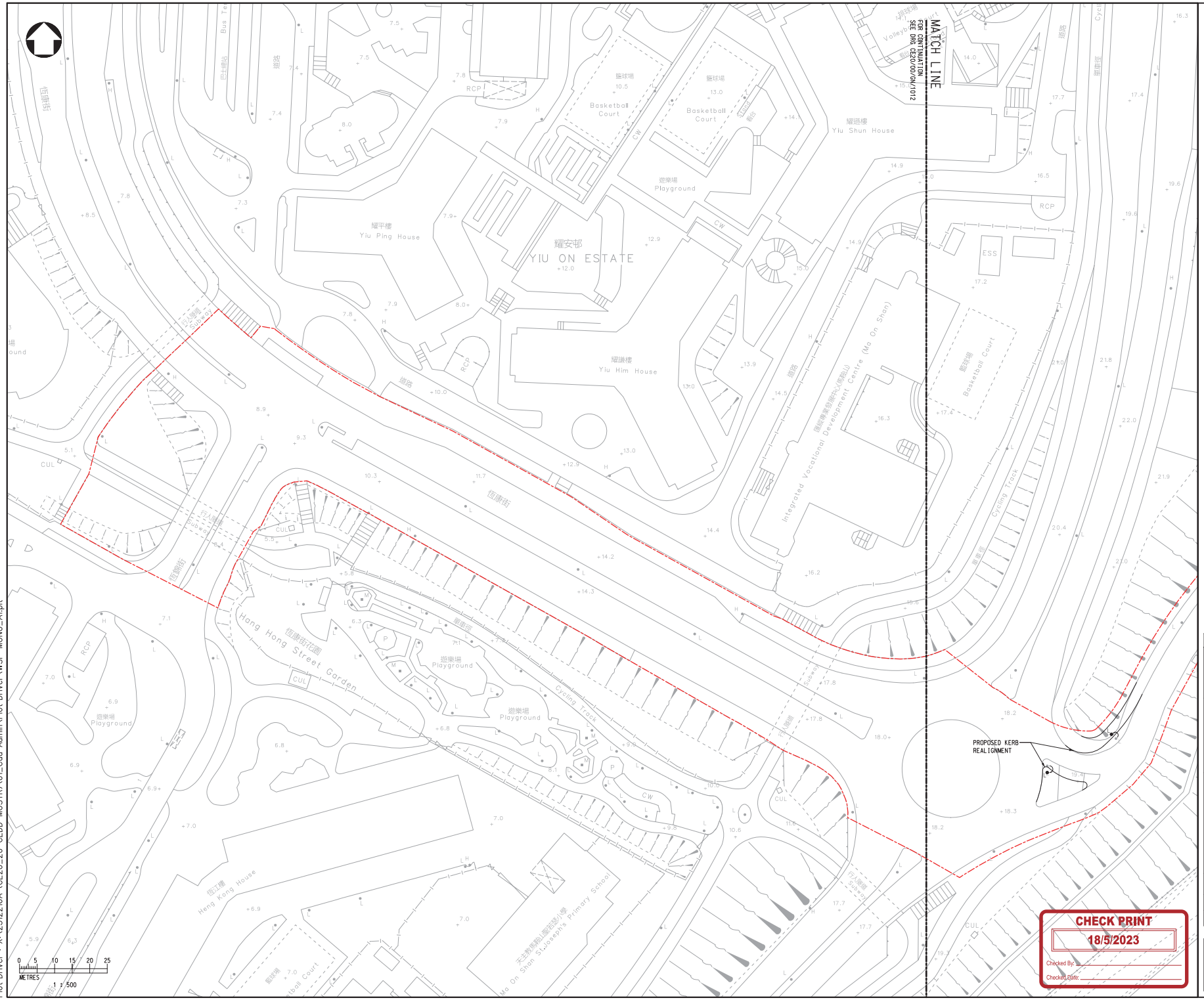

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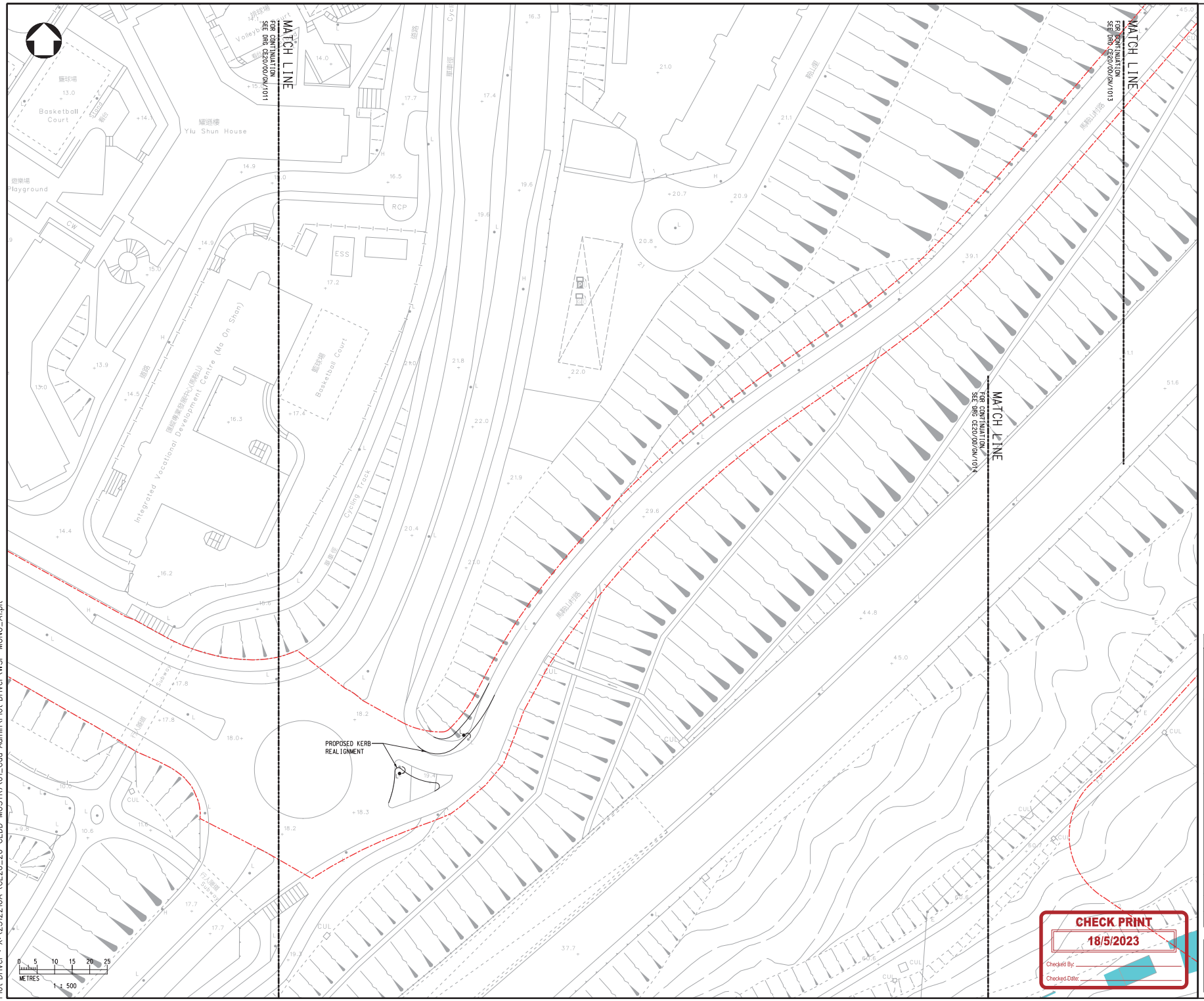

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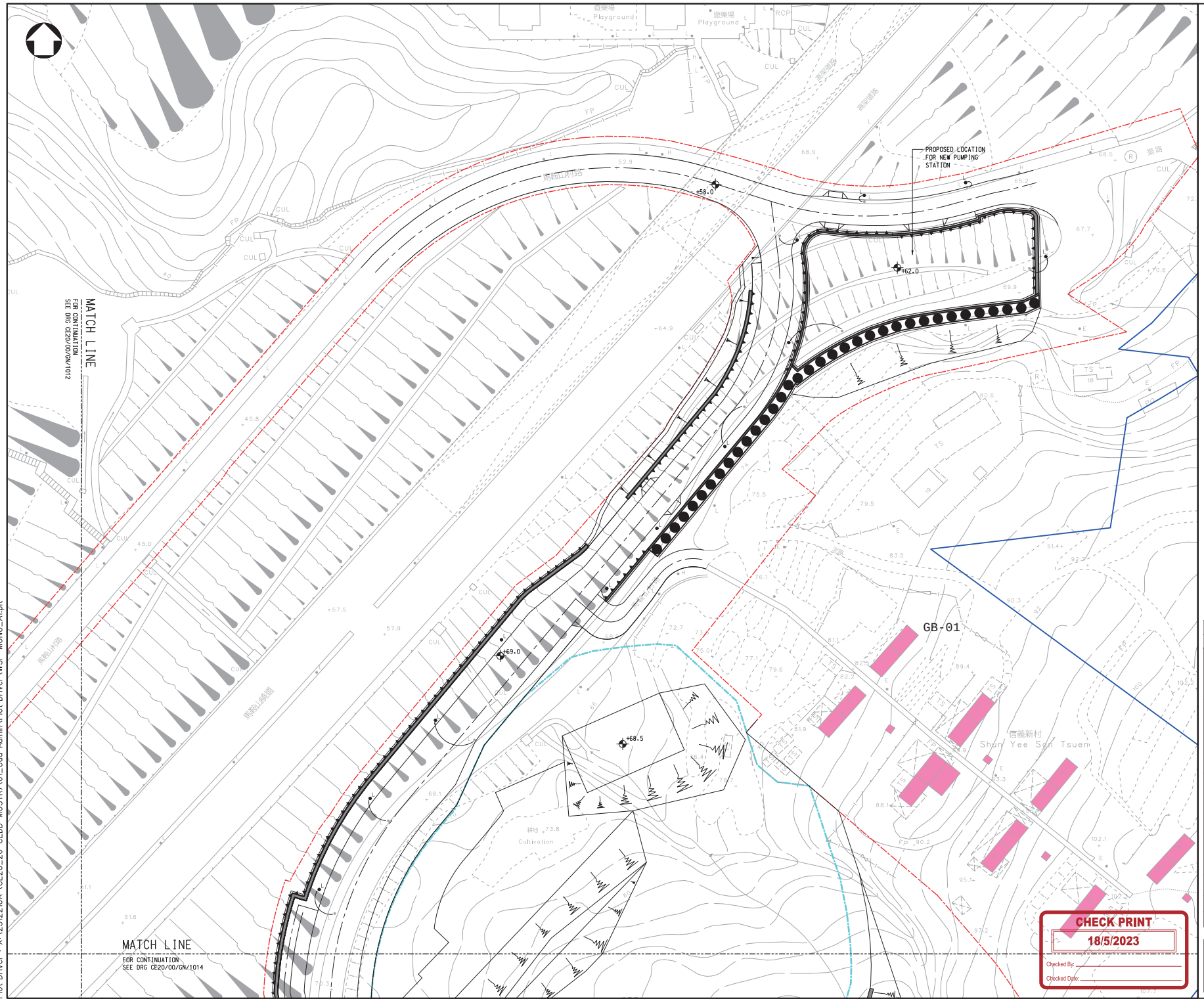

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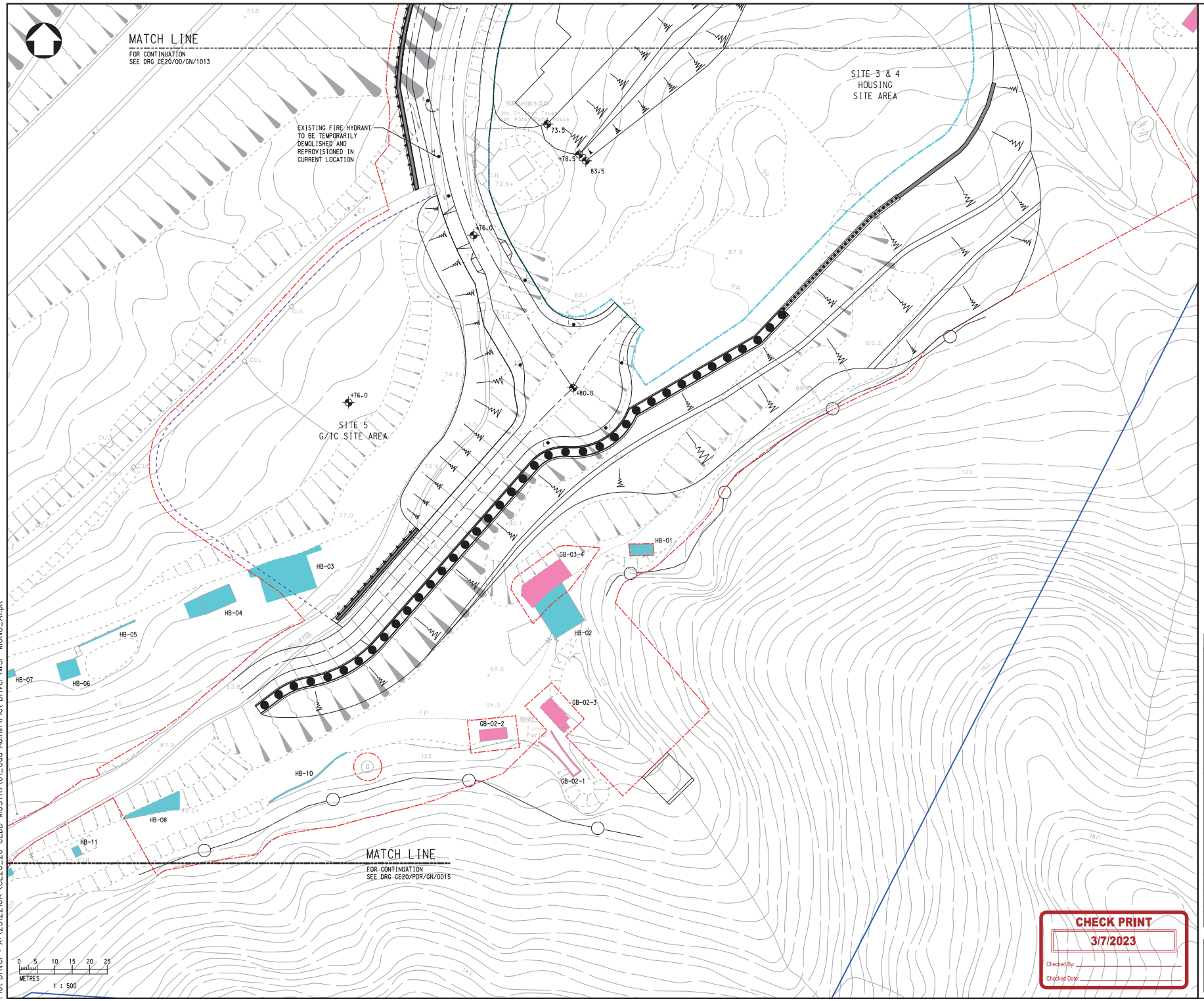

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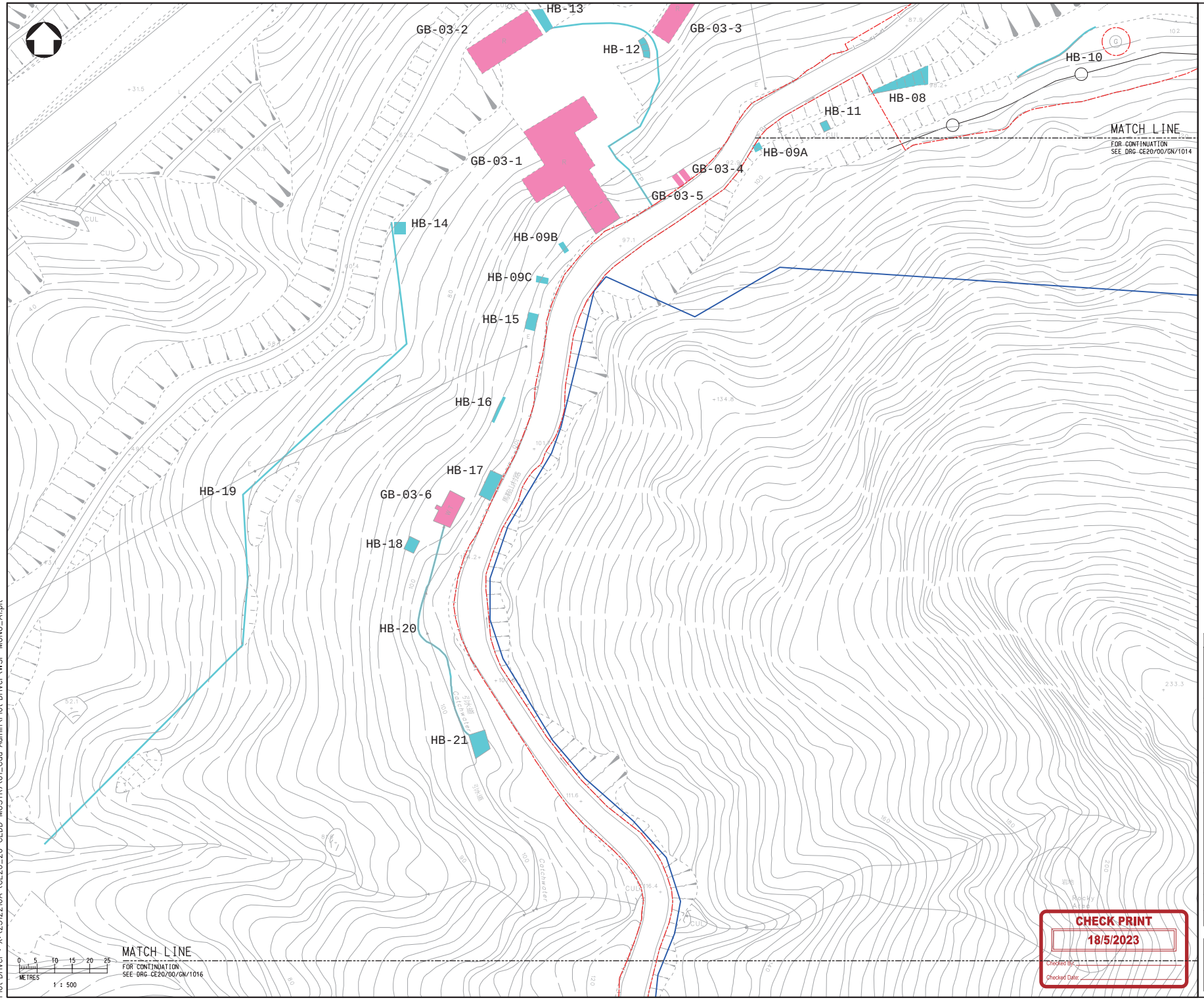

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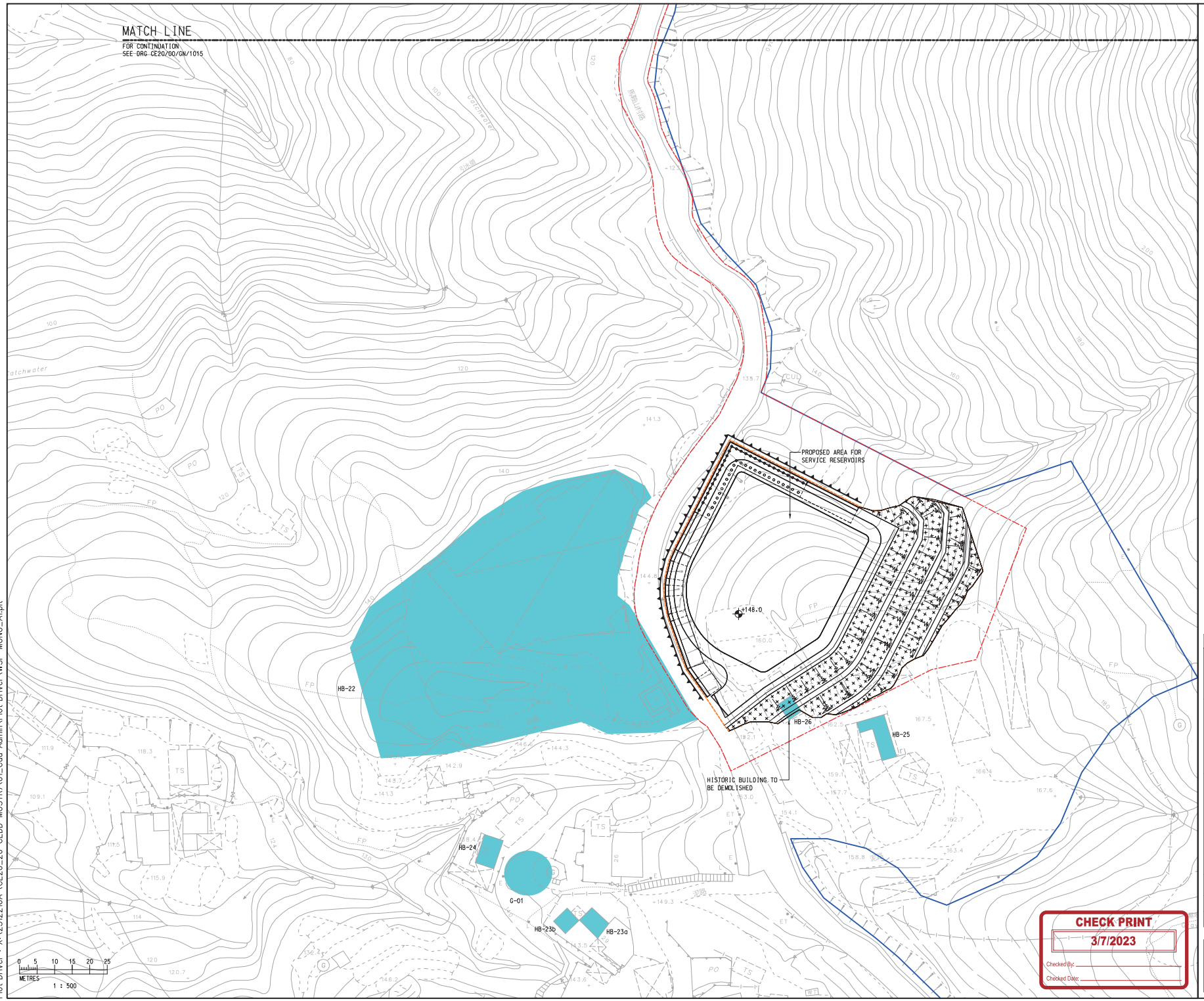

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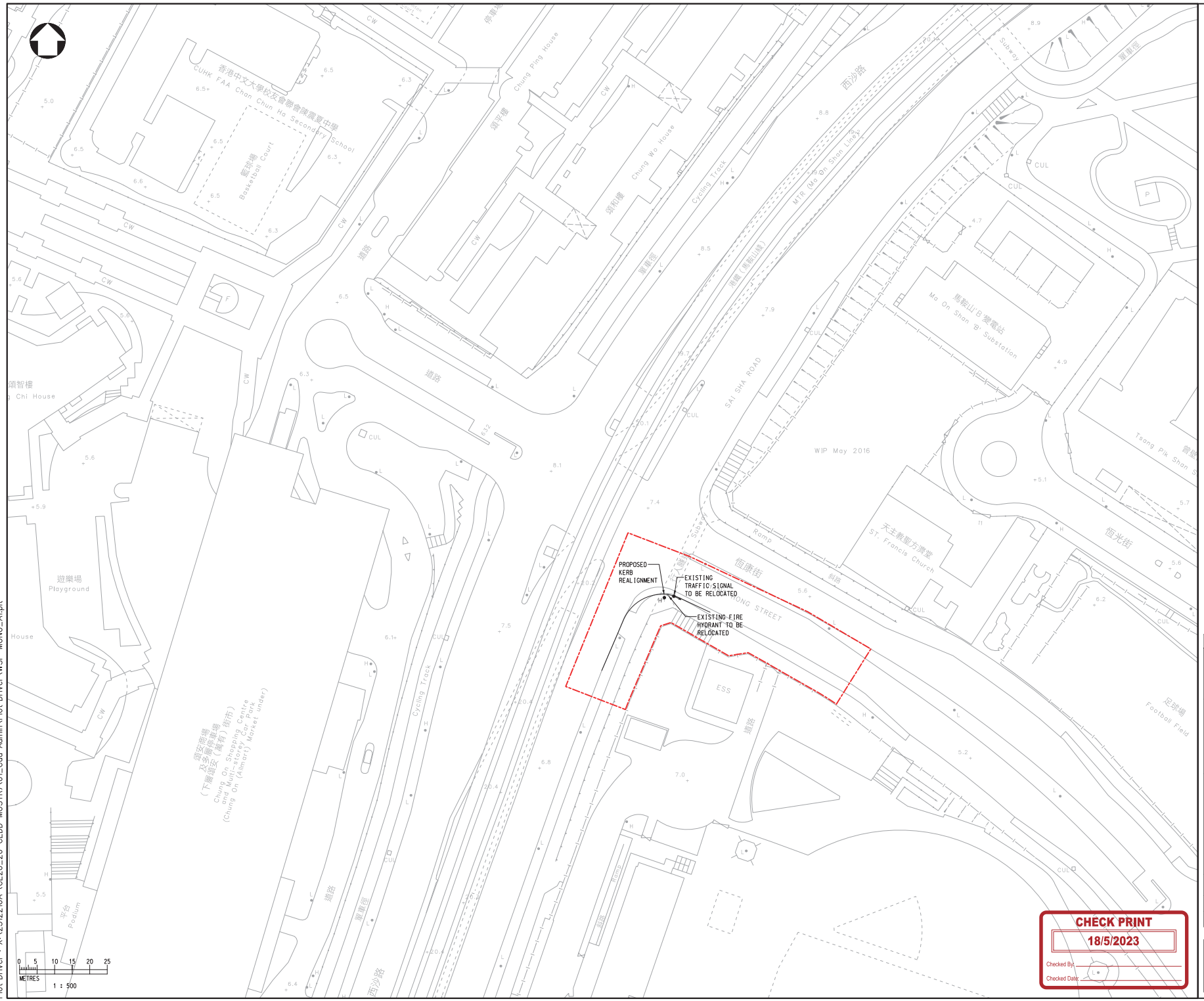

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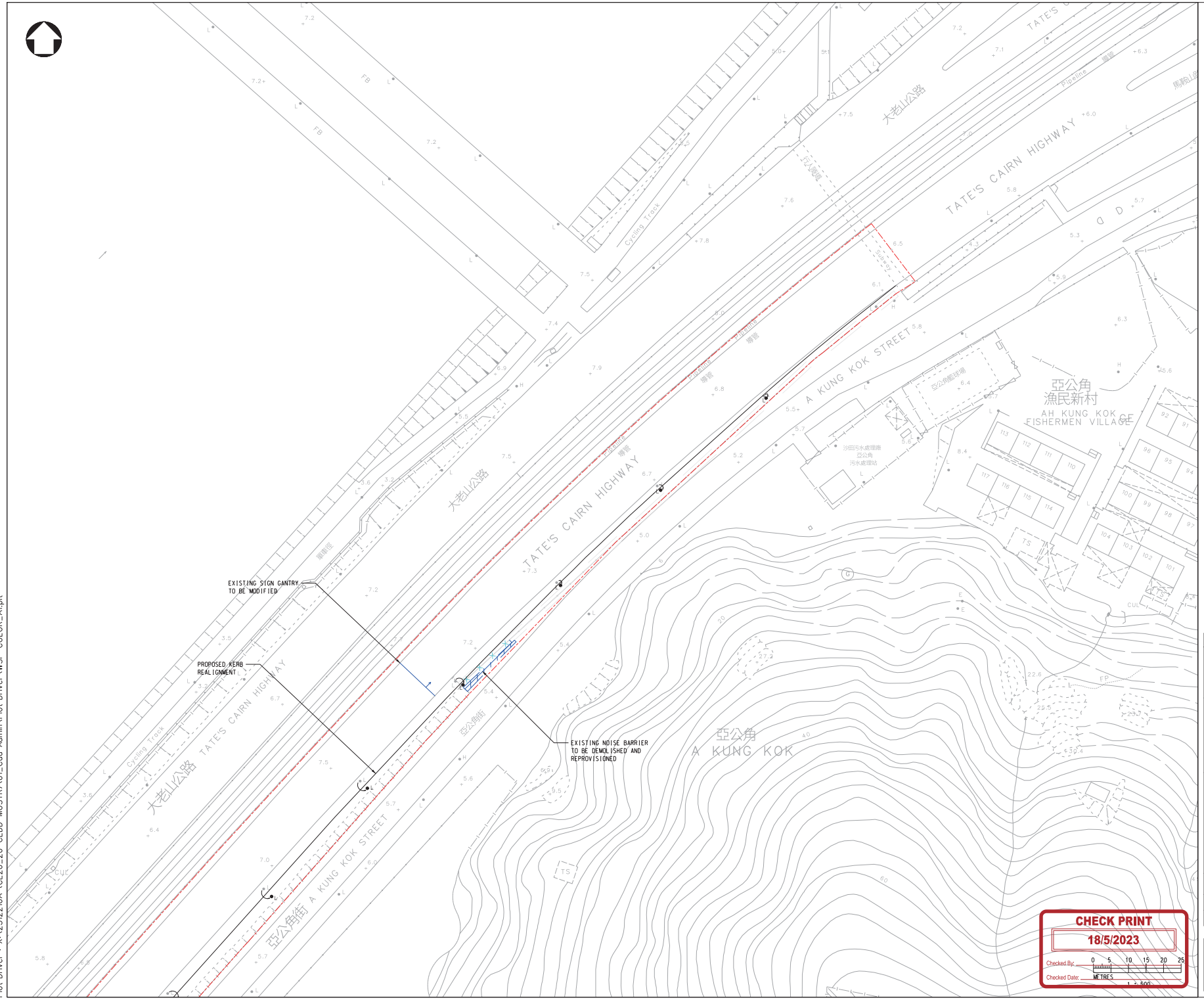

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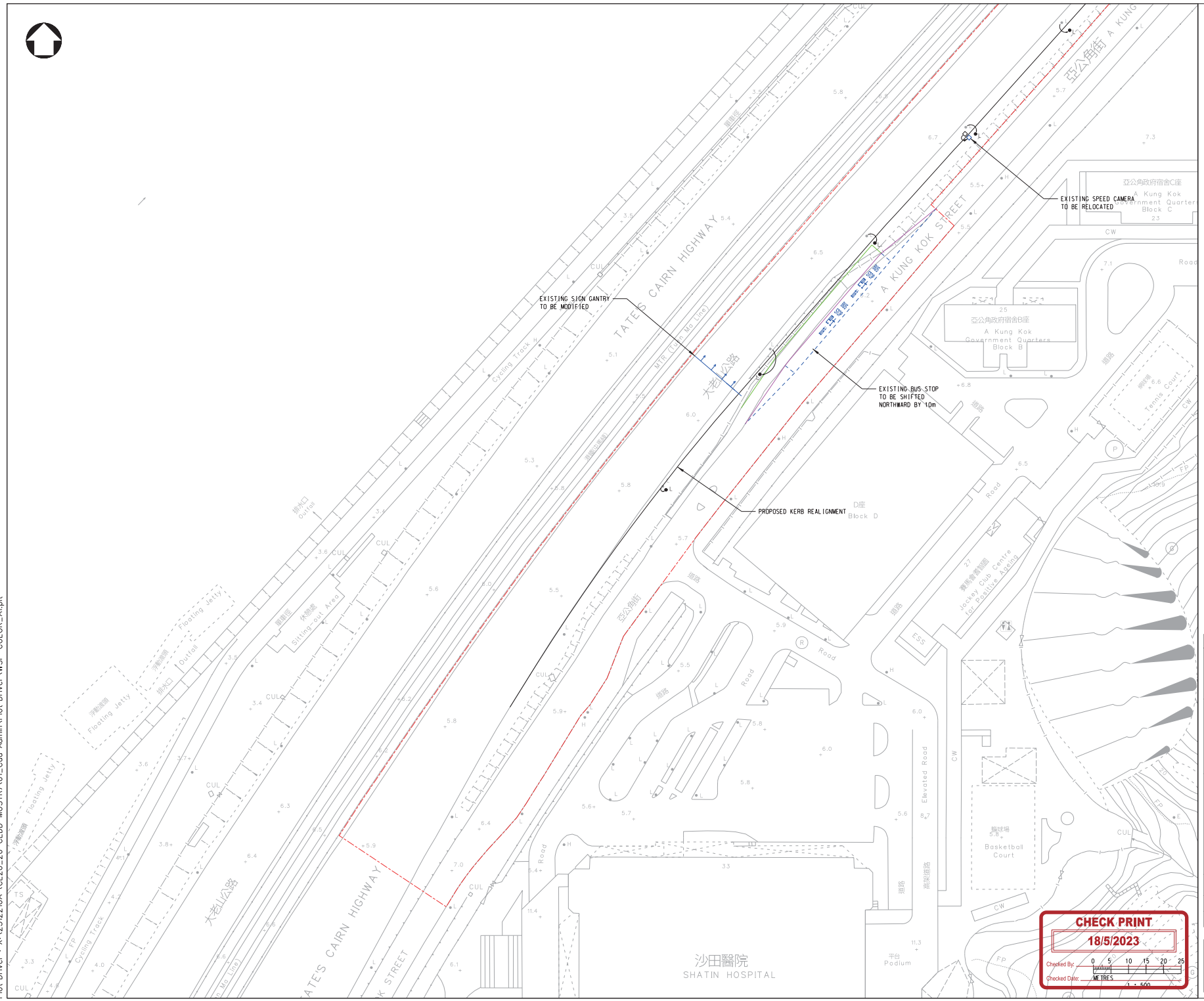

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GENERAL LAYOUT PLAN

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APPENDIX B
FIGURES

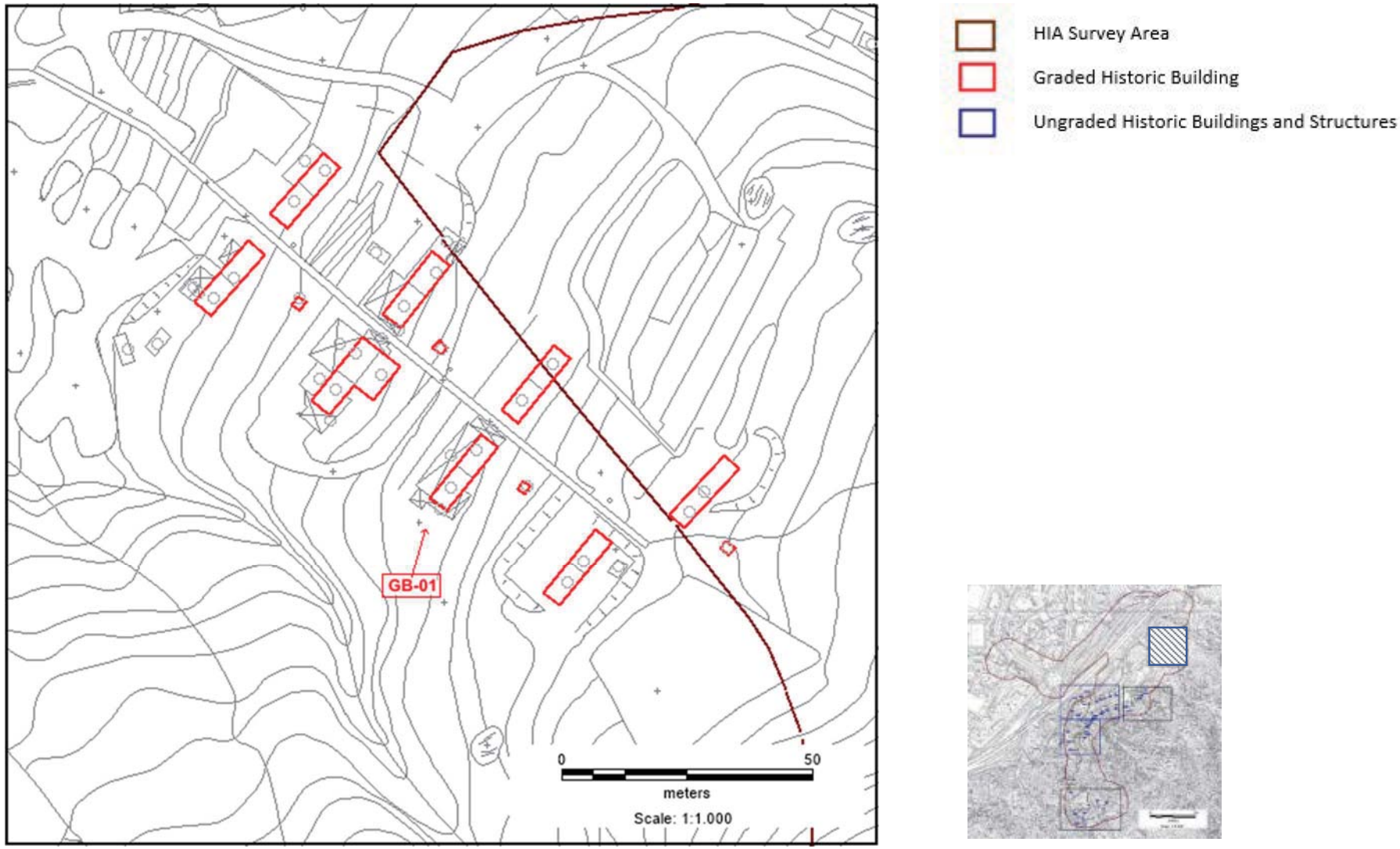


Figure 1 GB-01 *Serial no. N245 – the Site Structures at Mining Settlement (Shun Yee San Tsuen), Ma On Shan Iron Mine, Sha Tin, N.T. Grade 3 Historic Structure*

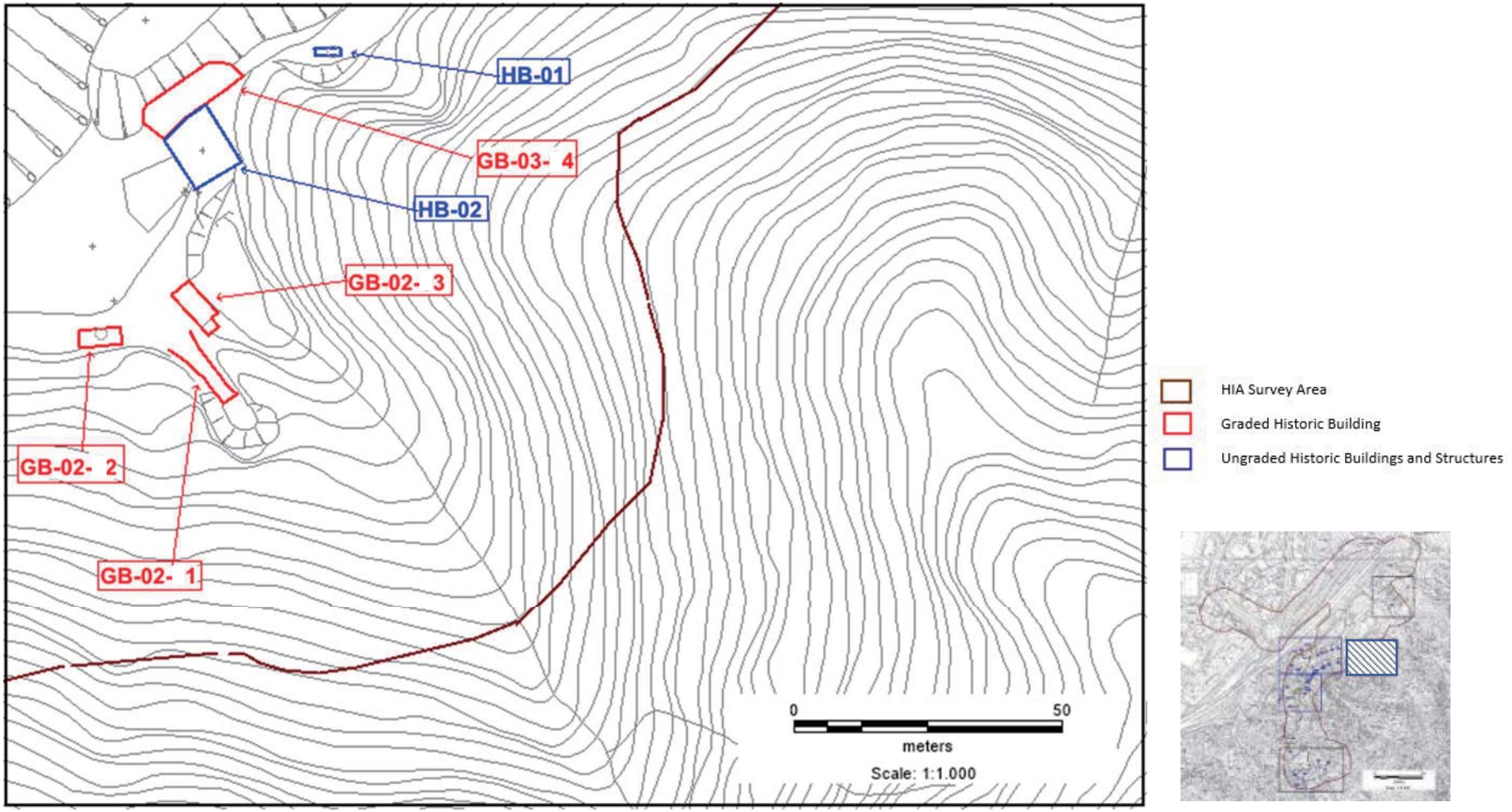


Figure 2 *Serial no. N100 – the Exterior Wall of 110ML (1963) part of Grade 2 Historic Structure Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.; including* **GB-02**-1: 110 ML exterior walls and portal; **GB-02**-2: Office; **GB-02**-3: Engine room; **GB-02**-4: Rail tracks, and other built heritage items: Toilet building (HB-01); Remains of building/location to store or repair ore bearing carts (HB-02).

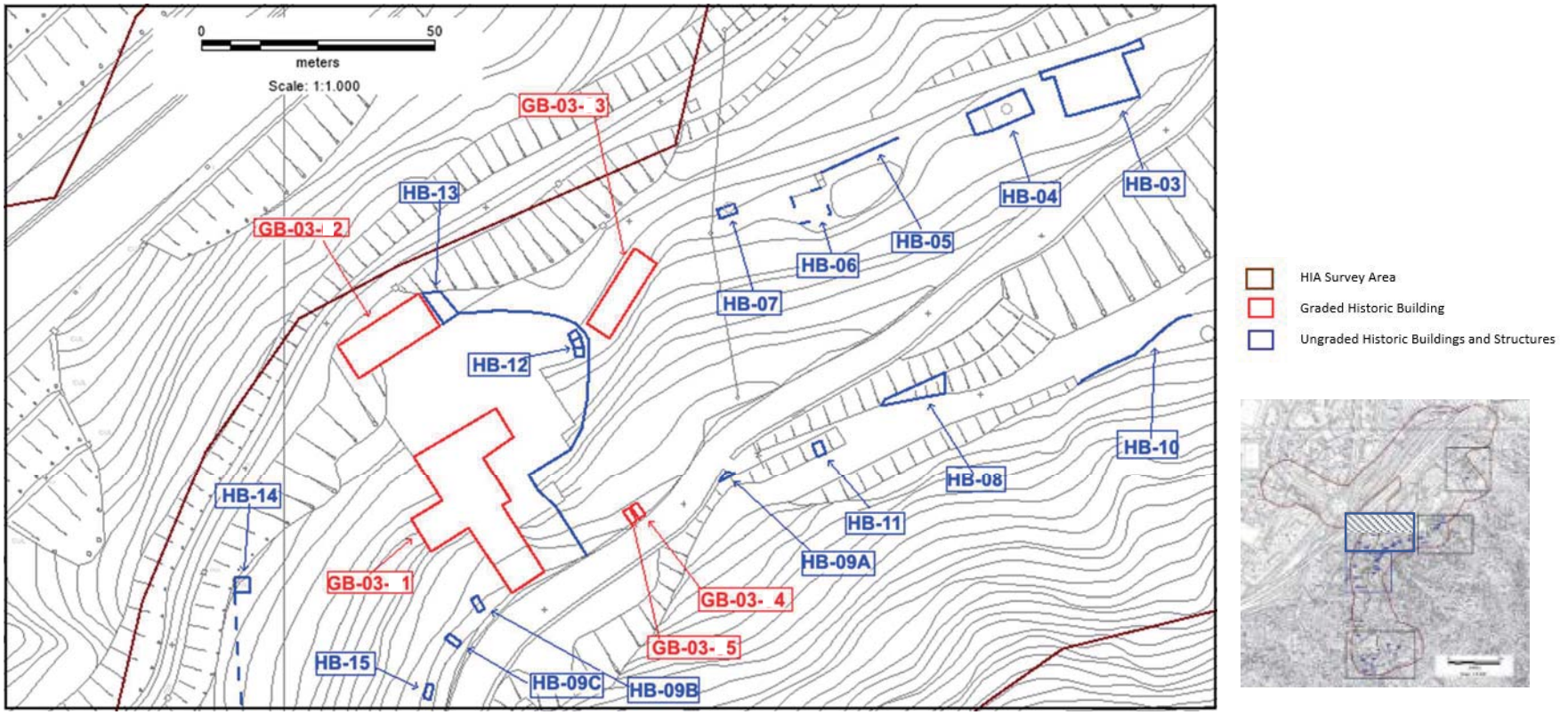


Figure 3 *Serial no. N101 – Mineral Preparation Plant (1954), Ma On Shan Iron Mine, Sha Tin, N.T. Grade 3 Historic Structure; including* **GB-03**-1: Main Mineral Preparation Plant building; **GB-03**-2: Structure for Stock-piles; **GB-03**-3: An office set up there to supervise the operation of the ore-dressing plant; **GB-03**-4 and **GB-03-**5: Pillars forming connection between 110ML portal and mineral preparation plant, and other built heritage items: Electric transformer platform (HB-03); Electric Sub-station (HB-04); Stone foundation of a temporary structure (HB-05); Collapsed building (HB-06); Toilet building (HB-07); Concrete retaining wall with buttress (HB-08); pillar (HB-09A); pillar (HB-09B); pillar (HB-09C); stone and concrete retaining wall (HB-10); water tank (HB-11); Thickener tank (HB-12); two sets of stairs part of the Mineral preparation plant (HB-13); Transmission building connected to main MPP by overhead conveyor belt (HB-14); Concrete solid support for rail track (HB-15)

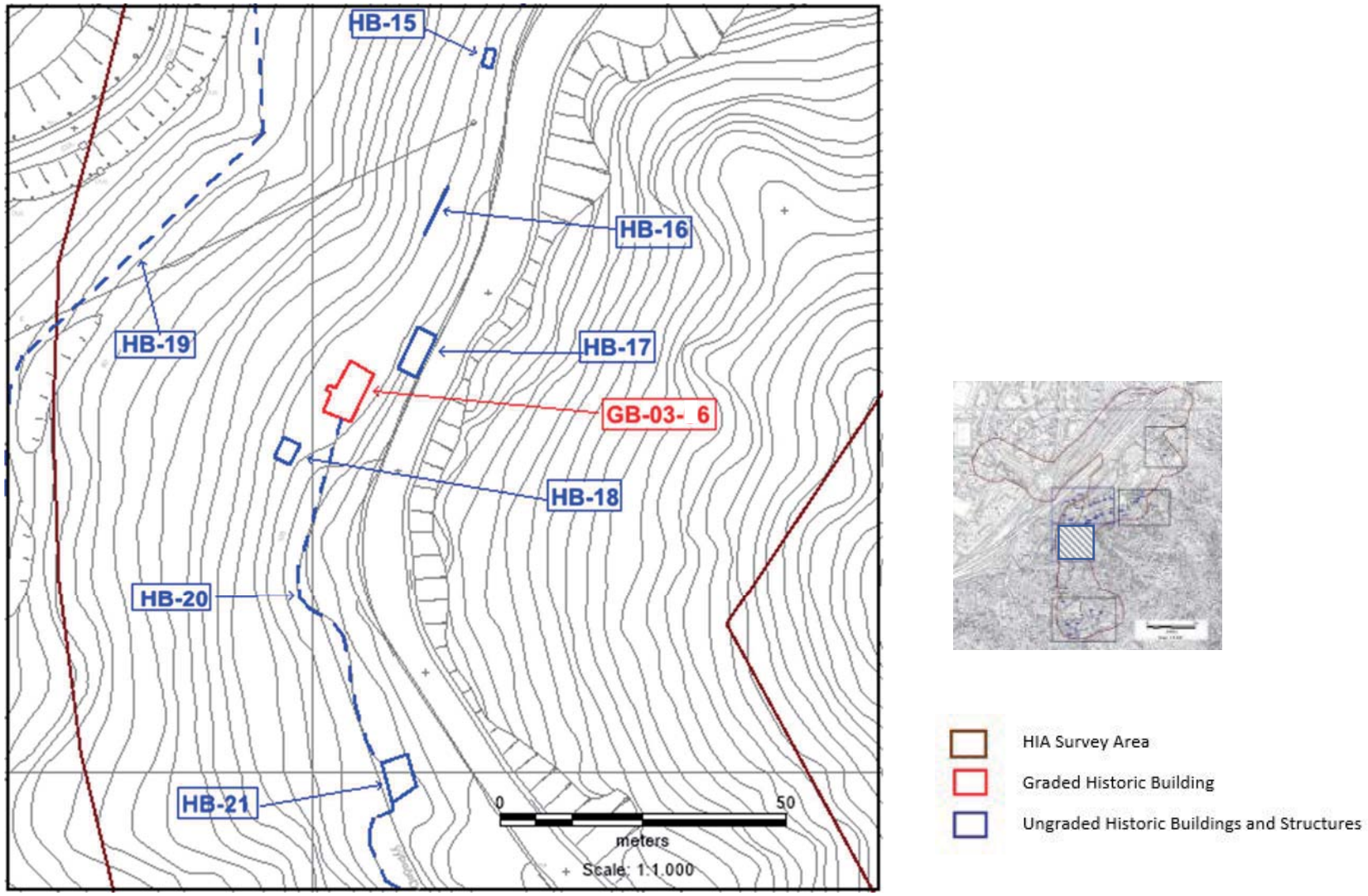


Figure 4 *Serial no. N101 – Mineral Preparation Plant (1954), Ma On Shan Iron Mine, Sha Tin, N.T. Grade 3 Historic Structure;* GB-03-6: Water Tank, and other built heritage items: concrete solid support for rail track (HB-15); concrete and stone support for rail track with stone barrier wall (HB-16); Stone retaining wall next to main road above water tank (HB-17); Small stone building next to water tank (HB-18); Pipeline with retaining wall on steep slopes (HB-19), Catch water (HB-20) and Catch water tank (HB-21)

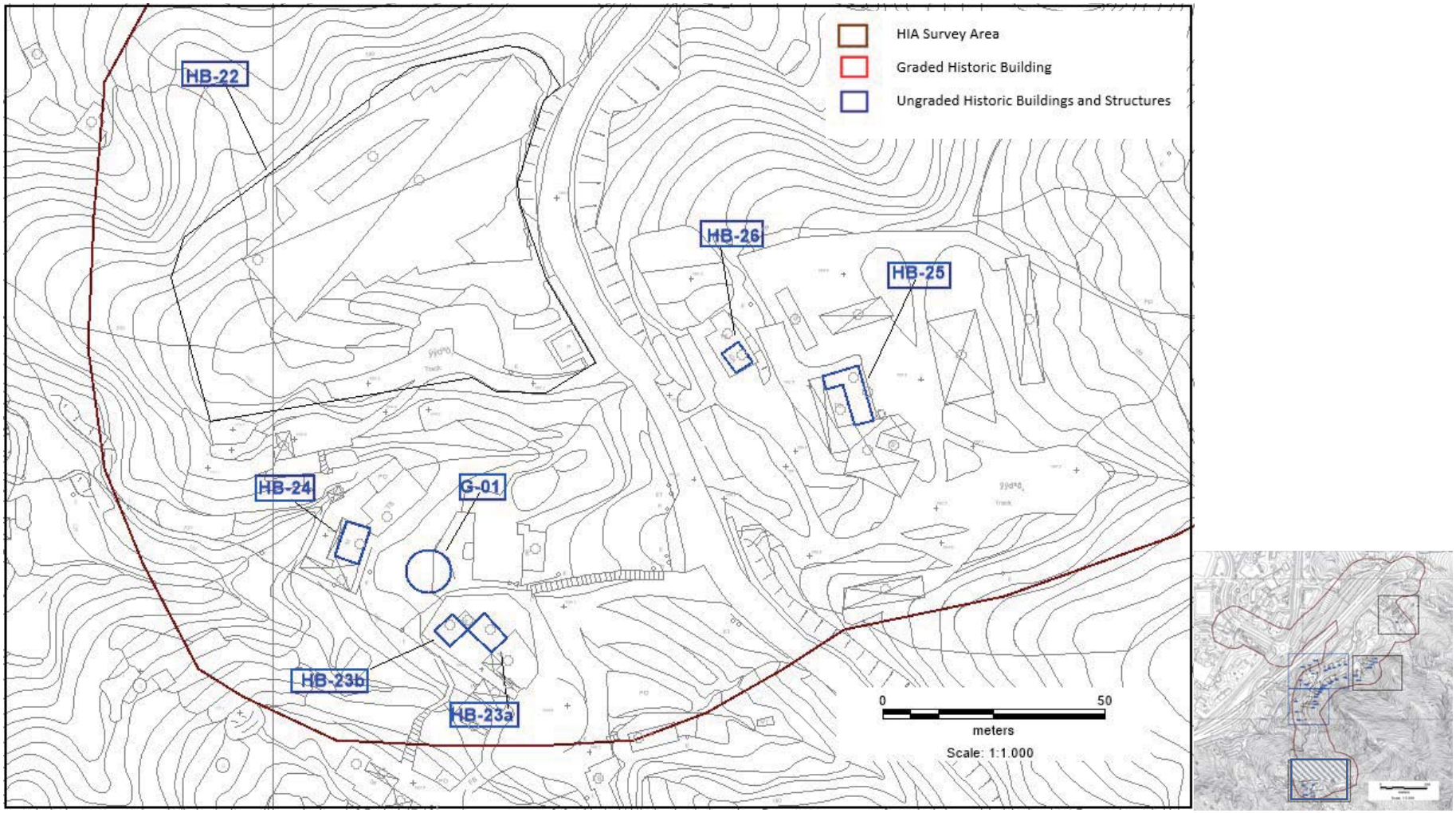


Figure 5 Map showing other built heritage ore waste dump (HB-22), residential houses (HB-23-26) and the Yau family Qing dynasty grave dated to 13th year of Guangxu period (G-01)

Figure 6 View of the open cast mine at Ma On Shan in 1963

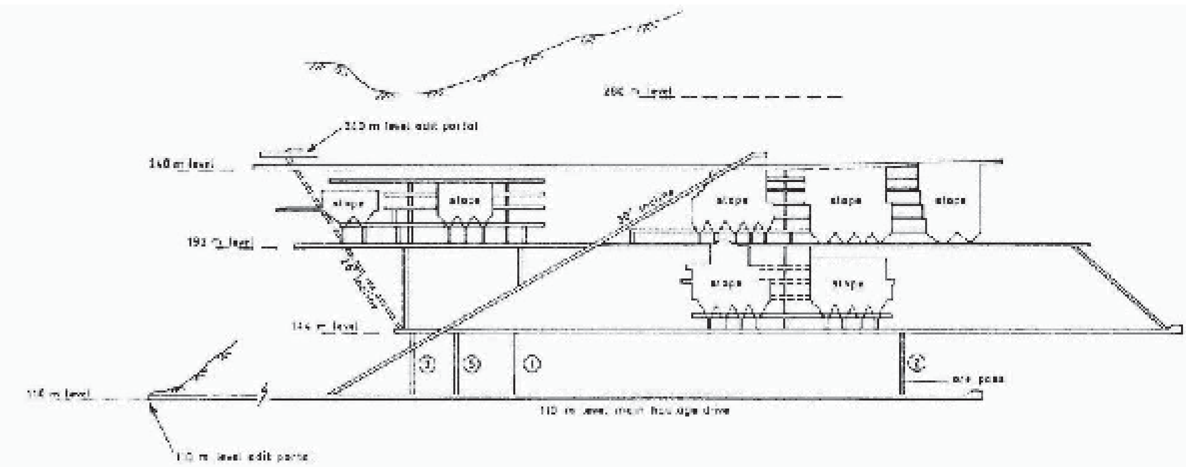


Figure 7 Schematic Diagram of Portals and Shafts

Figure 8 Photos of Electric tram operating in mine and at 110ML

Figure 9 Mineral Preparation plant under construction in the 1950's (Gwulo)

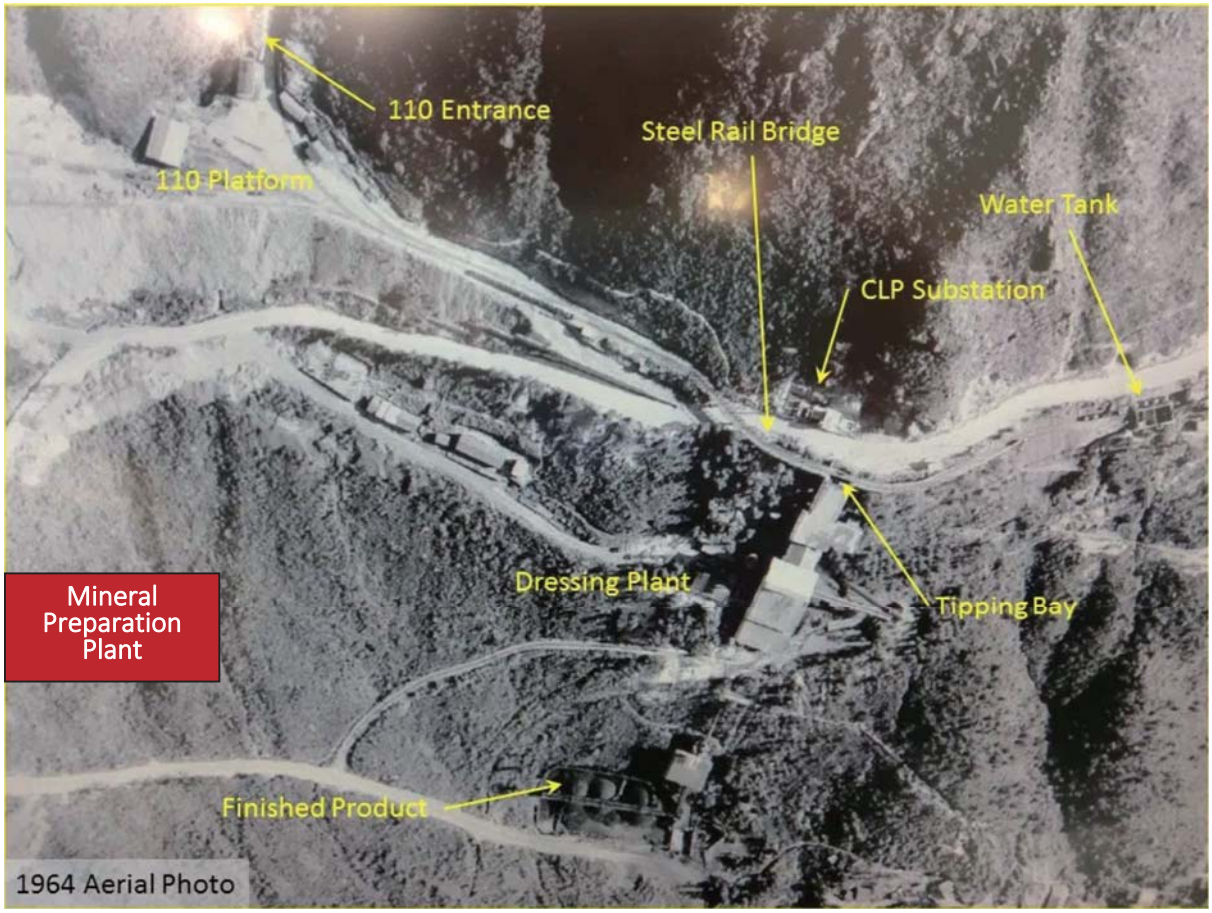


Figure 10 Aerial photo of 1969 showing the mineral preparation plant

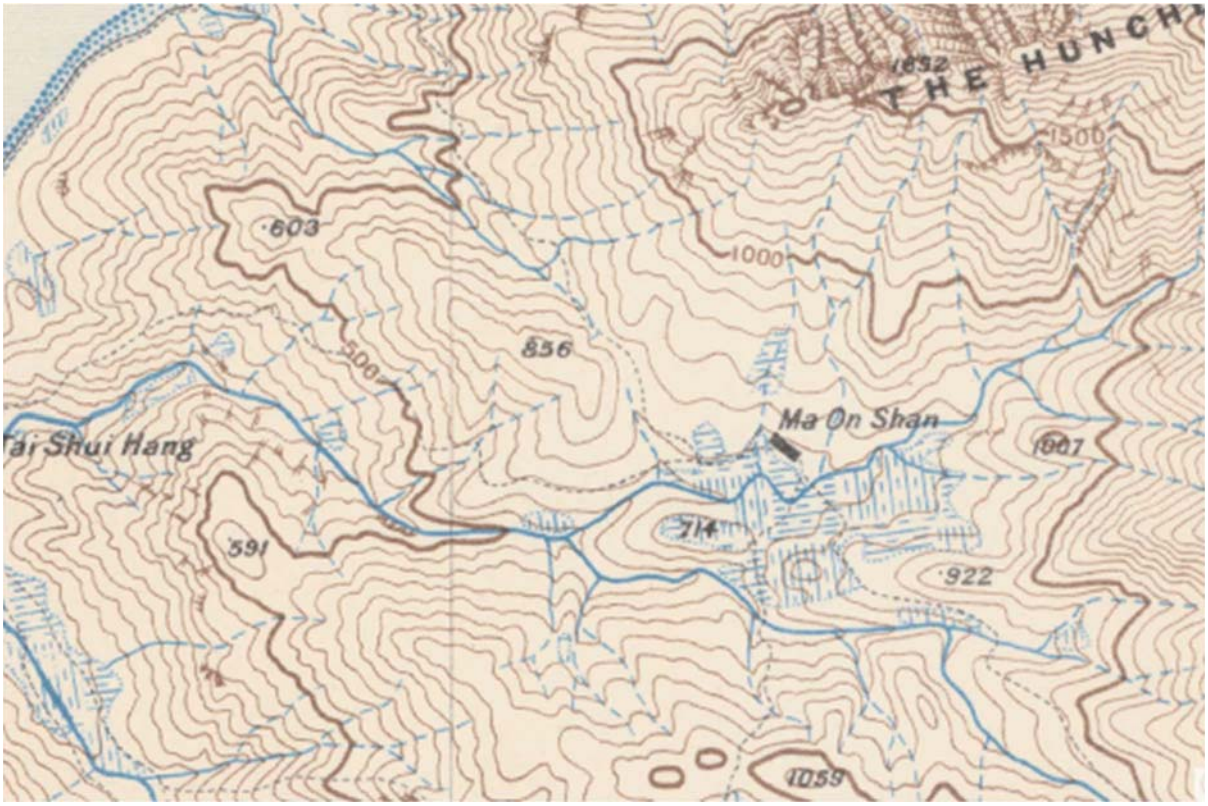


Figure 11 1913 map showing the agricultural activities around Ma On Shan village

APPENDIX C
BUILT HERITAGE INVENTORY

Ref: GB-01	Title: Site Structures at Mining Settlement in Shun Yee San Tsuen, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Residential
Address: Shun Yee San Tsuen, Ma On Shan		Figure Ref: Figure 1
Orientation: Northwest facing		Grading: Grade 3 (confirmed on 18 Apr 2016)

Surrounding Environment:

Located at the terraced slopes at the foothills of Ma On Shan.

Historical Appraisal:

Shun Yee San Tsuen (literally, "Lutheran New Village") was completed in 1961 by the Lutheran missionary. The village was built to rehouse some church members who were miners and had their houses destroyed by heavy rainstorms (AMO GISH 2020). In the early years of the new village, the Lutheran Yan Kwong Church would charge the tenants a nominal rent; but the rent charge was cancelled later on (馬鞍山民康促進會, 2012, 118).

Associated Historical/ Cultural Events or Individual:

Associated with miners' living conditions, religion and life supports offered by the Lutheran missionary during the mining practice.

The personnel of the Ma On Shan Iron Mine during 1949 to 1976 are comprised of two major groups: managing class, and miners. Managing class was formed by absorbing Chinese specialists who came to Hong Kong to escape the civil wars in mainland China; some of them once studied aboard in the USA; the others had experience in supervising mining practice and managing (馬鞍山民康促進會, 2012, 68). Japanese engineers and geologists were also part of the managing class and played important roles in the mining business. These managing classes were direct labor of the Mutual Trust Co. Ltd. (大公洋行) and were provided with accommodation.

Miners, on the other hand, were mostly labours from many various parts of China – e.g. Guangdong (廣東), Anhui (安徽), Henan (河南), Hubei (湖北), Shandong (山東)—who fled to Hong Kong to avoid wars. They were not provided with accommodation and often lived in poor conditions. Some even slept on hemp sacks inside temporary shelters made of bamboo and moved the shelters as work location changed (吳世寧 2016). An oral interview with a local Mr. Chan who lives at the Mid-level of Ma On Shan reveals that many miners did not marry and led single lives in hardship; some were able to set up families but most of them married mainland women. Most miners spoke a common language--mandarin, although with a wide range of dialectic accents (沙田區議會, 2002). As they did not speak Cantonese, they were cut off from the urban live of Hong Kong and formed their own community (Ma On Shan St. Joseph's Secondary School Website).

The missionaries saw opportunities to preach religion and set up churches in Ma On Shan Village. Two churches, one Catholic church whilst the other a Lutheran church established in the 1950s; food and supplies were offered to the miners and their families.

Architectural Appraisal:

Shun Yee San Tsuen is a cluster of residential units and comprises eight rectangular blocks in two rows. Each block can be subdivided into 2 home units and thus 16 subunits in total (AAB Appraisal 2016). A foot path is located in the middle of the two rows, providing an easy walking access within the village. The housing and toilet blocks are built of masonry and seem to be coated with cement slurry featuring painted finish. Pitched roofs supported on timber trusses are also features of the home units (AAB Appraisal 2016).

Interior: Not accessible.

Existing Condition: Occupied.

Past and Present Uses: Residential

Modifications: Metal sheets have been added to roof and courtyard; some minor alterations to windows and for aircon provisions.

Photos:

GB-01 front view

GB-01 back view

GB-01 front view

GB-01 back view

Ref: GB-02-1	Title: Portal and Exterior walls of 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: Northwest facing		Grading: Grade 2 (confirmed on 18 Apr 2016)
Surrounding Environment: Situated on an artificial terrace next to Ma On Shan Tsuen Road, the portal and retaining walls of the 110 ML portal are set into the hill slope and extends outwards		

Historical Appraisal:

Throughout the 20th century, there were once four major mines in Hong Kong: Lin Ma Hang Lead Mine, Needle Hill Tungsten Mine, Tai Mo To Graphite Mine and Ma On Shan (MOS) Iron Mine (AAB Appraisal 2016). Among all the four mines, the Ma On Shan was the longest in operation, in total 70 years, from 1906 to 1976.

The mine mainly produced magnetite (磁鐵礦) and hematite (赤鐵礦), but also yielded Goethite (針鐵礦), Andradite (鈣鐵榴石) and Pyrite (黃鐵礦) and other ores (沙田區議會, 2002). The site was first discovered by two Australian in 1905 (馬鞍山民康促進會, 2012, 44). From 1906 to 1976, the mine had 5 successive owners, namely:

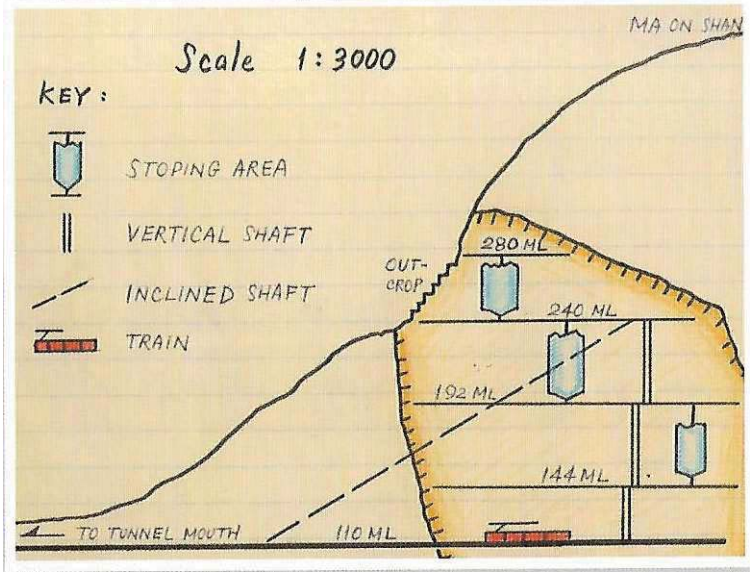
1. Hong Kong Iron Mining Co. Ltd. (香港鐵礦公司, 1906 to 1929),
2. the New Territories Iron Mining Co. Ltd. (華興礦務有限公司, 1931 to 1940),
3. the South China Iron Smelters Co. Ltd. (華南製鐵有限公司, 1940 to 1942),
4. Japanese occupied the mine during 1942 to 1944,
5. then in 1949, the Mutual Trust Co. Ltd. (大公洋行) took over the mine and operated until 1976.

In 1953, the Nittetsu Mining Company of Japan (日本鐵礦業株式會社) joined the Mutual Trust Co. Ltd. to operate the mine (AAB Appraisal 2016) and largely increased the productivity by introducing the then world's leading mining technology.

Ore extraction technology employed at MOS mine went through stages of improvement and innovation.

(During the early days and prior to 1953, open-cast mining was adopted to extract iron ore. Ore body was drilled from ground level and explosives were placed into drilled holes. After explosions, large raw ore blocks were further reduced by smaller amount of explosives or by hand tools (馬鞍山民康促進會, 2012, 51). This method has a wide variety of drawbacks including low productivity (only 100 tones raw ore daily; 馬鞍山民康促進會, 2012, 44), high cost input, and reverse impacts to the environment and natural landscape.

After 1953 and with technological support and specialists from the Nittetsu Mining Company of Japan (日本鐵礦業株式會社), the extraction of ore went underground. A number of adits, including 280ML, 240ML 192ML, 144ML and 110ML. and vertical and inclined shafts were drilled so that raw ore fragments obtained from explosions could be dropped to the lowest level (110ML, completed in 1963) and transported (which included an electric train) to the Mineral Preparation Plant for preparation (see figure below). It considerably reduced transportation costs. Previously, the ore had to be transported by vehicles down a winding access road. As a result, the mine was capable of producing 480 tons iron concentrates per-day (AAB Appraisal 2016).



(Source: 馬鞍山民康促進會, 2012, 56)

The heyday of the mine was during the 1950s and 1960s and in excess of 400,000 tons of ore were extracted annually (AAB Appraisal 2016). The majority of the iron ore was exported to Japan to cope with its increasing demand driven by industrial development.

Apart from its owners, the personnel of the mine included management, engineers and geologists, and miners. Management included Chinese specialists, some of which had studied in the USA and who came to Hong Kong to escape the civil wars in mainland China (馬鞍山民康促進會, 2012, 68). Japanese engineers and geologists played important roles in the mining operation. Miners came from many different parts of China – e.g. Guangdong (廣東), Anhui (安徽), Henan (河南), Hubei (湖北), Shandong (山東). They mainly spoke Mandarin, although with a wide range of dialectic accents (沙田區議會, 2002). Some of the residents of Rennie's Mill (Tiu Keng Leng) (調景嶺) also worked there. Mining operations, however, were suspended in March 1976 due to high costs and weakening global demand for iron ore. Many of the miners headed out to Kowloon to find alternative work, and the mining lease expired in 1981 (AAB Appraisal 2016).

Associated Historical/ Cultural Events or Individual:

The Portal and Exterior walls of 110 ML are associated with the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.

Architectural Appraisal: Constructed in 1963, the exterior wall of 110 ML (110 ML 礦洞外牆) is recessed into the side of the mountain in a cutting which is faced or revetted on either side by concrete retaining walls about 4 metres high marked with faux joint lines to resemble ashlars masonry.

The portal itself is an arched opening in a concrete retaining wall with faux joint lines to represent voussoirs (vaulting). (AAB Appraisal 2016).

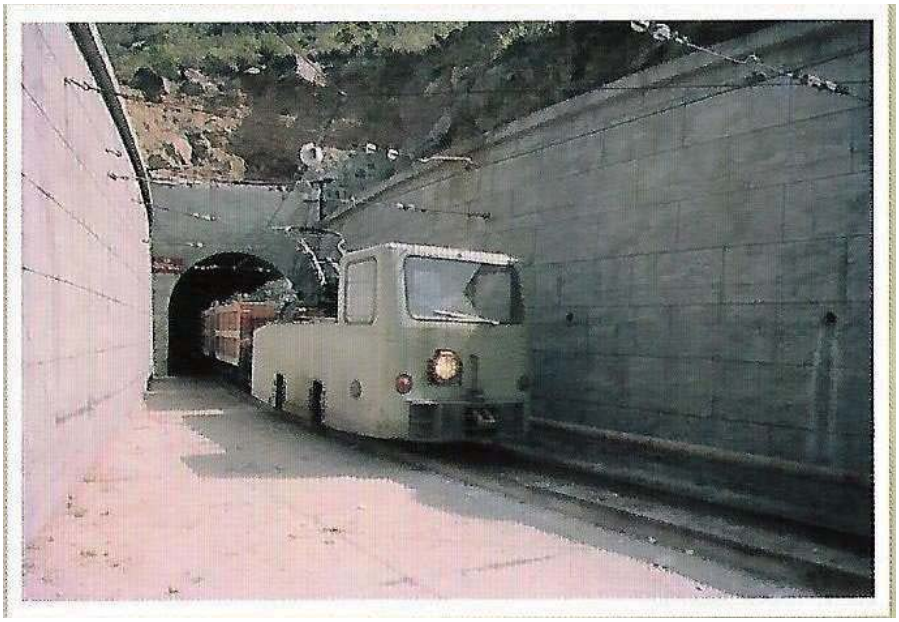
Interior: Entrance to the tunnel from the portal is blocked and cannot be accessed.

Existing Condition: the condition of the portal is obscured by the blocking wall but appears fair; the exterior wall of 110 ML despite its lack of maintenance is very good. The area with the track is under water.

Past and Present Uses: Industrial and functional

Modifications: A coarse wall has been built across the entrance to prevent unauthorized access. Two rectangular openings have been left for drainage purpose. A fence was set in front of the sealed wall. Drainage channels previously built underground was exposed. Rail tracks and electricity wires have been removed.

Photos:

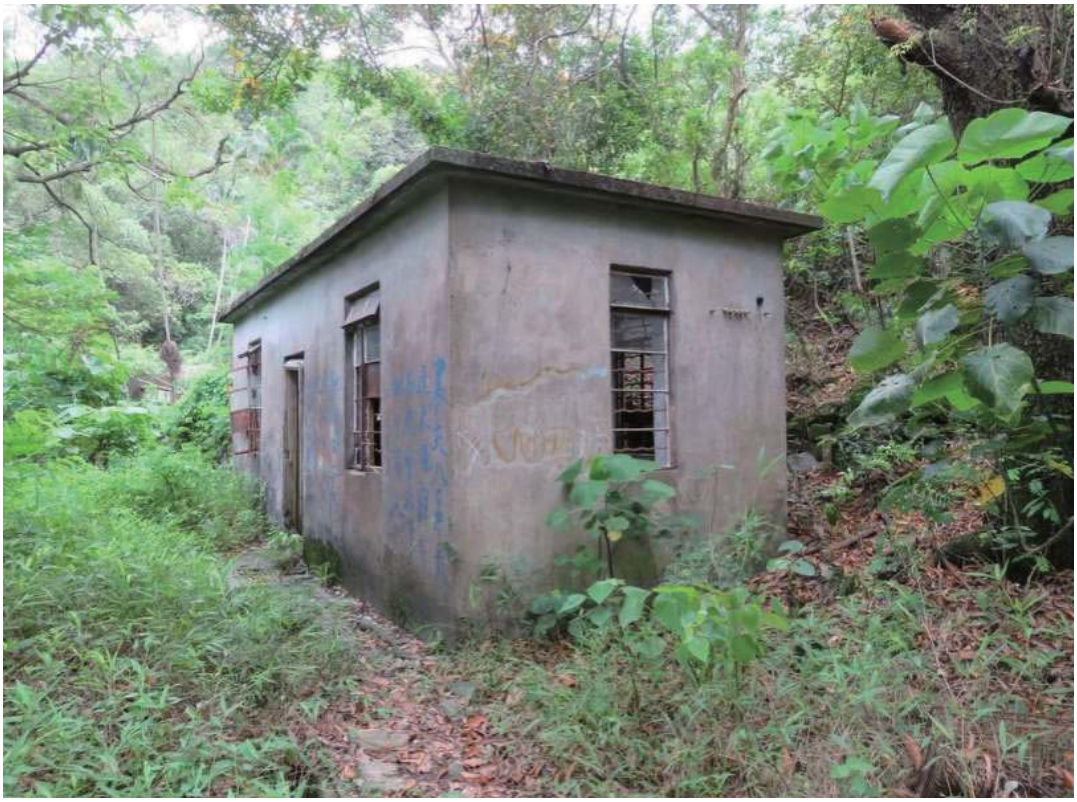


GB-02-1 **when in use (Source:** 馬鞍山民康促進會, 2012, 57)

GB-02-1 general view

GB-02-1 portal close-up view

Ref: GB-02-2	Title: Office part of the Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: North facing		Grading: Grade 2 (confirmed on 18 Apr 2016)
Surrounding Environment: Situated on an artificial terrace next to Ma On Shan Tsuen Road, near retaining walls of 110 ML portal and the engine room (110ML B-2).		
Historical Appraisal: See Historical Appraisal of **GB-02**-1.		
Associated Historical/ Cultural Events or Individual: The office building is associated with the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The office building is probably constructed at the same time as the portal and exterior walls of 110 ML (110 ML 礦洞外牆) and the engine room (**GB-02**-3) in 1963. The building is a rectangular structure with flat roof and a door and six widows: two on front wall, two on back wall, and one on each side wall.		
Interior: Walls, ceiling and ground intact; window glasses battered; wooden door damaged		
Existing Condition: Abandoned and some minor damage.		
Past and Present Uses: Industrial and now abandoned		
Modifications: Not observed.		
Photos:		



GB-02-2 side view

GB-02-2 rear view
Office building located next to 110ML portal

GB-02-2 internal view
Office building next to 110ML portal

Ref: GB-02-3	Title: Engine room part of the Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: Southwest facing		Grading: Grade 2 (confirmed on 18 Apr 2016)
Surrounding Environment: Situated on an artificial terrace next to Ma On Shan Tsuen Road, in the immediate vicinity of portal and retaining walls of 110 ML, the office building and rails.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1.		
Associated Historical/ Cultural Events or Individual: The engine room is associated with the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The engine room is probably constructed in the same time with the exterior walls of 110 ML (110 ML 礦洞外牆) and the office building (**GB-02**-2) in 1963. It is a rectangular structure; ceiling is collapsed. Windows and both doors are opened on walls. A side room attached to main room. The former engine room (Figure with **GB-02**-3) controlled light (AAB Appraisal 2016).		
Interior: Walls and ground intact; ceiling and doors collapsed and window glasses battered.		
Existing Condition: Abandoned and partially damaged.		
Past and Present Uses: Industrial, now abandoned		
Modifications: N/A		
Photos:		

GB-02-3 side view

-3

GB-02-3 façade

GB-02-3 internal views

Ref: **GB-02**-4	Title: rail tracks part of the Exterior walls of 240 ML and 110 ML, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: Northeast-Southwest		Grading: Grade 2 (confirmed on 18 Apr 2016)
Surrounding Environment: Situated above Ma On Shan Tsuen Road and at base of the terrace where 110ML portal structures were built upon.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1.		
Associated Historical/ Cultural Events or Individual: The rail tracks are associated with the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine. The track are part of the first electric train in Hong Kong.		
Architectural Appraisal: Remaining rail tracks have a length of 14 m and a width of 0.7 m		
Existing Condition: Good		
Past and Present Uses: Industrial now abandoned		
Modifications: Not observed.		

Looking generally north

Looking generally south

Ref: GB-03-01	Title: Main building, Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northwest facing		Grading: Grade 3 (confirmed on 18 Apr 2016)

Surrounding Environment: built in steps down the hillside below Ma On Shan Tsuen Road.

Historical Appraisal: Throughout the 20th century, there were once four major mines in Hong Kong: Lin Ma Hang Lead Mine, Needle Hill Tungsten Mine, Tai Mo To Graphite Mine and Ma On Shan Iron Mine (AAB Appraisal 2016). Among all the four mines, the Ma On Shan was the longest in operation, in total seventy years, from 1906 to 1976.

The mine mainly produced magnetite (磁鐵礦) and hematite (赤鐵礦), but also yielded Goethite (針鐵礦), Andradite (鈣鐵榴石) and Pyrite (黃鐵礦) and other ores (沙田區議會, 2002). The site was first discovered by two Australian in 1905 (馬鞍山民康促進會, 2012, 44). From 1906 to 1976, the mine had 5 successive owners, namely:

1. Hong Kong Iron Mining Co. Ltd. (香港鐵礦公司, 1906 to 1929),
2. the New Territories Iron Mining Co. Ltd. (華興礦務有限公司, 1931 to 1940),
3. the South China Iron Smelters Co. Ltd. (華南製鐵有限公司, 1940 to 1942),
4. Japanese occupied the mine during 1942 to 1944,
5. then in 1949, the Mutual Trust Co. Ltd. (大公洋行) took over the mine and operated until 1976.

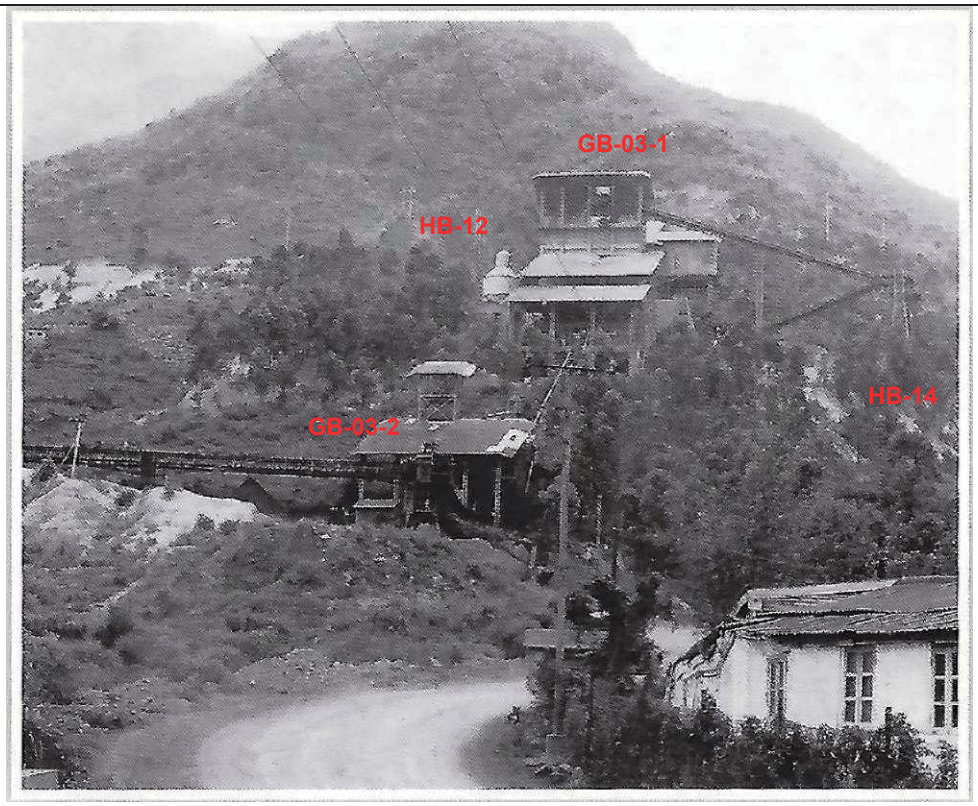
In 1953, the Nittetsu Mining Company of Japan (日本鐵礦業株式會社) joined the Mutual Trust Co. Ltd. to operate the mine (AAB Appraisal 2016) and largely increased the productivity by introducing the then world's leading mining technology.

Ore extraction technology employed at the mine went through an important improvement. During the early days and prior to 1953, open-cast mining was adopted to extract iron ore. Ore body was drilled from ground level and explosives were placed into drilled holes. After explosions, large raw ore blocks were further reduced by smaller amount of explosives or by hand tools (馬鞍山民康促進會, 2012, 51). This method has a wide variety of drawbacks including low productivity (only 100 tones raw ore daily; 馬鞍山民康促進會, 2012, 44), high cost input, and reverse impacts to the environment and natural landscape. After 1953 and with technological support and specialists from the Nittetsu Mining Company of Japan (日本鐵礦業株式會社), the extraction of ore went underground. A number of adits, including 280ML, 240ML 192ML, 144ML and 110ML. and vertical and inclined shafts were drilled so that raw ore fragments obtained from explosions could be dropped to the lowest level (110ML, completed in 1963) and transported to the Mineral Preparation Plant for preparation (see figure below). It considerably reduced transportation costs. Previously, the ore had to be transported by vehicles down a winding access road. As a result, the mine was capable of producing 480 tons iron concentrates per-day (AAB Appraisal 2016).

Associated Historical/ Cultural Events or Individual: The structure is the main building of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.

Architectural Appraisal: The Mineral Preparation Plant consists of a complex of concrete structures. They were built as engineering structures. The purpose of each structure is difficult to identify.

The main building is the largest structure in the Mineral Preparation Plant. It was built in steps down the hillside below Ma On Shan Tsuen Road. Three overhead pillars were built in an alignment from portal to the upper part of the main building. The ore was processed at the main building transported from 110ML portal. An ore pile can be seen at the base of the upper part structure (see photo). An old photo (see below) reveals that conveyor belts were set to connect the main building to transmission building.



Mineral Preparation Plant set up (Source: 馬鞍山民康促進會, 2012, 47)

Existing Condition: Abandoned and overgrown by vegetation; could pose danger to hikers as thick vegetation covers openings on ground level.

Past and Present Uses: Industrial

Modifications: Conveyor belts and machines removed.

Photos:

GB-03-01 general views

GB-03-01 Lower part

Ref: GB-03-2	Title: Structure for Stock-piles part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northwest facing		Grading: Grade 3 (confirmed on 18 Apr 2016)
Surrounding Environment: Built at hillside on Ma On Shan, at upper side of Ma On Shan Bypass. In alignment with main building at a higher altitude.		
Historical Appraisal: See Historical Appraisal of **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The transmission building is a rectangular concrete structure; it has no ceiling attached to wall. Openings at facade, but currently sealed with iron doors. It was built for transmitting ore from main building overhead conveyor belts.  View of construction of MPP and transmission buildings in 1954 (Gwulo)		
Interior: The building was built directly on hill slope, by using cement pavement to cover the natural landscape. The building once had a second storey or platform on inside but has now collapsed.		
Existing Condition: Abandoned and partially damaged.		

Past and Present Uses: Industrial, abandoned
Modifications: Transmission facilities removed; writing with paint on exterior.
Photos:
 **GB-03**-2 general view

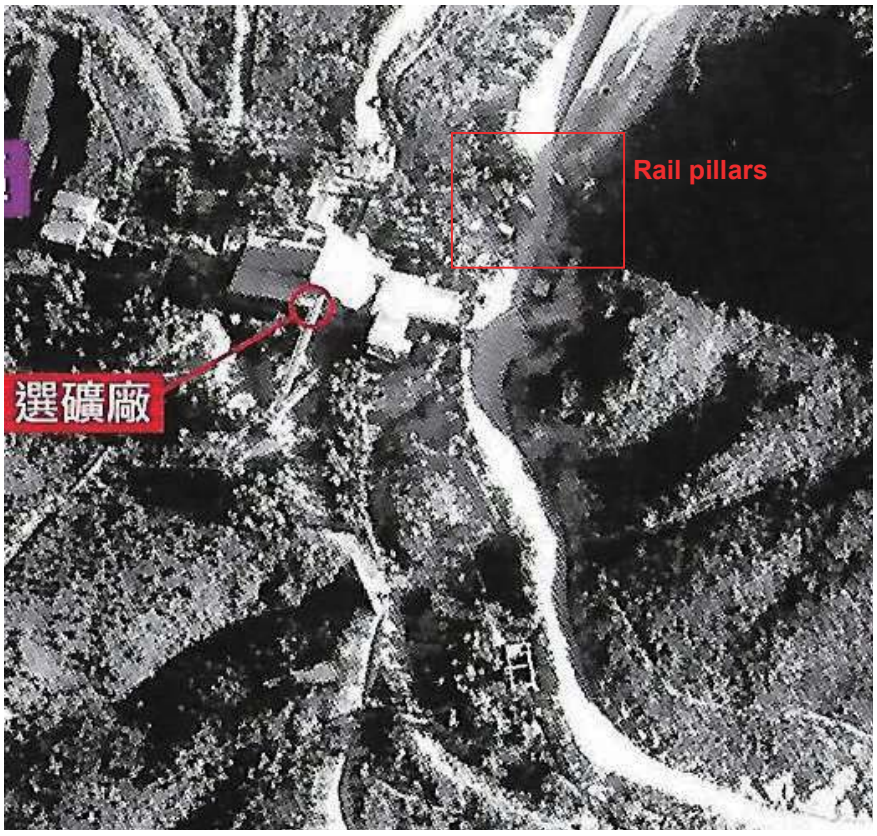
GB-03-2 internal view

GB-03-2 frontal view

Ref: GB-03-3	Title: An office set up there to supervise the operation of the ore-dressing plant part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northwest facing		Grading: Grade 3 (confirmed on 18 Apr 2016)
Surrounding Environment: built on a leveled ground on hill slope under Ma On Shan Tsuen Road		
Historical Appraisal: See Historical Appraisal of **GB-03**-1**.**		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The building is a rectangular structure with pitched roof but roof is collapsed. The structure is made of concrete. It has rectangular opening at facade, windows and a door at back, windows at side wall, and also has a small room on its right side.		
Interior: ground partially intact, partially invaded by vegetation;		
Existing Condition: Abandoned and overgrown with vegetation; storage contents include disposed deity idols, flowerpots and other living supplies, suggesting a lateral occupation.		
Past and Present Uses: Industrial		
Modifications: ceiling, windows and doors removed		
Photos:		

GB-03-3 general views

GB-03-3 internal views

Ref: GB-03-4, **GB-03**-5 and **HB-09A, HB-09B and HB-09C**	Title: Pillars part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figures 3-4
Orientation: Five pillar structures were laid in a linear alignment (with slight curve) running east to northeast and across Ma On Shan Tsuen Road.		Grading: Grade 3 for GB-03-4/5 (confirmed on 18 Apr 2016); HB-09 Other built heritage item.
Surrounding Environment: three pillars are located between the terrace in front of the portal and exterior walls of 110 ML and the main building of the Mineral Preparation Plant (MPP) and a further 2 are located to the west of the MPP		
Historical Appraisal: See Historical Appraisal of **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structures are part of the first electric train in Hong Kong and connected the portal to the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Three pillars supported the overhead ore transit railway as shown on 1963 aerial photo below. They are made of steel reinforced concrete and consist of two pillars connected with a rectangular cap. HB-09A is damaged and has one pillar left.  Aerial view of Mineral Preparation Plant under construction showing location of pillars in relation to plant (Source: 馬鞍山民康促進會, 2012, 11)		
Existing Condition: Partially damaged.		
Past and Present Uses: Industrial, not in use		

Modifications: Not observed.

Photos:

View of pillar **GB-03**-4

View of pillar **GB-03**-5 and stairs **HB-13** (to right)

View of pillar **HB-09A**

View of pillar **HB-09B**

View of pillar **HB-09C**

Ref: GB-03-6	Title: Water Tank part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Rectangular structure laying in northeast to southwest direction.		Grading: Grade 3 (confirmed on 18 Apr 2016)
Surrounding Environment: Situated immediately below Ma On Shan Tsuen Road.		
Historical Appraisal: See Historical Appraisal of **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The structure consists of a rectangular concrete water tank. It was used to collect water from hill stream and supply water to the plant.		
Interior: divided into units on inside.		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, now abandoned		
Modifications: Not observed.		

Photos:

General view of water tank **GB-03**-6

Ref: HB-01	Title: Toilet building part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: north		Grading: Other built heritage item
Surrounding Environment: near portal area		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: One of two toilet structures recorded within the lower mining landscape near the portal. Red brick construction with concrete render, glass window and some timber, functional design with flat roof, gutter style toilet. Three toilet compartments inside. Building was visible on 1969 map (Ordnance survey 1969).		
Interior: Three toilet compartments		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-01 General view of front

HB-01 view of rear

HB-01 gutter style toilet

Ref: HB-02	Title: Remains of building/location to store or repair ore bearing carts. part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 2
Orientation: generally northwest		Grading: Other built heritage item
Surrounding Environment: Near railway tracks **GB-02-4**		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The recorded remains include a short concrete wall, a concrete post and paved floor. The 1964 aerial photo shows a roofed shed at this location. Rail tracks were leading into it and a building beside (now gone) (Ordnance survey 1969; Lands Department 1964). Possibly a location to store or repair ore bearing carts.		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, abandoned and overgrown.		
Modifications: N/A		
Photos:		

HB-02 General views

HB-02 some details of rails

Ref: HB-03	Title: Electric Transformer Building part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: roughly south		Grading: Other built heritage item
Surrounding Environment: overgrown area in the lowest part of the mining landscape		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Staircase attached to a stone and concrete made platform along the southwest side. Concrete posts sit on top of platform. A short front wall extends towards the northeast. Severely overgrown. Shown on 1963 AP (Lands Dept 1963) and 1976 map marks it as Electric Transformer (Ordnance survey 1976).		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-03 General view of electric transformer building with stairs

HB-03 view of interior posts

Ref: HB-04	Title: Electric Sub-station Building part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: northwest facing		Grading: Other built heritage item
Surrounding Environment: set at lower end of MMP, part of administrative, utility buildings		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: concrete and red brick building with flat roof. The building has two doors and three windows and a round opening on façade and a round opening on rear wall. The building once had a pitch-roofed shed attached to southwest side but now only a concrete platform remains. Appeared on 1964 AP. 1976 map marked it as Electric Sub-station (Ordnance survey 1976).		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-04 General view of electric substation

HB-04 View of rear

HB-04 Interior view

Ref: HB-05	Title: Stone foundation of a temporary structure part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: northeast-southwest trending		Grading: Other built heritage item
Surrounding Environment: near collapsed building HB-06		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Stone foundation of a temporary structure seen on 1963 and 1964 aerial photos (Lands Dept 1963 & 64) within the lower mining landscape. Constructed with rough blocks.		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-05 General view of Stone foundation of a temporary structure

Ref: HB-06	Title: building with unknown function part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: unknown but suspected to north		Grading: Other built heritage item
Surrounding Environment: Lower part of mining landscape near electric substation.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Red brick with concrete render collapsed building with unknown function seen on 1963 aerial photo (Lands Dept 1963) within the mining landscape		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Photos:		

HB-06 General view of collapsed buildings

Ref: HB-07	Title: Toilet building part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: southeast facing		Grading: Other built heritage item
Surrounding Environment: within the lowest part of the mineral preparation plant area		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: One of two toilet structures recorded within the lower mining landscape. Red brick construction with concrete render, glass window and some timber, functional design with flat roof, gutter style toilet. Three toilet compartments inside. Building was built between 1969-76 (Ordnance survey 1969 &76).		
Interior: Three toilet compartments		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-07 General view of outside of building

HB-07 interior view of one of the compartments

Ref: HB-08	Title: Concrete retaining wall part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: along Ma On Shan Tsuen Road		Grading: Other built heritage item
Surrounding Environment: along Ma On Tsuen Road and below the portal area		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: concrete retaining wall with buttresses.		
Existing Condition: Abandoned and fair condition.		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-08 General view of retaining wall

Ref: HB-10	Title: stone and concrete retaining wall part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northeast/south west alignment		Grading: Other built heritage item
Surrounding Environment: Built on hill slope above Ma On Shan Tsuen Road next to way up to 110 ML entrance		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The 1969 topographical map shows it was located beside rail track and at the top of the structure a temporary structure with small footprint was marked (Ordnance survey 1969). The northeast of the wall structure is partly broken, possibly by later slope work.		
Existing Condition: fair		
Past and Present Uses: Industrial, abandoned		
Modifications: possible broken during later road or slope works		
Photos:		

HB-10 General view of stone and concrete retaining wall

Ref: HB-11	Title: water tank part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northeast/south west alignment		Grading: Other built heritage item
Surrounding Environment: Built on hill slope above Ma On Shan Tsuen Road next to way up to 110 ML entrance		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Water tank constructed out of concrete and marked on the 1969 topographical map as water tank (Ordnance survey 1969).		
Existing Condition: fair		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-11 General view of water tank

Ref: HB-12	Title: Thickener tank foundation part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Circular structure, not applicable.		Grading: Other built heritage item

Surrounding Environment: built on hill slope under Ma On Shan Tsuen Road situated in between main building and office (**GB-03**-3).

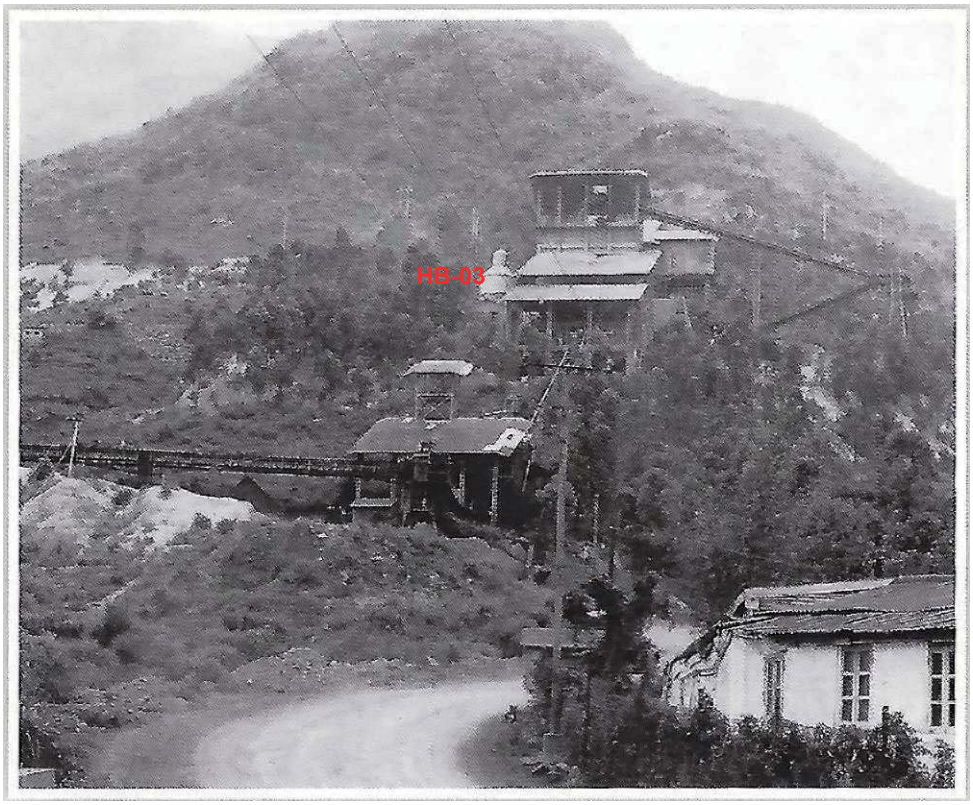
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.

Associated Historical/ Cultural Events or Individual:

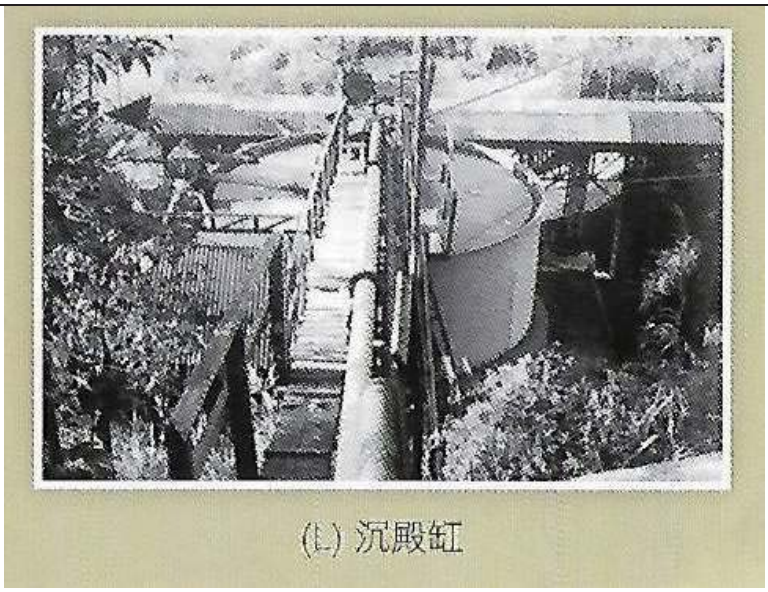
The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.

Architectural Appraisal:

The thickener tank consist of the remains of a circular structure. The structure is made of concrete. Old photos below show its spatial relation to other structure of the ore-dressing plant and its original appearance.



Mineral Preparation Plant (Source: 馬鞍山民康促進會, 2012, 47)



Thickener Tank (Source: 馬鞍山民康促進會, 2012, 65)

Existing Condition: Abandoned and partly collapsed.

Past and Present Uses: Industrial, abandoned

Modifications: Tank removed.

Photos:

HB-12 General view of thickener tank remains

Ref: HB-13	Title: path and stairs part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: N/A		Grading: Other built heritage item
Surrounding Environment: Built at hillside on Ma On Shan, at upper side of Ma On Shan Bypass.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The paths and stairs are part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Stairs were built to the right-hand side of transmission building **GB-03-2**. They served as a foot path connecting the Mineral Preparation Plant buildings. Stairs are built of concrete and held in place by reinforcing steel.		
Existing Condition: in use.		
Past and Present Uses: Industrial and residential, they remain in use by villagers		
Modifications: not apparent		
Photos:		

HB-13 View of stairs beside transmission building **GB-03-2**

Ref: HB-14	Title: Transmission building part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 3
Orientation: Northwest facing		Grading: Other built heritage item
Surrounding Environment: situated on hill slope under Ma On Shan Tsuen Road.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine. Chinese character 佛 Buddha and phrases 佛光普照， 國泰民安, were written on base of HB-14. The practice is probably related to casualties happened during the mining practice. Whether the writing was done during the mining practice or not is not certain; however, it reflects a cultural- religious-psychological aftershock in response to the casualties.		
Inscriptions: Chinese character 佛 Buddha and phrases 佛光普照， 國泰民安, were written in white paint on base of MPP-5. 佛光普照 means Buddha's grace illuminates all, and 國泰民安 means the preying of the country’s prosperity and the people can enjoy peace.		
Architectural Appraisal: HB-14 is a square structure built on a raised platform on hillside. It is built of concrete, iron bars can be seen attached to the top of the structure.		
Interior: Largely obscured by vegetation on a raised platform, the interior is neither accessible nor observable.		
Existing Condition: Abandoned and damaged		
Past and Present Uses: Industrial, abandoned		
Modifications: Conveyor belt removed.		
Photos:		

HB-14 general view

HB-14 upper part

HB-14 lower part

Ref: HB-15	Title: Railway support structure part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figures 3 and 4
Orientation: N/A		Grading: Other built heritage item
Surrounding Environment: below Ma On Shan Tsuen Road		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Concrete block attached to steep hillside next to main road and supported by stone-made buttress. Hollow concrete cap built on top. 1964 AP shows a rail track running from 100ML entrance to where the water tank GB-03-6 (Lands Dept 1964).		
Existing Condition: Abandoned and overgrown		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-15 General view

Ref: HB-16	Title: Railway support structure (possibly) part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: Northwest-southeast trending		Grading: Other built heritage item
Surrounding Environment: on hill slopes below Ma On Shan Road and in alignment with pillars. Generally located between MMP building and water tank.		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Solid railway support with stone barrier wall. Constructed out of stone and concrete. Part of iron railway protrudes out of a concrete fragment on floor level (?). Support lies in the path of the rail track as shown on 1964 aerial photo (Lands Dept 1964).		
Existing Condition: Abandoned and partly collapsed.		
Past and Present Uses: Industrial, abandoned		
Photos:		

HB-16 General view with railway evidence in red circle

Ref: HB-17	Title: Stone retaining wall part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: along Ma On Shan Tsuen Road		Grading: Other built heritage item
Surrounding Environment: below Ma On Shan Tsuen Road		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Stone retaining wall below main road and above water tank. Shown on 1964 aerial photo (Lands Dept 1964). Strangely 1969 map marks the location as a temporary structure (Ordnance survey 1969).		
Existing Condition: Abandoned and overgrown		
Past and Present Uses: Industrial, abandoned		
Photos:		

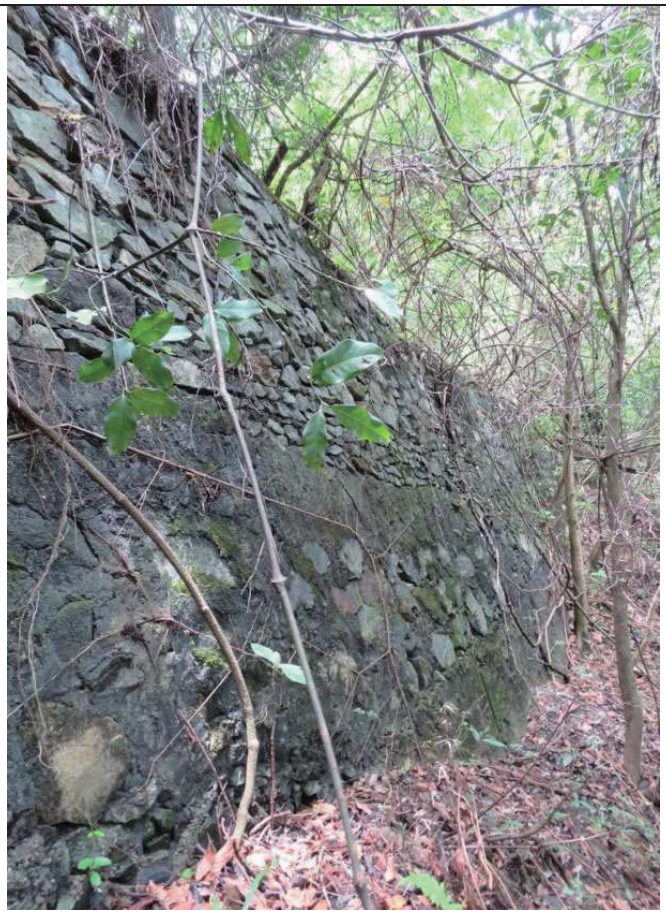
HB-17 General view

Ref: HB-18	Title: Small building next to water tank. part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: Northeast facing		Grading: Other built heritage item
Surrounding Environment: near water tank GB-03-6		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: Small building located on slope below water tank. Made of stone blocks and concrete and with flat roof. The metal door of the building faces the water tank, while an air window opens at low level of the side wall facing the downslope.		
Interior: Not accessible		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, abandoned		
Photos:		

HB-18 General view of front

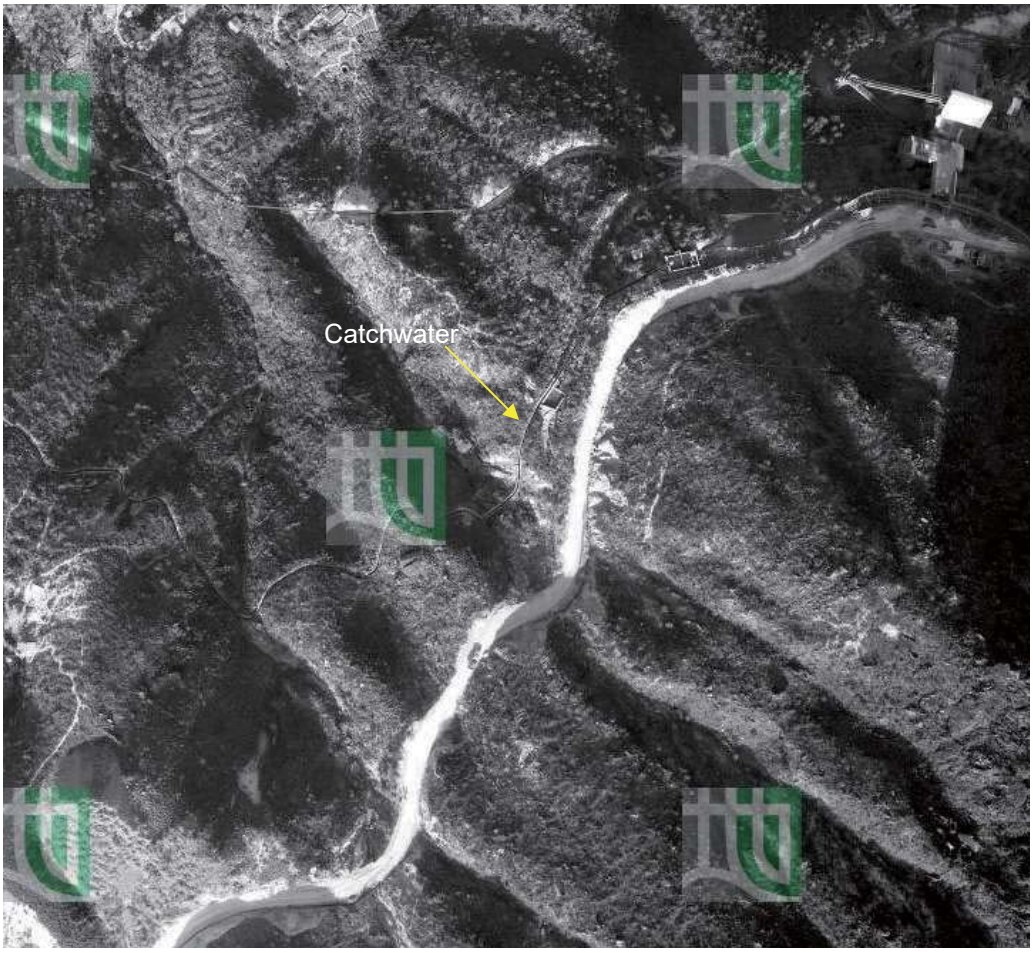
Ref: HB-19	Title: Pipeline with retaining wall part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: partially mapped on Figure 3		Grading: Other built heritage item
Surrounding Environment: to the west of the mining landscape		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The pipeline is seen on 1964 aerial photo and is recorded on the 1969 topographical map (Lands Department 1964; Ordnance survey 1969). It starts from a pump house (not mapped) below the MPP, runs southward and connects to a draining pipe out of the water tank, then continues along the seaward facing slopes. A stone made retaining wall supports the pipe.		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		

HB-19 General view of pipeline



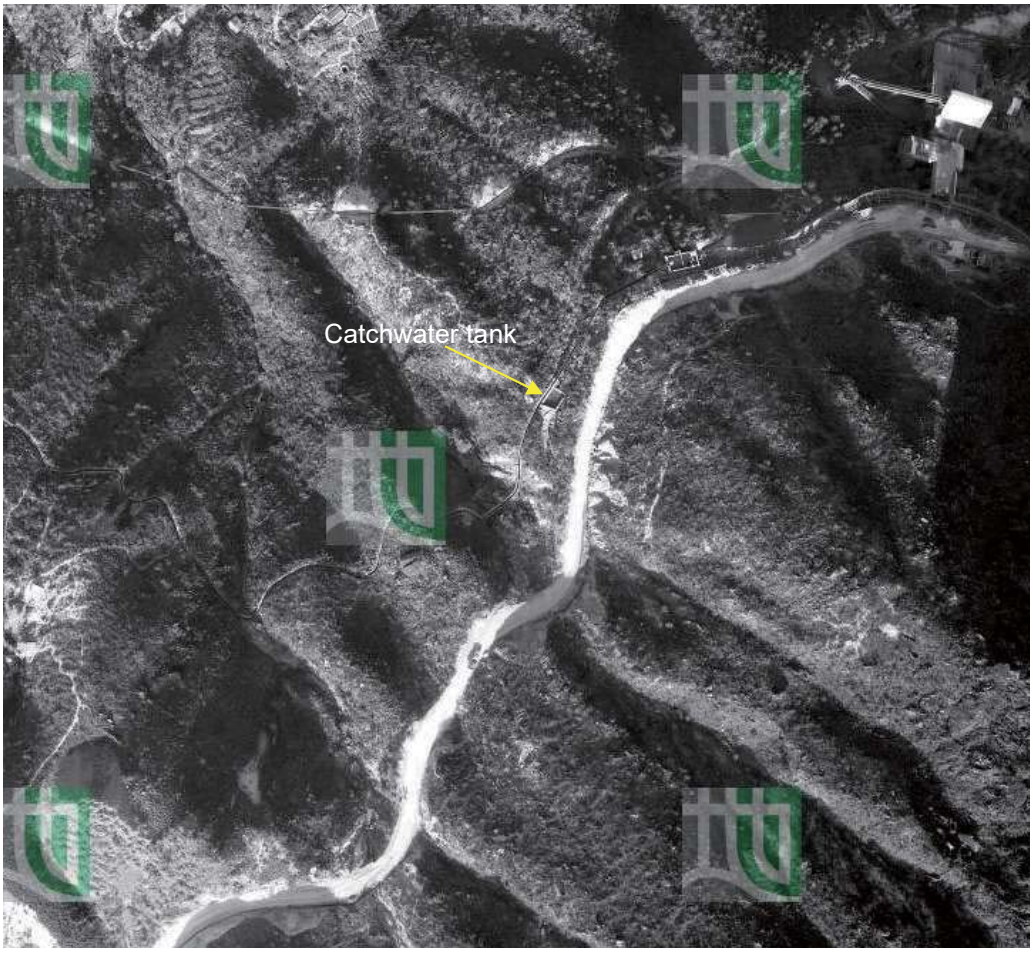
HB-19 General view of retaining wall of pipeline

Ref: HB-20	Title: Catchwater part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: partially mapped on Figure 3		Grading: Other built heritage item
Surrounding Environment: to the west of the mining landscape along Ma On Shan Tsuen Road; please note that the access was dangerous and presence was not verified in field		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The catchwater is seen on 1964 aerial photo (Lands Department 1964) and forms part of water collection and directing and supply water to the plant.		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		



HB-20 General view of catchwater in 1964

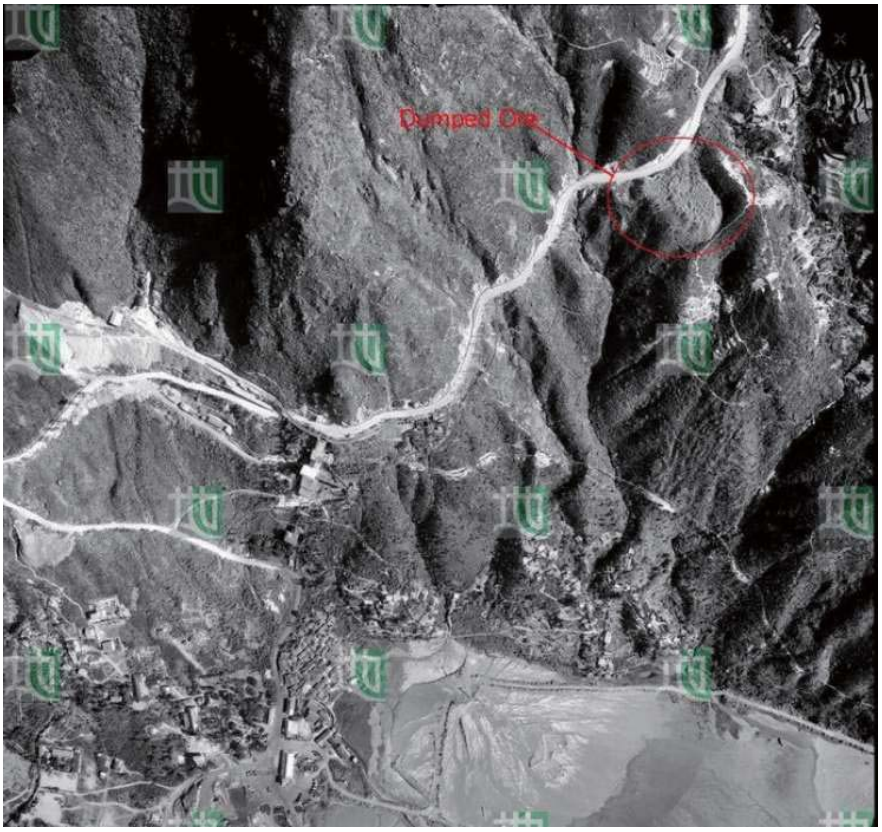
Ref: HB-21	Title: Catchwater tank part of Mineral Preparation Plant, Ma On Shan Iron Mine, Sha Tin, N.T.	Category: Industrial
Address: Ma On Shan Mining Landscape		Figure Ref: Figure 4
Orientation: partially mapped on Figure 3		Grading: Other built heritage item
Surrounding Environment: to the west of the mining landscape along Ma On Shan Tsuen Road; please note that the access was dangerous and presence was not verified in field		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: The structure is part of the Mineral Preparation Plant (important ore extraction technology innovation) which allowed for a sharp increase of productivity in Ma On Shan Iron Mine.		
Architectural Appraisal: The catchwater tank is seen on 1964 aerial photo (Lands Department 1964) and forms part of water collection and directing and supply water to the plant.		
Existing Condition: Abandoned		
Past and Present Uses: Industrial, abandoned		
Modifications: N/A		
Photos:		



HB-21 General view of catchwater in 1964

Ref: HB-22	Title: secondary ore deposit location Part of Ma On Shan mining landscape	Category: Industrial
Address: Ma On Shan Mining Landscape, two areas near Ma On Shan Tsuen Road		Figure Ref: Figure 5
Orientation: N.A.		Grading: Other built heritage item
Surrounding Environment: Near Ma On Shan Pavilion		
Historical Appraisal: See Historical Appraisal of **GB-02**-1 and **GB-03**-1.		
Associated Historical/ Cultural Events or Individual: Associated with dumping of ore refuse before Japanese technical support.		
Architectural Appraisal: A location near Ma On Shan Pavilion was used as low-graded ore deposal area.		
Existing Condition: Both grounds are now occupied by gardening companies which obscures the dumps.		
Past and Present Uses: Past-industrial; Present-gardening business.		
Modifications: Change in land use.		

Photos:



HB-22 1964 aerial photo showing ore dump

Ref: **HB-23a and HB-23b**	Title: Village houses inside the compound of No.29 Ma On Shan Tsuen	Category: Residential
Address: No.29 Ma On Shan Tsuen		Figure Ref: Figure 5
Orientation: HB-23a possibly southwest facing, HB-23b possibly southeast facing; unconfirmed due to access limitations (raised platform and fence)		Grading: Other built heritage item
Surrounding Environment: Built on raised platform on the west side of Ma On Shan Tsuen Road		
Historical Appraisal: Ma On Shan Tsuen (Village) near Ma On Shan Iron Mine turned into a mining settlement during the mine's operation period from 1906 to 1976. Ma On Shan Tsuen was first established by the Hakka Wan clan during Qing period; it was also listed in the 1819 Xinan gazetteer (Ng 1983: Map 8). According to Leung (2002), prior to 1970s, the village was sub-divided into four areas based on its geographical settings, which were Ma On Shan Ma Tau Tsuen (later demolished for the construction of Hang On Estate), Pun Shan Tsuen (also called Mid-Level Village), Ma On Kiu Tsuen (also called Ma On Bridge Village) and Shan Teng Tsuen (later renamed as Ma On Shan Upper Village) respectively. No.29 Ma On Shan Tsuen is located at the lower part of Pun Shan Tsuen. The village was initially settled by workers of the iron mine. They mainly originated from Chiuchow. The miners later turned to practice agricultural as well as pig and chicken farming, which brought them more income than mining jobs. Over time, the area grew into a small Chiuchow community as they invited relatives and fellow countrymen to settle in the place. (MOSPLRA Website 2015) Two buildings, HB-23a and HB-23b, inside the compound of No.29 seem older than the rest. Although unclear when HB-23a was first erected, the building can be seen on a 1963 aerial photo (HKMS 1963). HB-23b was constructed later; it shows on a 1973 aerial photo (Lands Department 1973), thus considered built between 1963 and 1973. Although the identity of the initial owner is unclear, the construction dates of the building fall into the operation period of the mine and thus they are considered potentially related to the mining settlement.		
Associated Historical/ Cultural Events or Individual: None.		
Architectural Appraisal: The two buildings are both single storey building with pitched roof setting. HB-23a has a roof covered by concrete cement while HB-23b by concrete on top of corrugated metal sheets. Their external surface is covered in white finish. Windows are seen on northwest elevation of HB-23a and southwest and northwest elevations of HB-23b. Views to the facades are blocked by fencing and elevated height of the terrace. The terrace platform is made of stone with cement finish.		
Interior: No access.		
Existing Condition: Good.		
Past and Present Uses: Residential; in the past associated with miners.		
Modifications: Modern style windows, air-conditioners and pipelines added.		
Photos:		

Back and side view of HB-23a, showing northwest and northeast facing elevations, looking south.

General view of HB-23b on raised terrace foundation, showing northwest and southwest facing elevations, looking northeast.

View showing spatial relationship of HB-23a and HB-23b, looking southwest. Note: small building with flat roof in the foreground was added later than the 1980s.

Ref: **HB-24**	Title: Village house, No.32 Ma On Shan Tsuen	Category: Residential
Address: No.32 Ma On Shan Tsuen		Figure Ref: Figure 5
Orientation: Northwest facing		Grading: Other built heritage item
Surrounding Environment: Built on raised platform on the west side of Ma On Shan Tsuen Road		
Historical Appraisal: Ma On Shan Tsuen (Village) near the iron Mine became a mining settlement during the mine's operation period. Ma On Shan Tsuen was first established by the Hakka Wan clan during Qing period; it was also listed in the 1819 Xinan gazetteer (Ng 1983: Map 8). According to Leung (2002), prior to 1970s, the village was sub-divided into four areas based on its geographical settings, which were Ma On Shan Ma Tau Tsuen (later demolished for the construction of Hang On Estate), Pun Shan Tsuen (also called Mid-Level Village), Ma On Kiu Tsuen (also called Ma On Bridge Village) and Shan Teng Tsuen (later renamed as Ma On Shan Upper Village) respectively. No.32 Ma On Shan Tsuen is located at the lower part of Pun Shan Tsuen. The village was initially settled by workers of the iron mine. They mainly originated from Chiuchow. The miners later turned to practice agricultural as well as pig and chicken farming, which brought them more income than mining jobs. Over time, the area grew into a small Chiuchow community as they invited relatives and fellow countrymen to settle in the place. (MOSPLRA Website 2015) A review of old aerial photos suggests the house site was occupied in 1963 (HKMS 1963). However, the roof setting changed from pitched to flat during the course between 1963 and 1973 (HKMS 1963; Lands Department 1973), suggesting a rebuilt of the house. Nonetheless, the construction date of the current house still falls in the operation period of the mine, which raises the potential that the house was once a part of the mining related settlement.		
Associated Historical/ Cultural Events or Individual: None.		
Architectural Appraisal: It is a two-storey building with flat roof and porch balcony. The building is made of brick and concrete. The external surface is covered in creamy white finish. Windows in modern style are seen on every elevations. The lower part of the façade cannot be observed due to blocking of view by fence and height of foundation platform, which is laid by stones. The slope work of the foundation platform has been maintained by the Lands Department and the slope report suggests the foundation was constructed between 1963 to 1969 (CEDD 1997).		
Interior: No access		
Existing Condition: Good		
Past and Present Uses: Residential; in the past associated with miners.		
Modifications: Not observed.		
Photos:		

General view of HB-24, looking northwest.

Side view of HB-24, showing the entrance gate on perimeter wall and the southwest facing elevation, looking northeast.

Front view of HB-24, showing the stone laid platform and top part of the façade, looking east.

Back view of HB-24, showing the southeast facing elevation, looking west.

Ref: HB-25	Title: Village house, No.42 Ma On Shan Tsuen	Category: Residential
Address: No.42 Ma On Shan Tsuen (near Ma On Shan Pavilion)		Figure Ref: Figure 5
Orientation: Southwest facing		Grading: Other built heritage item
Surrounding Environment: Built on terraced slope on the east side of Ma On Shan Tsuen Road; flanked by cut slope		
Historical Appraisal: Ma On Shan Tsuen (Village) near the iron Mine became a mining settlement during the mine's operation period. Ma On Shan Tsuen was first established by the Hakka Wan clan during Qing period; it was also listed in the 1819 Xinan gazetteer (Ng 1983: Map 8). According to Leung (2002), prior to 1970s, the village was sub-divided into four areas based on its geographical settings, which were Ma On Shan Ma Tau Tsuen (later demolished for the construction of Hang On Estate), Pun Shan Tsuen (also called Mid-Level Village), Ma On Kiu Tsuen (also called Ma On Bridge Village) and Shan Teng Tsuen (later renamed as Ma On Shan Upper Village) respectively. No.42 Ma On Shan Tsuen is located at the lower part of Pun Shan Tsuen. The village was initially settled by workers of the iron mine. They mainly originated from Chiuchow. The miners later turned to practice agricultural as well as pig and chicken farming, which brought them more income than mining jobs. Over time, the area grew into a small Chiuchow community as they invited relatives and fellow countrymen to settle in the place. (MOSPLRA Website 2015) An oral interview with Mr. Lee (at his 70s), owner of the house, discloses that his father was a miner, and the house was built by his father. Mr. Lee cannot recall when the house was first built. However, a cross checking with old maps and aerial photos suggests the house was already in existence in 1963 (HKMS 1963), if not earlier. Mr. Lee also informs that No.42A nearby was also a house settled by a miner family and more households related to mining works reside on the west side of the road on the downhill side.		
Associated Historical/ Cultural Events or Individual: None.		
Architectural Appraisal: A single storey house having an "L-shaped" plan. The house is constructed of brick, mortar and roofed by corrugated sheets. The external walls are painted in white. The main hall has a pitched roof while the north wing has a sloping roof. Metal frame glass windows in the style of 1950-60s show on exposed elevations. The front and the southeast facing elevations are hidden by extensive temporary shades and thus cannot be observed.		
Interior: No access		
Existing Condition: Fair to poor; roof showing leaking problem.		
Past and Present Uses: in the past associated with miners; now turned into gardening business.		
Modifications: Small air-conditioner window opened. Temporary shelters added to southwest and southeast sides of the house.		
Photos:		

Back and side view of HB-25, showing northeast and northwest facing elevations, looking southwest.

Front view concealed by temporary structures, looking northeast.

Side view concealed by temporary structures, looking northwest.

Ref: HB-26	Title: Village house, No.42A Ma On Shan Tsuen	Category: Residential
Address: No.42A Ma On Shan Tsuen		Figure Ref: Figure 5
Orientation: Southwest facing		Grading: Other built heritage item
Surrounding Environment: Built on raised stone platform in the east side of Ma On Shan Tsuen Road; backed by cut slope		
Historical Appraisal: Ma On Shan Tsuen (Village) near the iron Mine became a mining settlement during the mine's operation period. Ma On Shan Tsuen was first established by the Hakka Wan clan during Qing period; it was also listed in the 1819 Xinan gazetteer (Ng 1983: Map 8). According to Leung (2002), prior to 1970s, the village was sub-divided into four areas based on its geographical settings, which were Ma On Shan Ma Tau Tsuen (later demolished for the construction of Hang On Estate), Pun Shan Tsuen (also called Mid-Level Village), Ma On Kiu Tsuen (also called Ma On Bridge Village) and Shan Teng Tsuen (later renamed as Ma On Shan Upper Village) respectively. No.42A Ma On Shan Tsuen is located at the lower part of Pun Shan Tsuen. The village was initially settled by workers of the iron mine. They mainly originated from Chiuchow. The miners later turned to practice agricultural as well as pig and chicken farming, which brought them more income than mining jobs. Over time, the area grew into a small Chiuchow community as they invited relatives and fellow countrymen to settle in the place. (MOSPLRA Website 2015) An oral interview with Mr. Lee living in No.42 nearby reveals that No.42A was also a house settled by a miner family. A cross-checking of old maps suggests that the building came into existence between 1969 to 1976 (Ordnance Survey 1969 and 1976). A slope study suggests the building was constructed before 1973 along with the cut slope behind it (CEDD 2014), which information might help narrow down the construction date to between 1969 to 1973.		
Associated Historical/ Cultural Events or Individual: None.		
Architectural Appraisal: A single storey flat-roof house with parapet wall on top and covered porch at front. The house is constructed on brick and concrete. The external wall in painted in white. Metal frame glass windows are seen on façade beside main entrance. The porch has been extended by corrugated sheets and supported by concrete pillars. No access to the northwest and northeast elevations.		
Interior: No access		
Existing Condition: Fair. Part of the building is covered by tarpaulin, suggesting leaking problem.		
Past and Present Uses: in the past associated with miners; now residential.		
Modifications: Porch extended; Roof covered by corrugated metal sheets.		
Photos:		

General view of HB-26, showing stone laid terrace foundation and front view of the house inside fence, looking northeast.

Front and side view of HB-26, showing southwest and southeast elevations, looking north.

Ref: G-01	Title: Grave	Category: Burial
Address: Mid-level of Ma On Shan		Figure Ref: Figure 5
Orientation: Northwest facing		Grading: Other built heritage item

Surrounding Environment: Surrounded by residential buildings.

Historical Appraisal:

This mid-level area was first populated by miners from hilltop village in the 1950s (馬鞍山民康促進會, 2012, 123). An oral interview to a local villager, Mr. Chan, age 80, confirmed some of his neighbors were former miners. After the miners left the mine, some started to farm pig and chicken; abandoned pigsties can still be seen in the neighbourhood. Later on, villagers invited their mainland relatives to live here. Gradually, the area formed a small community dominated by Ciu Zau (潮州) immigrants (馬鞍山民康促進會, 2012, 123).

G-01 shows the deceased passed in the 13th of Guangxu (光緒) year (1884) on the gravestone; the grave is maintained by family. It is possible that the grave had been relocated when miners moved here. This could not be confirmed.

Associated Historical/ Cultural Events or Individual:

Associated with miner's life and cultural tradition.

Inscriptions (from perspective of viewer):

First line: 光緒拾叁….

Second line: 清顯考啟?邱公□府君

Third line: 祀男宏 良捷開□ 孫 賢永秀□傑 萬□仝□

Architectural Appraisal:

G-01 is a grave paved by cement; the grave is with a semi-circular worshiping ground at front and a brick structure as furnace at one side. Gravestone seems original but inscriptions is weathered and hard to read.

Existing Condition: Good

Past and Present Uses: Burial

Modifications: Cement pavement and brick furnace are later modifications

Photos:

G-01 front view

G-01 looking north

G-01 tablet

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APPENDIX D
INTERNATIONAL EXAMPLES OF REUSE OF INDUSTRIAL HERITAGE

Three international examples of repurposing of industrial heritage spaces and buildings are presented.

1-Landscaftspark Duisburg-Nord, Germany

Creation of an industrial park with objective to preserve as much as possible and allow for educational visit to learn about metallurgical plant. The park repurposed buildings into recreational activities for schools and individuals and is a tourism attraction.

Repurposing of heritage structure into a climbing garden

Leisure garden, playground

Picnic, entertainment, outdoor food court

2-High line, New York

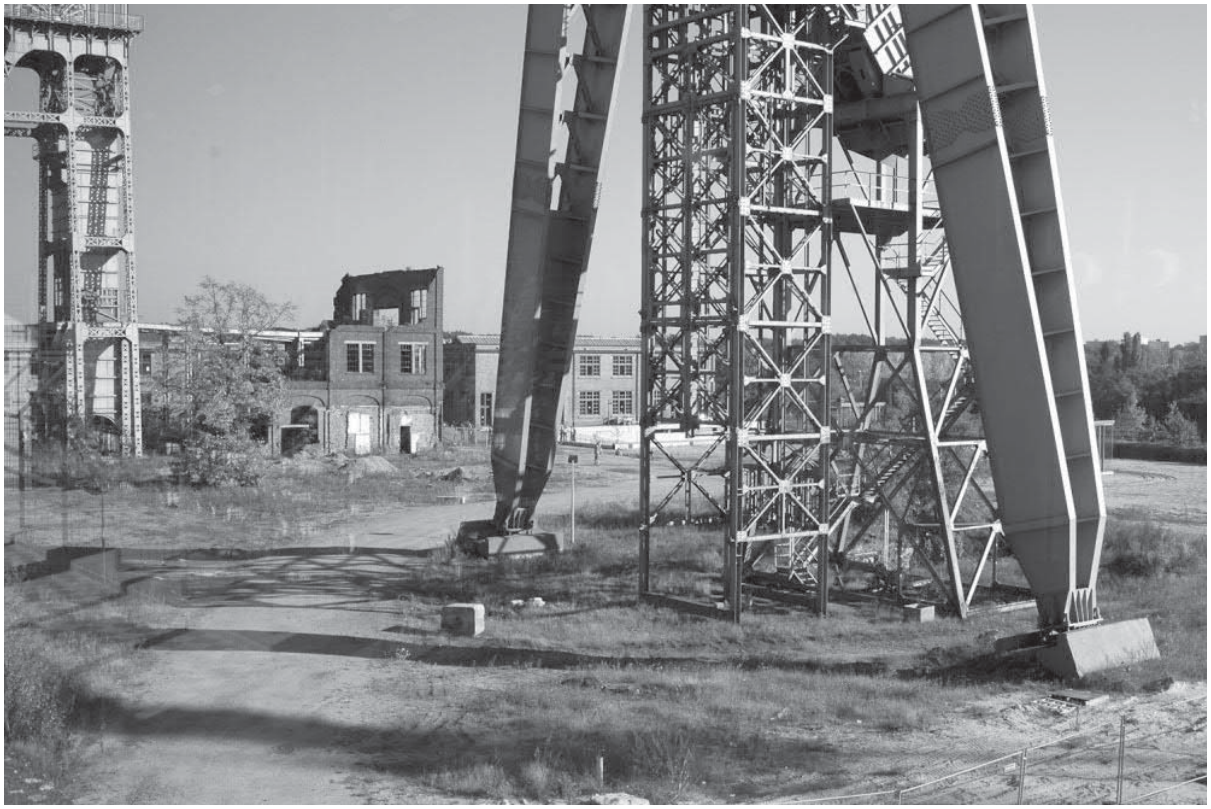
Another example is the High line in New York, which equally was turned into an industrial park. The former ***New York*** Central Railroad spur on the west side of Manhattan in ***New York*** City was converted to an elevated park and promenade. The park design includes landscaping using native species to evoke the wild and spontaneous growth that had occurred on the tracks after the rail line fell into disuse. The High Line contains several architectural features and a number of individual or group seating areas, as well as a sundeck. The High Line is also home to a rotating display of artworks by artists from around the globe.

The popularity of the High Line and the simultaneous rezoning of the neighbourhood along it spurred a building boom nearby.

Creating heritage connections and public open space

3-C-Mine in Genk, Belgium

Industrial museum and cultural centre based in an old coal-mining complex with underground tours. One of the larger buildings of the former coalmining complex provided multipurpose auditoria of different scales, meeting rooms and spaces for flexible cultural programming, and accommodation for technical support and administration. The site also houses a university campus in newly constructed building and commercial complex in repurposed industrial buildings.



Open space and open-air art museum, buildings in rear and to right include commercial use


Integrated (new) architecture designed to not detract from heritage