

Appendix 3: Traffic Impact Assessment Report

**Proposed Tai Po Kau Nature Academy
in Lots 1, 2, 4-8 in D.D. 33 and Adjoining Government Land
at Tai Po Kau, Tai Po**

Traffic Impact Assessment Report

Originating Organisation : LLA Consultancy Limited Unit 610, 6/F, Island Place Tower, 510 King's Road, North Point, Hong Kong	Prepared by: SKL	<i>SKL</i>	Date: 20 July 2022
	Approved by: SLN	<i>SLN</i>	Date: 20 July 2022
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1 INTRODUCTION

1.1 Background

- 1.1.1 The Applicant proposes to develop a nature academy in Lots 1, 2, 4-8 in D.D. 33 and adjoining government land at Tai Po Kau, Tai Po (hereafter, the proposed nature academy). The location of the application site is shown in **Figure 1.1**.
- 1.1.2 It is noted that part of the application site falls within “Green Belt” zone on the draft Tai Po Outline Zoning Plan (OZP) No. S/TP/29, as “Field Study/Education/Visitor Centre” and Holiday Camp” (tent camping ground) are Column 2 uses, a Section 16 planning application is therefore required.
- 1.1.3 LLA Consultancy Limited was commissioned to undertake the traffic impact assessment study to support the S16 planning application. This report presents the findings of the study.

1.2 Study Objectives

- 1.2.1 The objectives of this study can be summarised as follows:
- to review the existing traffic conditions in the vicinity of the proposed nature academy;
 - to estimate the traffic generation and attraction from the proposed nature academy;
 - to assess the future traffic situation of the surrounding network in the vicinity of the proposed nature academy;
 - to appraise the potential traffic impact of the proposed nature academy; and
 - to propose appropriate car parking and loading/unloading provisions as well as traffic layouts.

2 THE PROPOSED DEVELOPMENT

2.1 The Application Site

- 2.1.1 The application site has an area of 9,054 m². As shown in **Figure 1.1**, the application site is accessible via a local track, Tai Po Kau Forest Track – Kau Lead Section, which is a restricted road connecting to Tai Po Road – Tai Po Kau Section.
- 2.1.2 At present, the application site is covered by vegetation with few existing single-storey vacant structures.

2.2 The Proposed Development Content

- 2.2.1 The proposed nature academy will comprise of a visitor centre, an activity centre and a plant nursery with ancillary facilities by redevelopment of the three existing buildings. It will provide facilities for agricultural/field study and a camping ground for overnight educational activity.
- 2.2.2 2 nos. of private car parking spaces, 1 no. of LGV loading/unloading space will be provided to serve the operational needs of the proposed nature academy.

3 EXISTING TRAFFIC SITUATION

3.1 Existing Road Network

- 3.1.1 Tai Po Kau Forest Track – Kau Lead Section is a restricted road connecting to Tai Po Road – Tai Po Kau Section. The road runs uphill from Tai Po Road to the Tai Po Kau Special Area. A guard booth is located at the entrance of the road from Tai Po Road and all vehicles have to register before they enter the road. Hikers are frequently observed along the road. Due to the extremely small vehicular traffic volume, the operation of the road is very smooth.
- 3.1.2 Tai Po Road – Tai Po Kau Section is a single-two lane rural road connecting Sha Tin and Tai Po. The road is an alternative route of Tolo Highway and its function is to serve access for the low density developments along the road. So, the traffic condition is not busy.
- 3.1.3 In order to appraise the existing traffic conditions, vehicular and pedestrian surveys were carried out on the following time periods:
- (i) 07:00 to 19:00 on 29 May 2022 (Sunday)
 - (ii) 07:00 to 19:00 on 30 May 2022 (Monday)

3.2 Existing Traffic Conditions

- 3.2.1 Tai Po Kau Forest Track – Kau Lead Section is a local access road and is served as a hiking track. So, it is necessary to conduct pedestrian traffic surveys to quantify the pedestrian demand at the road on a typical weekday and weekend. The results are summarized and presented in **Table 3.1**.

Table 3.1 Survey Results at Tai Po Kau Forest Track

Time	Pedestrian Flows (ped/hr)				Vehicular Flows (veh/hr)		
	Uphill	Downhill	Total	Flow Rate ⁽¹⁾ (ped/min/m) [LOS ⁽²⁾]	Uphill	Downhill	Total
Weekday							
0700 – 0800	26	15	41	0.3 [A]	1	4	5
0800 – 0900	41	22	63	0.4 [A]	3	3	6
0900 – 1000	73	28	101	0.7 [A]	6	2	8
1000 – 1100	74	24	98	0.7 [A]	2	3	5
1100 – 1200	39	37	76	0.5 [A]	3	2	5
1200 – 1300	16	31	47	0.3 [A]	1	5	6
1300 – 1400	31	41	72	0.5 [A]	4	1	5
1400 – 1500	20	45	65	0.4 [A]	1	1	2
1500 – 1600	18	26	44	0.3 [A]	1	2	3
1600 – 1700	28	48	76	0.5 [A]	2	2	4
1700 – 1800	15	64	79	0.5 [A]	5	2	7
1800 – 1900	1	8	9	0.1 [A]	0	1	1
Weekend							
0700 – 0800	39	17	56	0.4 [A]	1	2	3
0800 – 0900	59	33	92	0.6 [A]	4	2	6
0900 – 1000	173	38	211	1.4 [A]	4	2	6
1000 – 1100	134	32	166	1.1 [A]	1	5	6
1100 – 1200	101	99	200	1.3 [A]	2	6	8
1200 – 1300	57	141	198	1.3 [A]	3	1	4
1300 – 1400	78	95	173	1.2 [A]	1	0	1
1400 – 1500	63	71	134	0.9 [A]	6	5	11
1500 – 1600	58	79	137	0.9 [A]	4	5	9
1600 – 1700	55	107	162	1.1 [A]	1	3	4
1700 – 1800	28	97	125	0.8 [A]	6	2	8
1800 – 1900	13	50	63	0.4 [A]	6	0	6

- Notes: (1) The actual width of the existing track is 3.5m, assuming 0.5m clearance zone on each side, the effective width would be 2.5m. Flow rate = peak hour pedestrian flow / 60 minutes / effective width.
- (2) For LOS "C" or above, flow rate should be less than 33 ped/m/min.

3.3 Existing Public Transport Facilities

3.3.1 Some franchised bus and minibus routes are operating in the vicinity of the application site along Tai Po Road – Tai Po Kau Section. The details of these routings are presented in **Table 3.2** and **Figure 3.1**.

Table 3.2 Existing Transport Facilities

Mode	Route No.	Origin-Destination	Frequency (min)
Bus	72	Tai Po (Tai Wo) – Cheung Sha Wan	15 – 30
	72A	Tai Po Industrial Estate – Tai Wai Station	20 – 35
	73A	Fanling (Wah Ming) – Yu Chui Court	20 – 35
	74A	Tai Po (Tai Wo) – Kai Yip	60
GMB	28K	Tai Po Market Station – Sha Tin (Pak Hong Ting Street) ⁽¹⁾	6 – 9

Note: (1) Circular Route.

4 FUTURE TRAFFIC SITUATION

4.1 Design Year

4.1.1 It is anticipated if approved by TPB, the proposed nature academy can be operated in 2024. Therefore, a design year of 2027, which is the third year of the operation, will be adopted in this study.

4.2 Future Traffic Growth

Annual Traffic Census (ATC) – Historical Data

4.2.1 In order to establish the traffic growth rate in the vicinity of the application site, reference was made to the 2016 to 2020 Annual Traffic Census Reports published by Transport Department, reporting on the annual average daily traffic (AADT) flows at the counting stations in the territory. The details of the counting stations in the study area and the corresponding counts are shown in **Table 4.1**.

Table 4.1 Annual Traffic Census Data

Stn. No.	Road Section			AADT ⁽¹⁾					Avg. Growth %
	Road	From	To	2016	2017	2018	2019	2020	
5420	Tai Po Road - Yuen Chau Tsai	Kwong Wang Street	Nam Wan Road	23,310	33980 (-0.7%)	35060 (3.2%)	36630 (4.5%)	29900 (-18.4%)	-3.3%
6210	Tai Po Road - Ma Liu Shui	Entrance to Chung Chi College, CUHK	Yuen Chau Tsai INT	8,240	8900 (8%)	7650 (-14%)	7640 (-0.1%)	7970 (4.3%)	-0.8%
Total				42,460	42,880	42,710	44,270	37,870	-2.8%

Note: (1) Figures in bracket indicated the % increase between two years.

4.2.2 **Table 4.1** showed that the recorded average annual growth rate of the concerned counting station is -2.8% between years 2016 to 2020.

Territorial Population and Employment Data Matrix (TPEDM – Projection Data)

4.2.3 Reference was also made to the 2019 – based TPEDM data published by the Planning Department. The population and employment data of year 2019 to 2031 are summarized in **Table 4.2**.

Table 4.2 Population and Employment Data in Tai Po District

Year	2019	2026	2031
Population	250,050	285,850	263,800
Employment	86,750	83,700	78,550
Total	336,800	369,550	342,350
Average Annual Growth %		+1.3% (2019 to 2026)	-1.5% (2026 to 2031)

4.2.4 As shown in **Table 4.2**, the average annual growth rate for the population and the employment total between 2019–2026 and 2026–2031 is +1.3% and -1.5% respectively.

4.2.5 Based on the ATC historical data in **Table 4.1** and the TPEDM projection data in **Table 4.2**, the larger growth rate of +1.3% (in TPEDM between 2019 to 2026) will be adopted for the subsequent traffic forecasting.

4.3 Pedestrian Traffic Generation of the Proposed Nature Academy

4.3.1 The proposed nature academy will comprise of a visitor centre, an activity centre and a plant nursery with ancillary facilities. As discussed with the operator, the proposed nature academy is planned to accommodate a maximum of 50 visitors per hour during both weekdays and weekends for joining workshops or activities. Besides, as the proposed nature academy located along the route to hiking track, it is expected some hikers will walk around to enjoy the environment. The projected daily visitor number is not more than 400.

4.3.2 Overnight program will be provided in March, April, September, October and November of the year during weekends and the number of participants and tutors will be not more than 18.

4.3.3 In view of the limited capacity, the proposed nature academy will be operating on a pre-book arrangement, all participants will be informed of the house rules to use public transport to arrive. They will then walk uphill from Tai Po Road to arrive the proposed nature academy. The walking distance is about 600m to the entrance of the visitor centre and the walking time will be about 12 minutes only.

4.3.4 Based on the above operation pattern, the visitor arrival numbers during different time periods are summarised in **Table 4.3**.

Table 4.3 Visitors Arrival/Leave Pattern

Time Period		Number of Visitors Arriving [ped/hr]	Number of Visitors Leaving [ped/hr]
Weekday	09:00 – 18:00	50	50
Weekend	09:00 – 18:00	50	50
Overnight Program (Weekend Only)	Before Program Start	18	0
	After Program End	0	18

4.3.5 The proposed nature academy is estimated to generate a maximum 2-way pedestrian flows of 100 ped/hr and 120 ped/hr during weekday and weekend peak hour, respectively. The increase in pedestrian flows on weekday and weekend was assigned onto the existing track for assessment.

4.4 Reference and Design Pedestrian Flows

4.4.1 The 2027 Reference Flows, i.e. the pedestrian flows in the local road without the proposed nature academy, were estimated based on the following equation.

$$2027 \text{ Reference Flows} = 2022 \text{ Existing Flows} \times (1 + 1.3\%)^5$$

4.4.2 The 2027 Design Flows, i.e. the pedestrian flows in the local road network with the proposed nature academy, were estimated based on the following equation:

$$2027 \text{ Design Flows} = 2027 \text{ Reference Flows} + \text{additional pedestrians Induced by the proposed nature academy}$$

4.4.3 The level of services (LOS) of the existing track based on the 2027 reference and design flows were assessed and presented in **Table 4.4**.

Table 4.4 Future Level of Service (LOS) at Tai Po Kau Forest Track

Time	2027 Reference Scenario		Additional Pedestrian Flows (ped/hr)	2027 Design Scenario	
	Pedestrian Flows (ped/hr)	Flow Rate ⁽¹⁾ (ped/min/m) [LOS ⁽²⁾]		Pedestrian Flows (ped/hr)	Flow Rate ⁽¹⁾ (ped/min/m) [LOS ⁽²⁾]
Weekday					
0700 – 0800	44	0.3 [A]	0	44	0.3 [A]
0800 – 0900	41	0.3 [A]	50	91	0.6 [A]
0900 – 1000	73	0.5 [A]	100	173	1.2 [A]
1000 – 1100	74	0.5 [A]	100	174	1.2 [A]
1100 – 1200	39	0.3 [A]	100	139	0.9 [A]
1200 – 1300	16	0.1 [A]	100	116	0.8 [A]
1300 – 1400	31	0.2 [A]	100	131	0.9 [A]
1400 – 1500	20	0.1 [A]	100	120	0.8 [A]
1500 – 1600	18	0.1 [A]	100	118	0.8 [A]
1600 – 1700	28	0.2 [A]	100	128	0.9 [A]
1700 – 1800	15	0.1 [A]	100	115	0.8 [A]
1800 – 1900	1	0.0 [A]	50	51	0.3 [A]
Weekend					
0700 – 0800	60	0.4 [A]	0	60	0.4 [A]
0800 – 0900	99	0.7 [A]	68	167	1.1 [A]
0900 – 1000	226	1.5 [A]	100	326	2.2 [A]
1000 – 1100	178	1.2 [A]	100	278	1.9 [A]
1100 – 1200	214	1.4 [A]	100	314	2.1 [A]
1200 – 1300	212	1.4 [A]	100	312	2.1 [A]
1300 – 1400	185	1.2 [A]	100	285	1.9 [A]
1400 – 1500	143	1.0 [A]	100	243	1.6 [A]
1500 – 1600	147	1.0 [A]	100	247	1.6 [A]
1600 – 1700	173	1.2 [A]	100	273	1.8 [A]
1700 – 1800	134	0.9 [A]	118	252	1.7 [A]
1800 – 1900	68	0.5 [A]	50	118	0.8 [A]

- Notes: (1) The actual width of the existing track is 3.5m, assuming 0.5m clearance zone on each side, the effective width would be 2.5m. Flow rate = peak hour pedestrian flow / 60 minutes / effective width.
(2) For LOS "C" or above, flow rate should be less than 33 ped/m/min.

4.4.4 **Table 4.4** shows that the future condition of the track will be satisfactory after accommodating the pedestrians generated and attracted by the proposed nature academy with LOS "A".

4.5 Construction Traffic Impact Assessment

- 4.5.1 During the entire construction period, it is anticipated that the delivery of material will generate the largest amount of construction traffic, as compared with the other construction activities because the proposed nature academy will be developed by vitalization of the existing buildings.
- 4.5.2 The maximum number of construction vehicles arriving/departing from the Site would be not more than 5 vehicles during construction peak hour. Having considered the existing width and gradient of the Tai Po Kau Forest Track – Kau Lead Section, only vehicles less than 7m will be used during the construction stage. Such volume of construction traffic would unlikely be causing any adverse impact to the local road network.

5 TRANSPORT FACILITIES PROVISIONS

5.1 Vehicular Access Arrangement

- 5.1.1 The proposed nature academy is accessible via Tai Po Kau Forest Track – Kau Lead Section. At present, there are two vehicular accesses, located at 500 m and 600m away from Tai Po Road. It is proposed to keep the two vehicular accesses for the proposed nature academy use.
- 5.1.2 The vehicular access near the visitor centre (about 600m away from Tai Po Road) would be the main access which staffs and visitors with disabilities can park their vehicles there. While the vehicular access near the plant nursery (about 500m away from Tai Po Road) would be the secondary access which all loading/unloading activities, such as delivery of necessities etc. are anticipated to be carried out here.

5.2 Internal Transport Facilities Provision

- 5.2.1 In general, the car parking provisions for the proposed nature academy would be provided in accordance with the latest Hong Kong Planning Standards and Guidelines (HKPSG). However, there is no specific guideline set in the HKPSG for the nature academy use. **Table 5.1** summarized the proposed car parking provisions which is therefore based on the proposed operational needs.

Table 5.1 Proposed Car Parking Provision

Type of transport facilities	No. of Proposed Provision	Dimensions
Car Parking Space	1	5.0m(L) x 2.5m(W)
Disable Car Parking Space	1	5.0m(L) x 3.5m(W)
Light Goods Vehicle Loading/Unloading Bay	1	7.0m(L) x 3.5m(W)

- 5.2.2 It is proposed to provide a total of 2 nos. of private car parking spaces and 1 no. of LGV loading/unloading bay. The layout of the proposed internal transport facilities is enclosed in **Figure 5.1**. The 2 nos. of private car parking spaces are reserved for staffs and disable uses only.

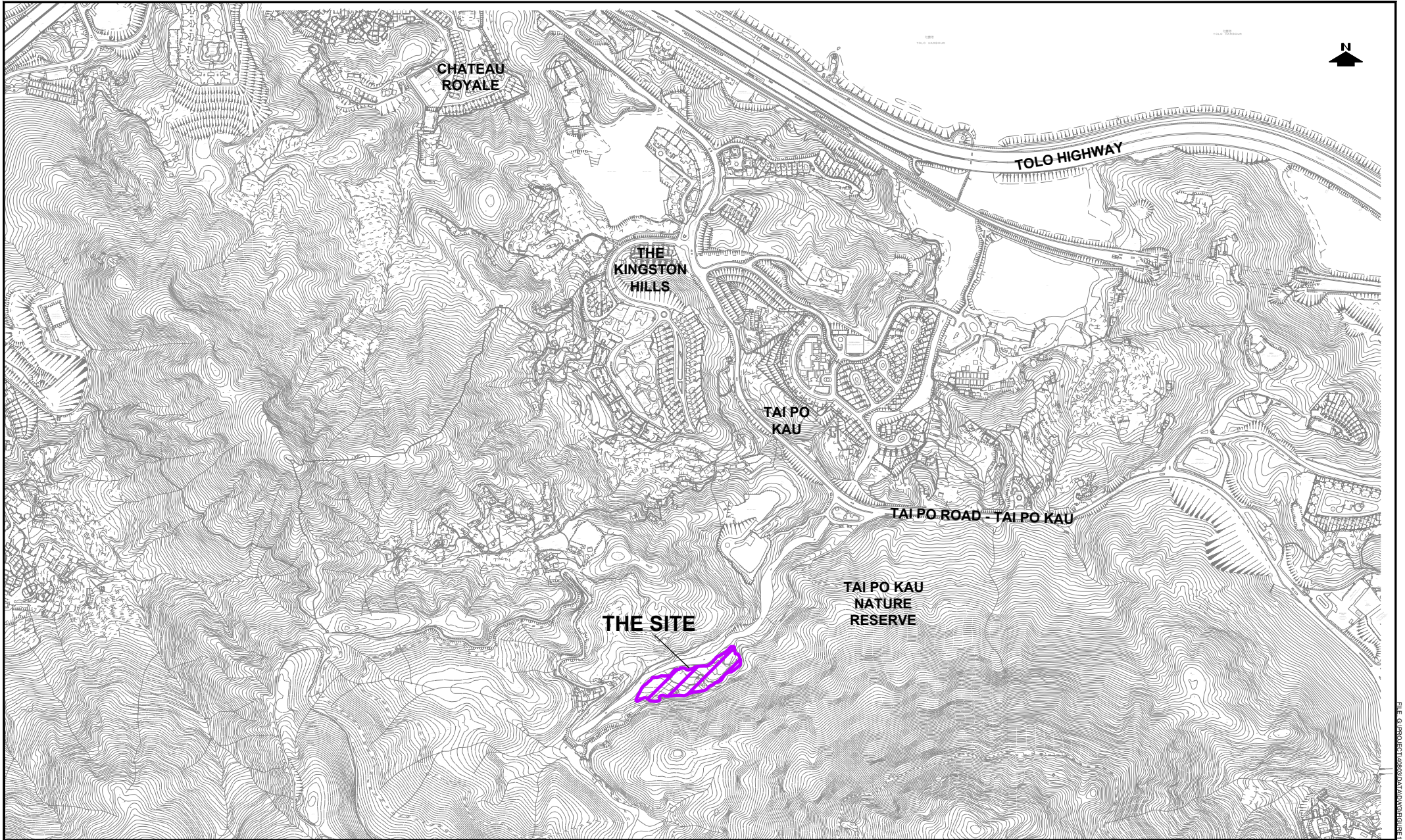
6 SUMMARY AND CONCLUSION

6.1 Summary

- 6.1.1 The Applicant proposes to develop a nature academy in Lots 1, 2, 4-8 in D.D. 33 and adjoining government land at Tai Po Kau, Tai Po. It is noted that part of the application site falls within "Green Belt" zone on the draft Tai Po Outline Zoning Plan (OZP) No. S/TP/29, as "Field Study/Education/Visitor Centre" and Holiday Camp" (tent camping ground) are Column 2 uses, a Section 16 planning application is therefore required.
- 6.1.2 The proposed nature academy will comprise of a visitor centre, an activity centre and a plant nursery with ancillary facilities by redevelopment of the three existing buildings. It will provide facilities for agricultural/field study and a camping ground for overnight educational activity.
- 6.1.3 Tai Po Kau Forest Track – Kau Lead Section is a local access road and is served as a hiking track. Pedestrian traffic survey was conducted to quantify the pedestrian demand at the road on a typical weekday and weekend. Based on the existing pedestrian flows, the LOSs are "A" and are satisfactorily.
- 6.1.4 The proposed nature academy is planned to accommodate a maximum of 50 visitors per hour during both weekdays and weekends for joining workshops or activities. Overnight program will be provided in March, April, September, October and November of the year during weekends and the number of participants and tutors will be not more than 18. In view of the limited capacity, the proposed nature academy will be operating on a pre-book arrangement, all participants will be informed of the house rules to use public transport to arrive. They will then walk uphill from Tai Po Road to arrive the proposed nature academy. The walking distance is about 600m to the entrance of the visitor centre and the walking time will be about 12 minutes only.
- 6.1.5 Based on the future pedestrian forecast, the conditions of the track will be satisfactory after accommodating the pedestrians generated and attracted by the proposed nature academy with LOSs "A".
- 6.1.6 The proposed nature academy is accessible via Tai Po Kau Forest Track – Kau Lead Section. At present, there are two vehicular accesses, located at 500m and 600m away from Tai Po Road. It is proposed to keep the two vehicular accesses for the proposed nature academy.
- 6.1.7 The vehicular access near the visitor centre (about 600m away from Tai Po Road) would be the main access which staffs and visitors with disabilities can park their vehicles there. While the vehicular access near the plant nursery (about 500m away from Tai Po Road) would be the secondary access which all loading/unloading activities, such as delivery of necessities etc. are anticipated to be carried out here.
- 6.1.8 The proposed nature academy will provide a total of 2 nos. of private car parking spaces and 1 no. of LGV loading/unloading bay.

6.2 Conclusion

- 6.2.1 Based on the findings of the traffic impact assessment, it can be concluded that the proposed nature academy will not induce significant adverse traffic impact.



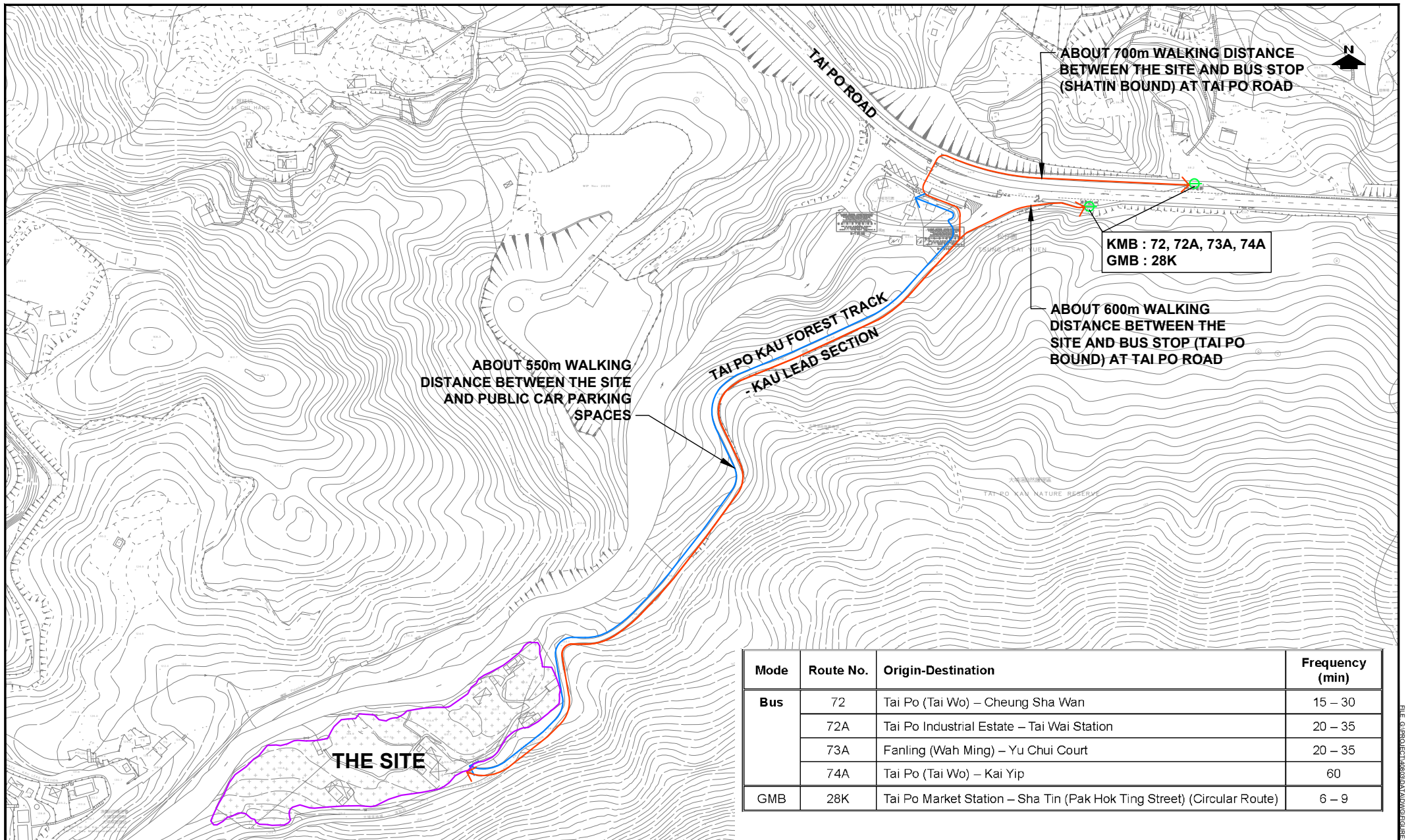
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DESIGNED	SLN	DATE JUL 2022
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CHECKED	SLN	

PROJECT TITLE **PROPOSED TAI PO KAU NATURE ACADEMY IN LOTS 1, 2, 4-8 IN D.D. 33 AND ADJOINING GOVERNMENT LAND AT TAI PO KAU, TAI PO**

DRAWING TITLE	LOCATION PLAN	
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DRAWING NO.	FIGURE 1.1	REV.	B
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Mode	Route No.	Origin-Destination	Frequency (min)
Bus	72	Tai Po (Tai Wo) – Cheung Sha Wan	15 – 30
	72A	Tai Po Industrial Estate – Tai Wai Station	20 – 35
	73A	Fanling (Wah Ming) – Yu Chui Court	20 – 35
	74A	Tai Po (Tai Wo) – Kai Yip	60
GMB	28K	Tai Po Market Station – Sha Tin (Pak Hok Ting Street) (Circular Route)	6 – 9

PROJECT NO.	40803	
DESIGNED	SLN	DATE JUL 2022
DRAWN	CLL	SCALE 1:3000
CHECKED	SLN	






PROJECT TITLE: PROPOSED TAI PO KAU NATURE ACADEMY IN LOTS 1, 2, 4-8 IN D.D. 33 AND ADJOINING GOVERNMENT LAND AT TAI PO KAU, TAI PO

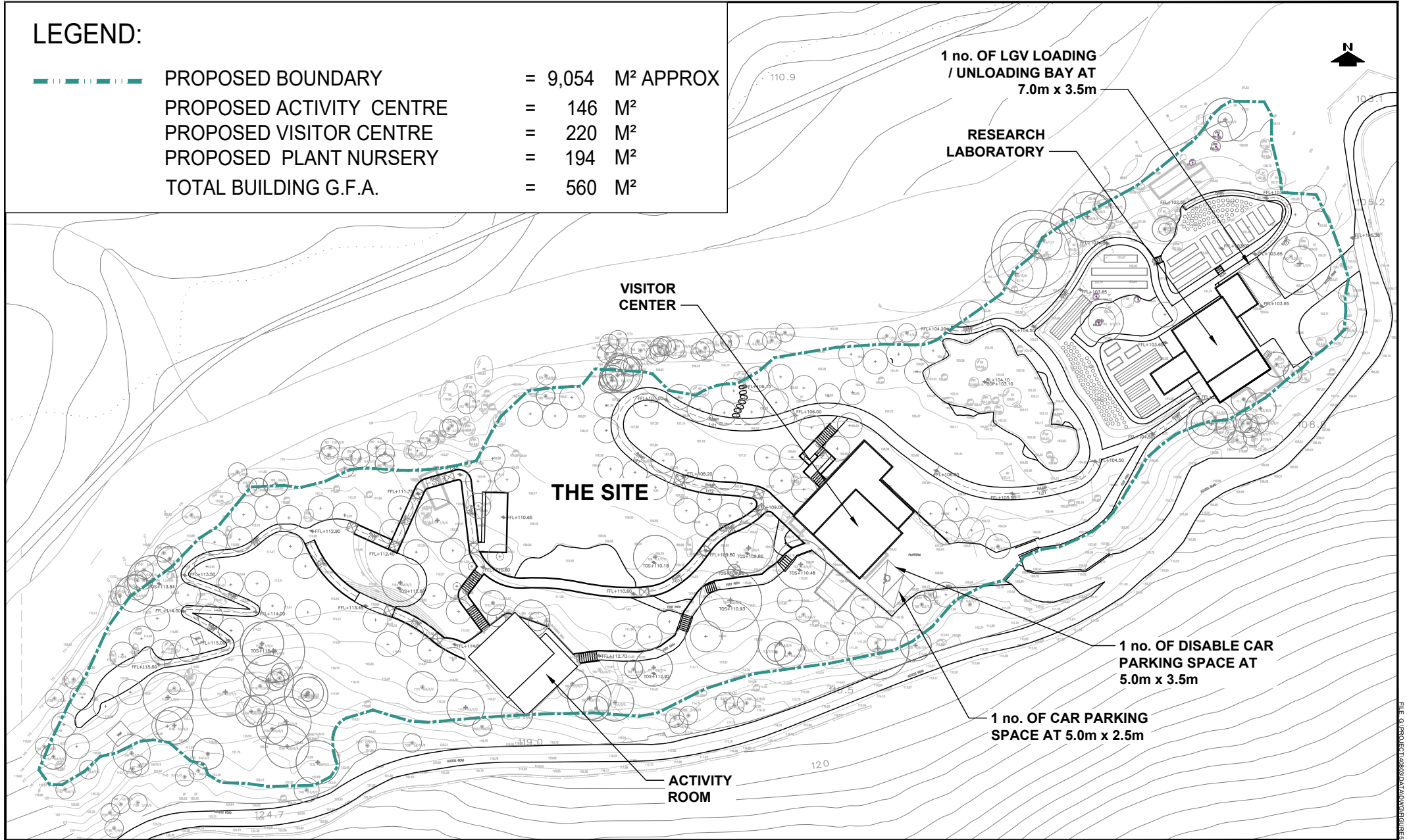
DRAWING NO.	FIGURE 3.1	REV.	B
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PUBLIC TRANSPORT SERVICES IN THE VICINITY AND THE ANTICIPATED PEDESTRIAN ROUTING

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LEGEND:

	PROPOSED BOUNDARY	= 9,054 M ² APPROX
	PROPOSED ACTIVITY CENTRE	= 146 M ²
	PROPOSED VISITOR CENTRE	= 220 M ²
	PROPOSED PLANT NURSERY	= 194 M ²
	TOTAL BUILDING G.F.A.	= 560 M ²



PROJECT NO.	40803	
DESIGNED	SLN	DATE JUL 2022
DRAWN	CLL	SCALE 1:800
CHECKED	SLN	

PROJECT TITLE **PROPOSED TAI PO KAU NATURE ACADEMY IN LOTS 1, 2, 4-8 IN D.D. 33 AND ADJOINING GOVERNMENT LAND AT TAI PO KAU, TAI PO**

DRAWING TITLE	PROPOSED LAYOUT PLAN	
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DRAWING NO.	FIGURE 5.1	REV.	B
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