Proposed Residential Development at
105 Robinson Road, Mid-Level, Hong Kong

Traffic Review Report

January 2024

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Traffic & Transportation Consultants

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1. INTRODUCTION

1.1 Background

1.1.1 The subject site is currently zoned as R(C)5 zone in the outline zoning plan and is permitted for residential use with maximum building height of 161m above Principal Datum (mPD).

1.1.2 Sino Noble Enterprises Limited (the owner of the lot) intends to redevelop the current residential site. A general building plan (GBP) with 217 flats was approved by Buildings Department in 17 March 2023.

1.1.3 In October 2023, an amended scheme for minor height relaxation (from 161mPD to 215mPD), with the same number of 217 flats, is proposed by the Owner. A S16 application is therefore required to support the proposed relaxation.

1.1.4 Ho Wang SPB Limited is commissioned by the Owner to review the associated traffic impact due to height relaxation and internal parking arrangements for this S16 planning application.

2. THE PROPOSED DEVELOPMENT

2.1 Site Location

2.1.1 The Application Site is located at Inland Lot No. 942 on No. 105 Robinson Road, Mid-Level, Hong Kong as shown in **Figure 2.1**.

2.1.2 The subject site is connected by an access road branching off from Robinson Road. It is bounded by Robinson Road to its north, Panorama Gardens to its east, Woodland Gardens to its south and Imperial Court to its west.

2.2 Development Schedule

2.2.1 The site area of the proposed development remains the same as 2,557.620m^2.

2.2.2 The building design will be modified from 2 towers to 1 tower, with a minor height increase from 161m to 215m as compared with the recent approved GBP in 17 March 2023.

2.2.3 The comparison of the approved and proposed development schemes is summarized in **Table 2.1**.

Table 2.1 Comparison of Development Parameters between Previously Approved Scheme and Proposed Scheme

		Previously Approved Scheme (A) in September 2023	**Proposed Scheme (B)**	**Changes (B)-(A)**
Development		Residential	Residential	No change
Site Area (m^2)		2,557.620	2,557.620	No change
Plot Ratio		5	5	No Change
Building Height (mPD)		161	215	+54
No. of Block		2	1	-1
Gross Floor Area (m^2)		12,787.8	12,787.8	No Change
No. of Flat	GFA 40-70m^2	203	189	-14
	GFA 70-100m^2	14	27	+13
	GFA 130-160m^2	0	1	+1
	Total	**217**	**217**	**No Change**

2.2.4 Despite the building design is changed from 2 towers to 1 tower, the total number of flats remains the same.

3. INTERNAL TRANSPORT FACILITIES

3.1 Parking and Loading / Unloading Provisions

3.1.1 There is no specific parking requirement for this site as stipulated in the Land Lease. The proposed parking and loading / unloading provisions based on the latest HKPSG's and Lease requirement are summarised in **Table 3.1**.

Table 3.1 Parking and Loading / Unloading Provisions for the Proposed Residential Scheme under Lease Conditions and HKPSG

Lease Requirement	HKPSG Requirement	Proposed Provision
No specific requirement on parking and loading / unloading provisions	Private Car Parking Spaces (1) Flat size (40 – 70m^2): 189 units = 189/7 x 1.2 x 0.75 x 1 to 189/4 x 1.2 x 0.75 x 1 = 25 to 43 Flat size (70 – 100m^2): 27 units = 27/7 x 2.4 x 0.75 x 1 to 27/4 x 2.4 x 0.75 x 1 = 7 to 12 Flat size (130 – 160m^2): 1 unit = 1/7 x 5.5 x 0.75 x 1 to 1/4 x 5.5 x 0.75 x 1 = 1 to 1 Total = 33 to 56 Visitor Parking Spaces 5 visitor parking spaces per block	 56 5 (including 1 accessible parking space)
	Motorcycle Parking Spaces 1 space per 100-150 flats = 2	2
	Loading / Unloading Minimum 1 bay per housing block	1 (LGV) (2)

Notes:

(1) Parking Requirement = 1 parking space per 4-7 flats x Demand Adjustment Ratio (R1) x Accessibility Adjustment Ratio (R2) x Development Intensity Adjustment Ratio (R3), where
R1 = 1.2 for flat size between 40-70m^2; 2.4 for flat size between 70-100m^2; 5.5 for flat size between 130-160m^2
R2 = 0.75 for site within a 500m-radius of rail station (The 500m-radius catchment area of a rail station is drawn from the centre of the station as shown in Figure 2.1)
R3 = 1 for Domestic Plot Ratio between 2-5

(2) Due to the width constraint of the existing access road which can only accommodate the manoeuvrability of vehicles below 9m in length, a LGV loading / unloading bay instead of HGV loading / unloading bay is provided.

The comparison of the internal transport facilities between the previous scheme and the current proposed scheme is summarized in **Table 3.2**.

Table 3.2 Comparison of Internal Parking and Loading / Unloading Provisions between Previously Approved Scheme and Proposed Scheme

Internal Transport Facilities	Previously Approved Scheme	Proposed Scheme
Private Car Parking Spaces	13 + 1 (accessible)	56
Visitor Parking Spaces	0	4 + 1 (accessible)
Motorcycle Parking Spaces	2	2
LGV Loading / Unloading Spaces	2	1

3.1.2 With the site constraint (i.e. bulk excavation limit) that limits the extension of basement levels, the owner attempts to adopt the maximum requirement under HKPSG the car parking numbers at the ground and basement floors with 56 private car parking spaces, 5 visitor car parking spaces (including 1 accessible car parking space) and 2 motorcycle parking spaces.

Ground Floor (G/F)

3.1.3 1 LGV loading / unloading bay [with dimension of 7m (length) x 3.5m (wide) x 3.6m (height)], 4 visitor parking spaces and 1 accessible visitor parking space are proposed at G/F. Two designated waiting spaces are also provided for vehicles using the car lift to access the basement floors. The G/F layout plan is shown in **Figure 3.1**.

Lower Ground 1 Floor (LG1/F)

3.1.4 38 private car parking spaces and 2 motorcycle parking spaces are proposed at LG1/F. The LG1/F layout plan is shown in **Figure 3.2**.

Lower Ground 2 Floor (LG2/F)

3.1.5 18 private car parking spaces are proposed at LG2/F. The LG2/F layout plan is shown in **Figure 3.3**.

E&M Floor

3.1.6 The provision of additional parking spaces at E&M Floor is considered inefficient due to the bulk excavation limit. The E&M Floor layout plan is shown in **Figure 3.4**.

3.2 Internal Traffic Circulation

3.2.1 A car lift is proposed for vehicles from LG2 to G/F.

3.3 Car Lift Capacity Assessment

Performance Factors of Car Lift Operation

3.3.1 To estimate the operation cycle of the car lift, a survey on a similar carpark was conducted.

3.3.2 Vertical speed is a critical factor in the measurement of car lift performance. It mainly depends on the power of the drive units and the operation frequency. The survey result shows that the vertical speed is generally about 0.5m/sec.

3.3.3 The loading / unloading activities, controlled by the operation speed of lift doors, driver skill and human reaction time, determine the operation cycle. Based on the survey results, the operation speed of lift doors is 3 seconds per open/close, the in / out manoeuvring time of a vehicle is normally within 3 seconds, and the driver's reaction time is 3 seconds in general. In addition, an extra 20 seconds for motorists to enter the lift is taken into this assessment for conservative purpose.

3.3.4 According to the building layout, the maximum vertical distance from LG2/F to G/F is 5.8m.

3.3.5 **Table 3.3** illustrates the maximum cycle time of the car lift operation between G/F and LG2/F.

Table 3.3 Maximum Cycle Time of Proposed Car Lift

Location	Activity	Calculation	Time (Sec.)
G/F	Door Open Car Out Car In Door Close	- 3 + 3 3 + 20 + 5 -	3 6 28 3
From G/F to LG2/F Carpark	Vertical Travelling Time	6m @ 0.5m/sec	12
Carpark at LG2/F	Door Open Car Out Door Close	- 3 + 3 -	3 6 3
From LG2/F Carpark to LG1/F Carpark	Vertical Travelling Time	3m @ 0.5m/sec	6
Carpark at LG1/F	Door Open Car In Door Close	- 3 + 20 + 5 -	3 28 3
From LG1/F Carpark to G/F	Vertical Travelling Time	3m @ 0.5m/sec	6
		Total	**110**

3.3.6 The maximum cycle time of the car lift will be approximately 110 seconds for traveling between G/F and LG2/F.

Car Lift Assessment

3.3.7 The car lift assessment for vehicles queuing to leave the car park is calculated as follows:

Number of Car Lift $N = 2$

Average Arrival Rate Per Hour (λ) $\lambda = 18$ veh/hr (18 veh/hr worst AM peak generation *Details refer to Table 4.2)

Average Service Time of Car Lift 110 seconds

Average Service Rate (μ) $\mu = 3{,}600 / 110 = 33$ veh/hr

$$p = \frac{\text{Average Arrival Rate Per Hour } (\lambda)}{\text{Average Service Rate } (\mu)} = 0.6$$

with the probability of having no vehicles in the system is:

$$P_0 = \frac{1}{\sum_{i=0}^{N-1} \frac{\rho^i}{i!} + \frac{\rho^N}{N!\,(1-\frac{\rho}{N})}}$$

and the probability of having n vehicles in the system is:

$$P_n = \frac{\rho^n P_0}{n!} \text{ (for } n \leq N\text{)}$$

$$P_n = \frac{\rho^n P_0}{N^{n-N} N!} \text{ (for } n > N\text{))}$$

3.3.8 The car lift queuing analysis is calculated with reference to Principles of Highway Engineering and Traffic Analysis by Fred L. Mannering and Walter P. Kilareski. The results of the car lift queuing analysis are summarised in **Table 3.4**.

Table 3.4 Vehicle Queuing Analysis for the Proposed Car Lift

Number of Vehicles Waiting for the Car Lift (n)	Probability of Number of Vehicles Waiting p(n)	Accumulative Probability of More Than n Vehicles Generation p(≤n)
(a) n = 0	0.569	0.569
(b) n = 1	0.313	0.882
(c) n = 2	0.086	0.968
(d) n ≥ 3	1 – (a) ~ (c) = 0.032	N.A.

3.3.9 From the results of vehicle queuing analysis, the probability of 1 vehicle queuing for the car lift at G/F while another 2 vehicle is using the car lift is less than 4% which represents almost no vehicle will be expected to queue for the car lift at G/F.

3.3.10 It is therefore concluded that the proposed 2 car lifts with 2 waiting spaces are adequate to meeting the proposed development traffic demand and will not cause circulation problem at G/F.

3.3.11 The owner will propose and implement suitable traffic management plan and contingency plan for scheduled maintenance and emergency maintenance of car lift to ensure smooth traffic circulation within the development.

3.4 Swept Path Analysis

3.4.1 Computerized swept path analysis is conducted for the design vehicles manoeuvring at critical parking spaces and the loading / unloading bay as well as entering and leaving the car lift.

3.4.2 Adequate manoeuvre space is provided for the design vehicles as demonstrated in the swept path drawings **Appendix A (Figures SP1 – SP6**).

4. TRAFFIC IMPACT ASSESSMENT

4.1 Traffic Assessment

4.1.1 The development traffic generation are estimated based on the trip rate in TPDM. The adopted trip rates summarised in **Table 4.2**.

Table 4.1 Trip Generation Rates of Residential Development

Private Housing (1)	**AM Peak (pcu/hr/flat)**		**PM Peak (pcu/hr/flat)**	
	Generation	**Attraction**	**Generation**	**Attraction**
Average flat size: 60m^2	0.0718	0.0425	0.0286	0.0370
Average flat size: 80m^2	0.1058	0.0605	0.0426	0.0590
Average flat size: 140m^2	0.2604	0.1372	0.1275	0.1722

Note:
(1) Trip generation rates are adopted from Annex C of TPDM Volume 1 Chapter 3.

4.1.2 The subject site is always permitted to residential development with plot ratio of 5 and height limit of 161mPD.

4.1.3 The comparison of traffic generated by the previously approved scheme in 17 March 2023 and the proposed scheme is summarised in **Table 4.2**.

Table 4.2 Comparison of Traffic Generation between Previously Approved Scheme and Proposed Scheme

Private Housing	**AM Peak (pcu/hr)(1)**		**PM Peak (pcu/hr)(1)**	
	Generation	**Attraction**	**Generation**	**Attraction**
Previously Approved Scheme				
Average flat size: 60m^2 : 203 units	15	9	6	8
Average flat size: 80m^2 : 14 units	2	1	1	1
Total (pcu/hr) (A)	**17**	**10**	**7**	**9**
Proposed Scheme				
Average flat size: 43.3m^2 : 189 units	14	9	6	7
Average flat size: 77.6m^2 : 27 units	3	2	2	2
Average flat size: 141m^2 : 1 unit	1	1	1	1
Total (pcu/hr) (B)	**18**	**12**	**9**	**10**
Net Difference in Traffic (pcu/hr) (B)-(A)	**+1**	**+2**	**+2**	**+1**

Note:
(1) Total vehicular trips (pcu/hr) are rounded up to the nearest pcu.

4.1.4 The above table shows that the traffic generation of the proposed development scheme is insignificant (i.e. +3 pcu/hr in AM peak and +3 pcu/hr in PM peak). Hence, the traffic impact on the local road network is considered negligible and minimal.

4.1.5 Before the redevelopment of the subject site, there were 54 number of car parking spaces provided in Jade Garden. In comparison, the traffic generation by the proposed development site with proposed provision of 56 numbers of car parking spaces (refer to **Table 3.1**) shall be similar.

5. SUMMARY AND CONCLUSION

5.1 Summary

5.1.1 The subject site is currently zoned as R(C)5 zone in the outline zoning plan and is permitted for residential use with maximum building height of 161m above Principal Datum (mPD).

5.1.2 Further to the approval of GBP with 217 flats submitted in 17 March 2023, an amended scheme for minor height relaxation from 161mPD to 215mPD, with the same number of 217 flats, is proposed in October 2023. Therefore, a S16 application is required to support the proposed relaxation.

5.1.3 A total of 61 car parking spaces (56 private cars + 4 visitor cars + 1 accessible visitor car), 2 motorcycle parking spaces and 1 LGV loading / unloading bay are provided for this proposed scheme.

5.1.4 The provision of 2 car lifts and 2 waiting spaces at G/F is justified by the queuing analysis.

5.1.5 The additional traffic generation by the proposed development scheme is insignificant (i.e. 3 pcu/hr in AM peak and 3 pcu/hr in PM peak). Hence, the traffic impact on the local road networks is considered negligible.

5.2 Conclusion

5.2.1 Based on the findings, the traffic impact onto the local road network by the proposed height relaxation from 161m to 215m with 217 residential flat units is minimal and insignificant.

5.2.2 The proposed residential development is therefore supported from a traffic engineering point of view.

Figures

SAI YING PUN MTR STATION

300m

105 ROBINSON ROAD

BONHAM ROAD

PARK ROAD

HOSPITAL ROAD

LYTTELTON ROAD

BREEZY PATH

CAINE ROAD

SEYMOUR ROAD

ROBINSON ROAD

CASTLE ROAD

CONDUIT ROAD

KOTEWALL ROAD

OAKLANDS AVE.

PO SHAN ROAD

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Project Title: PROPOSED HEIGHT RELAXATION FOR RESIDENTIAL DEVELOPMENT AT 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 2500	Date: DEC 2023	Figure No.: 2.1
Figure Title: SITE LOCATION PLAN	Project No.: J1494	CAD Ref.: J1494/TN6/F21A/2023-12-07	Rev.: A

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GROUND FLOOR PLAN

(1 NOS LOADING/ UNLOADING SPACE,
SIZE: 3.5mW X 7mL X 3.6mH)
(5 NOS VISITOR CAR PARKING SPACE)

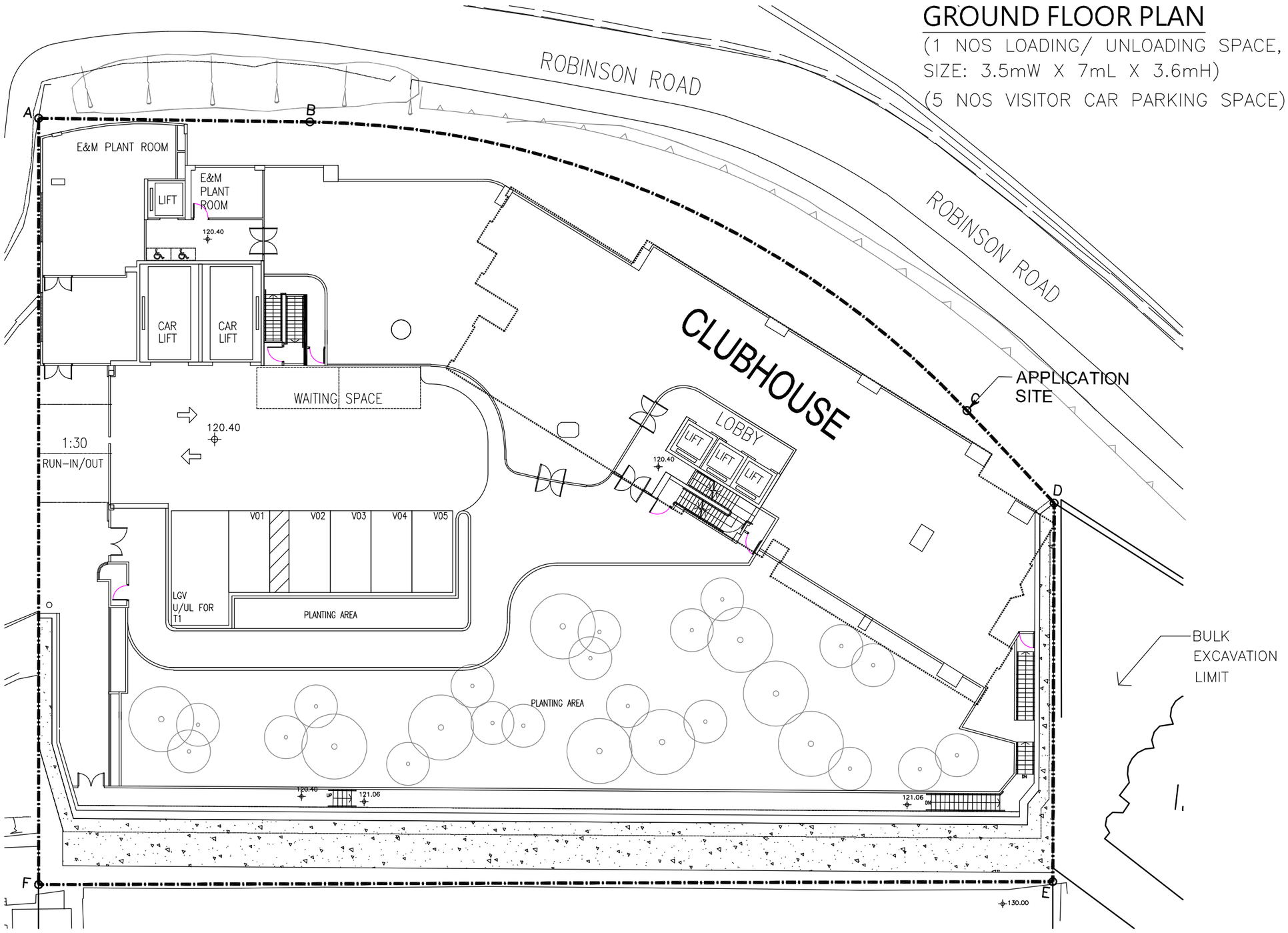

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	Figure Title: GROUND FLOOR LAYOUT PLAN	Project No.: J1494	CAD Ref.: J1494/TN6/F31A/2024-01-18	Rev.: A

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LG1 FLOOR PLAN

(38 NOS CAR PARKING SPACE)
(2 NOS MOTORCYCLE PARKING SPACE)

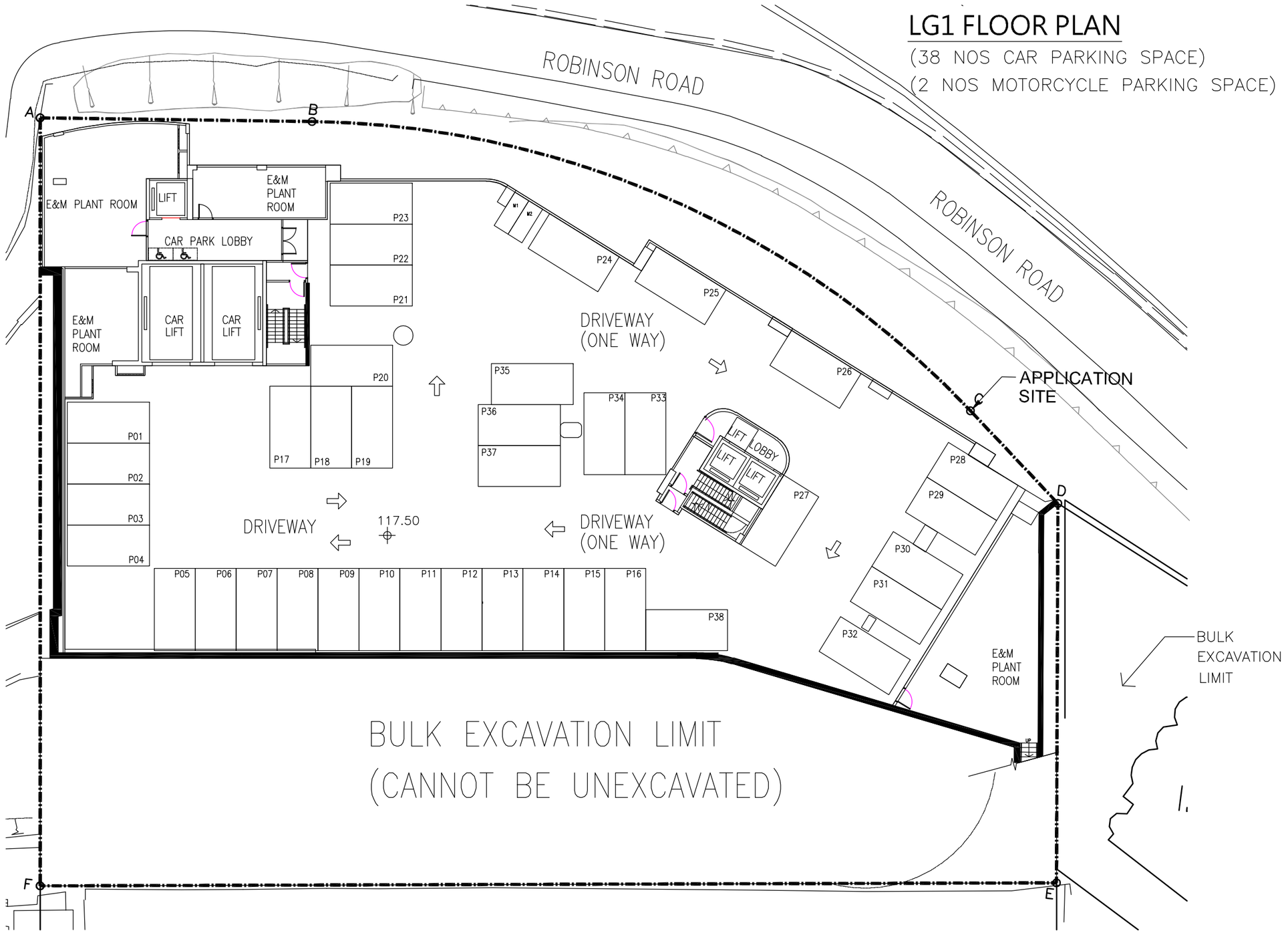

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	Figure Title: LG1/F LAYOUT PLAN	Project No.: J1494	CAD Ref.: J1494/TN6/F32A/2023-12-07	Rev.: A

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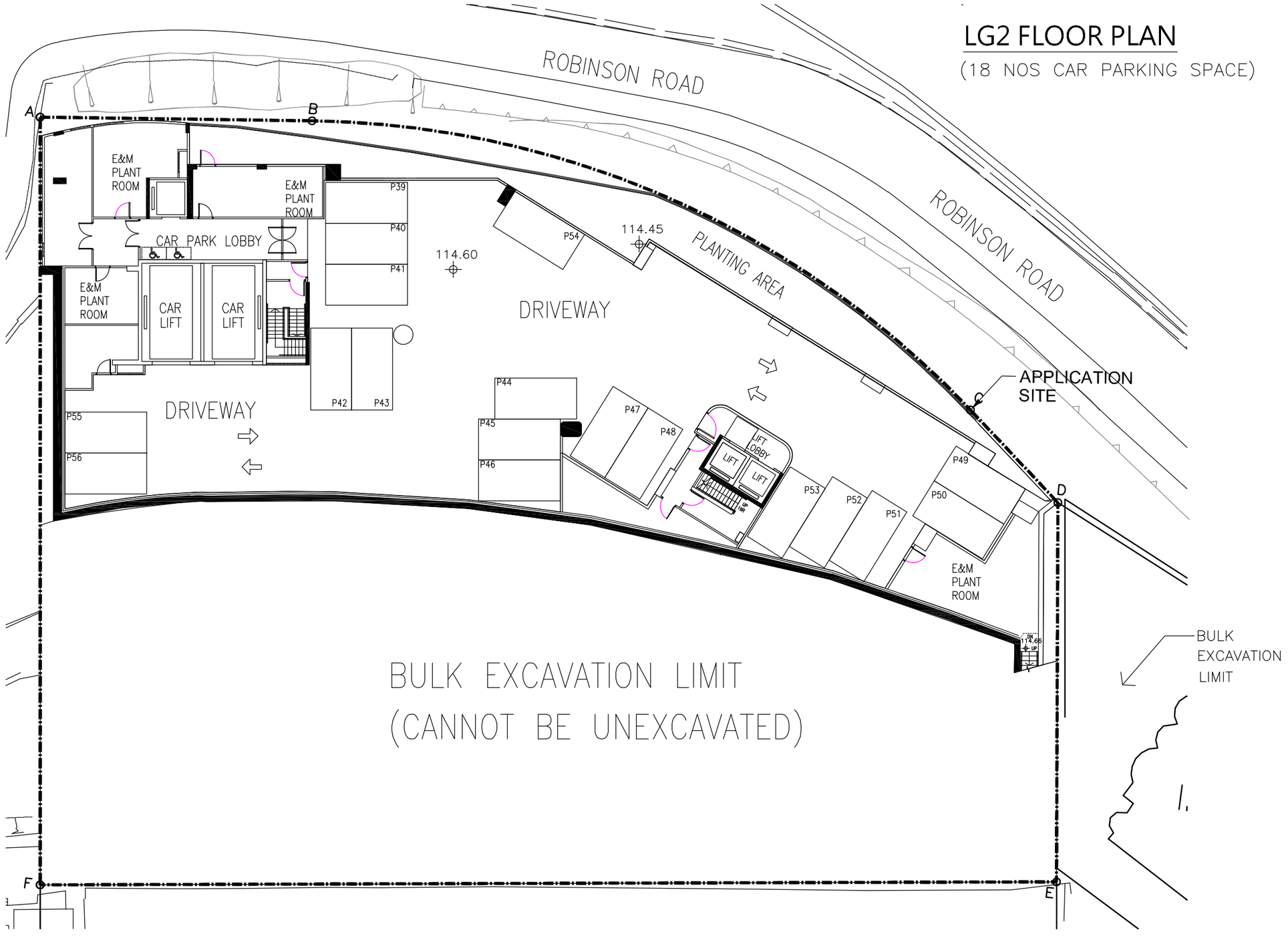
LG2 FLOOR PLAN

(18 NOS CAR PARKING SPACE)



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E&M FLOOR PLAN

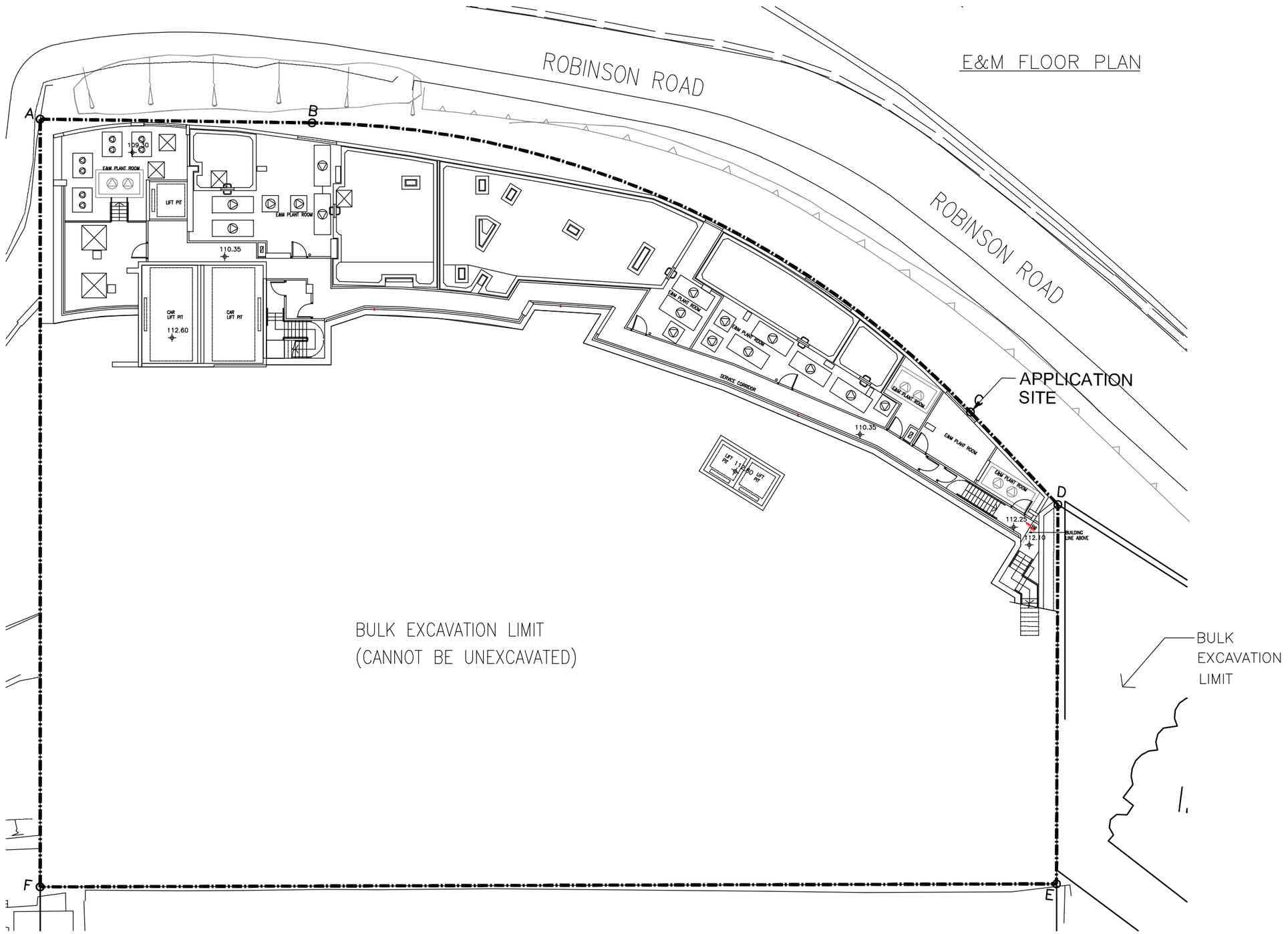

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	Figure Title: E&M FLOOR PLAN	Project No.: J1494	CAD Ref.: J1494/TN6/F34/2023-12-07	Rev.: -

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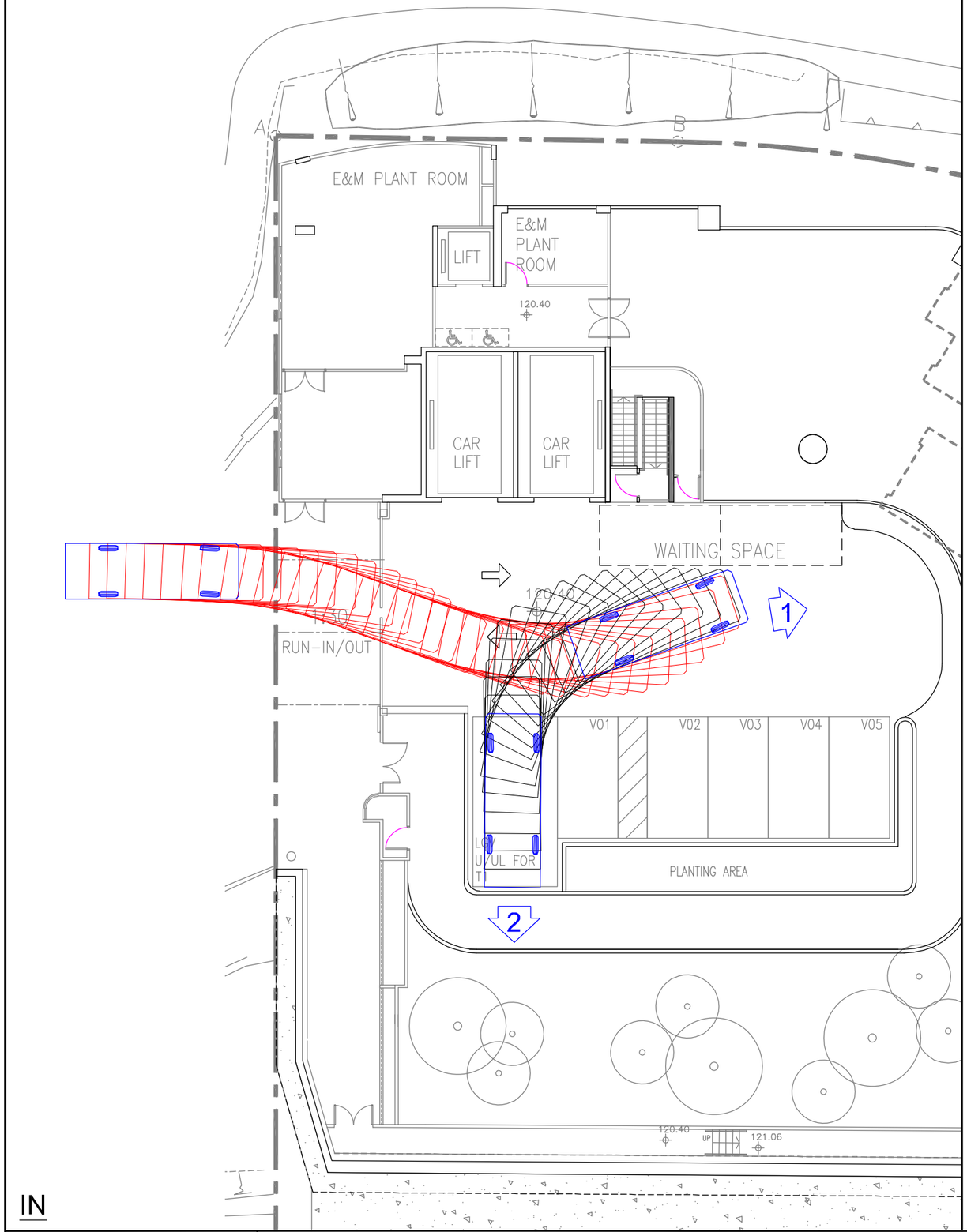
Appendix A
Swept Path Analysis



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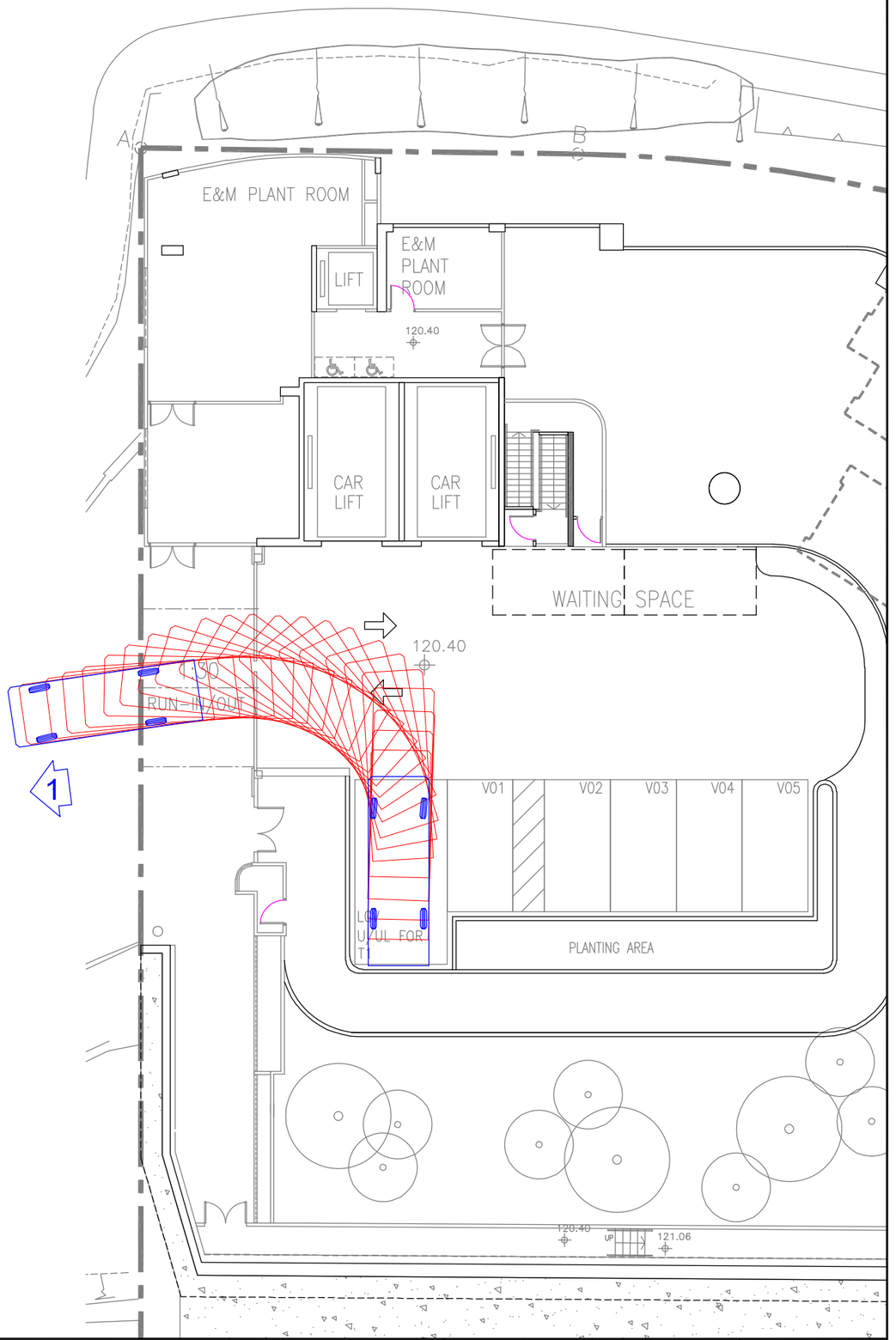

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP1
Figure Title: SWEPT PATH ANALYSIS OF 7m VEHICLE MANOEUVRE INTO AND OUT OF THE L/UL BAY AT GF	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: -

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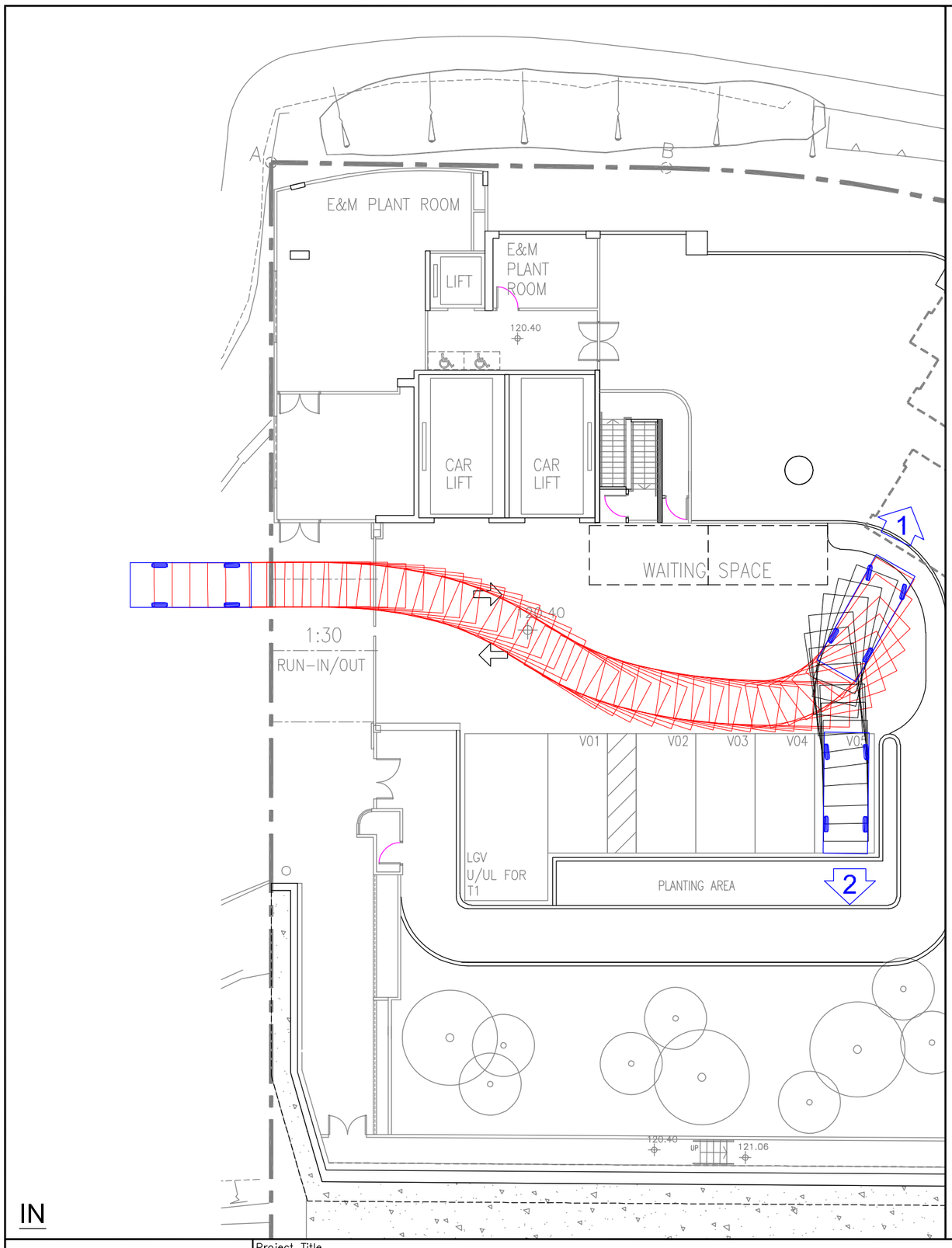

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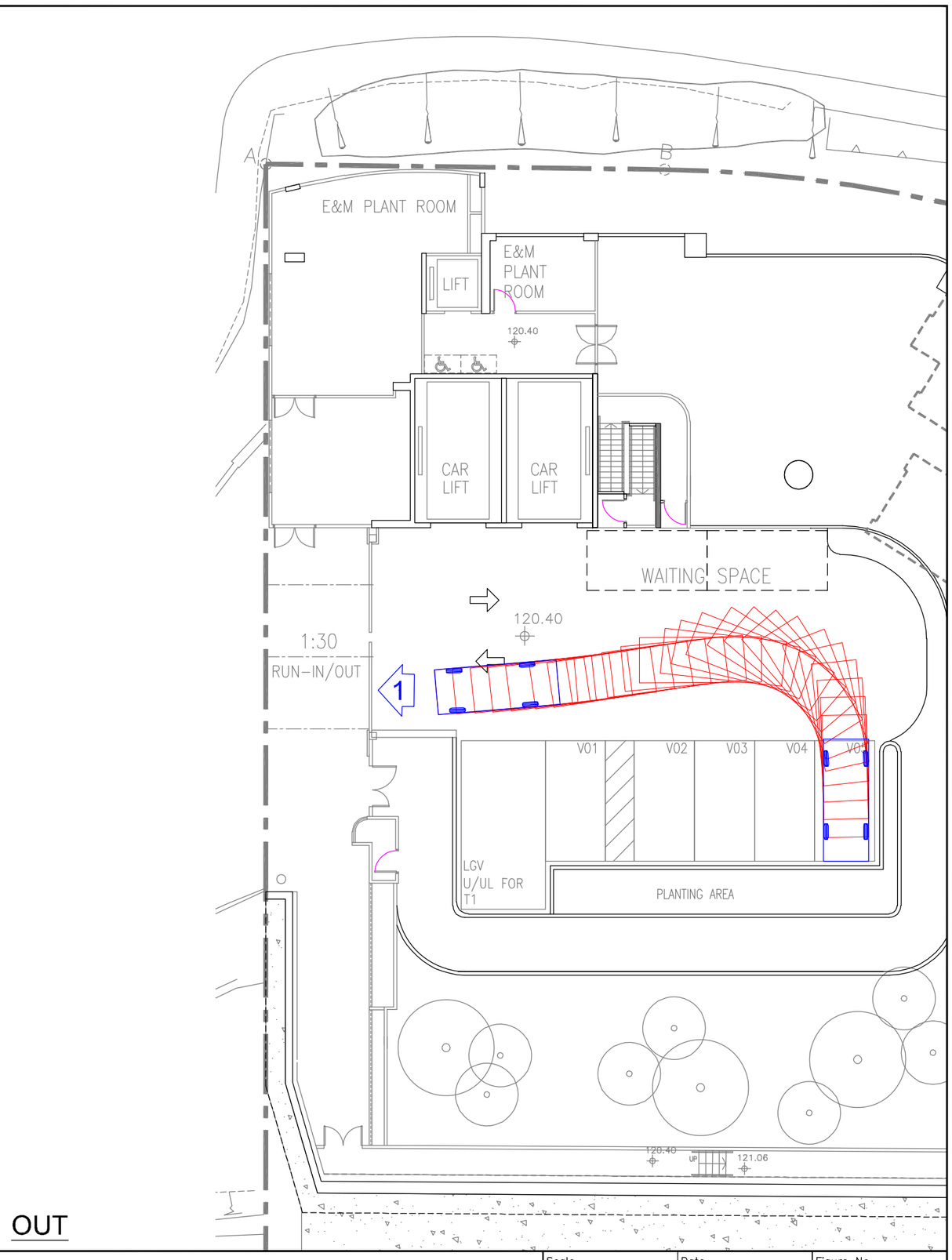

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP2
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO AND OUT OF THE PARKING SPACE AT GF	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: –

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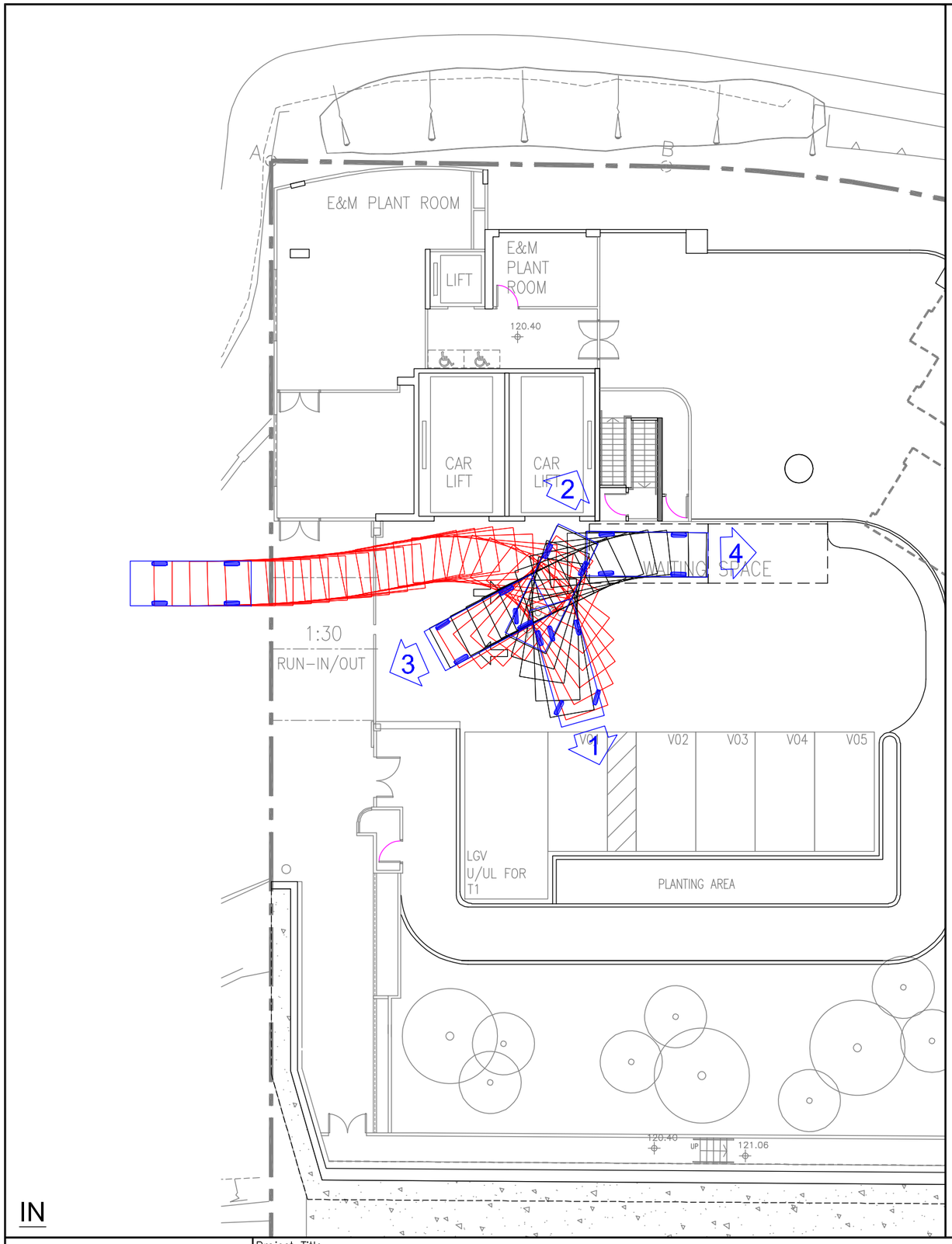

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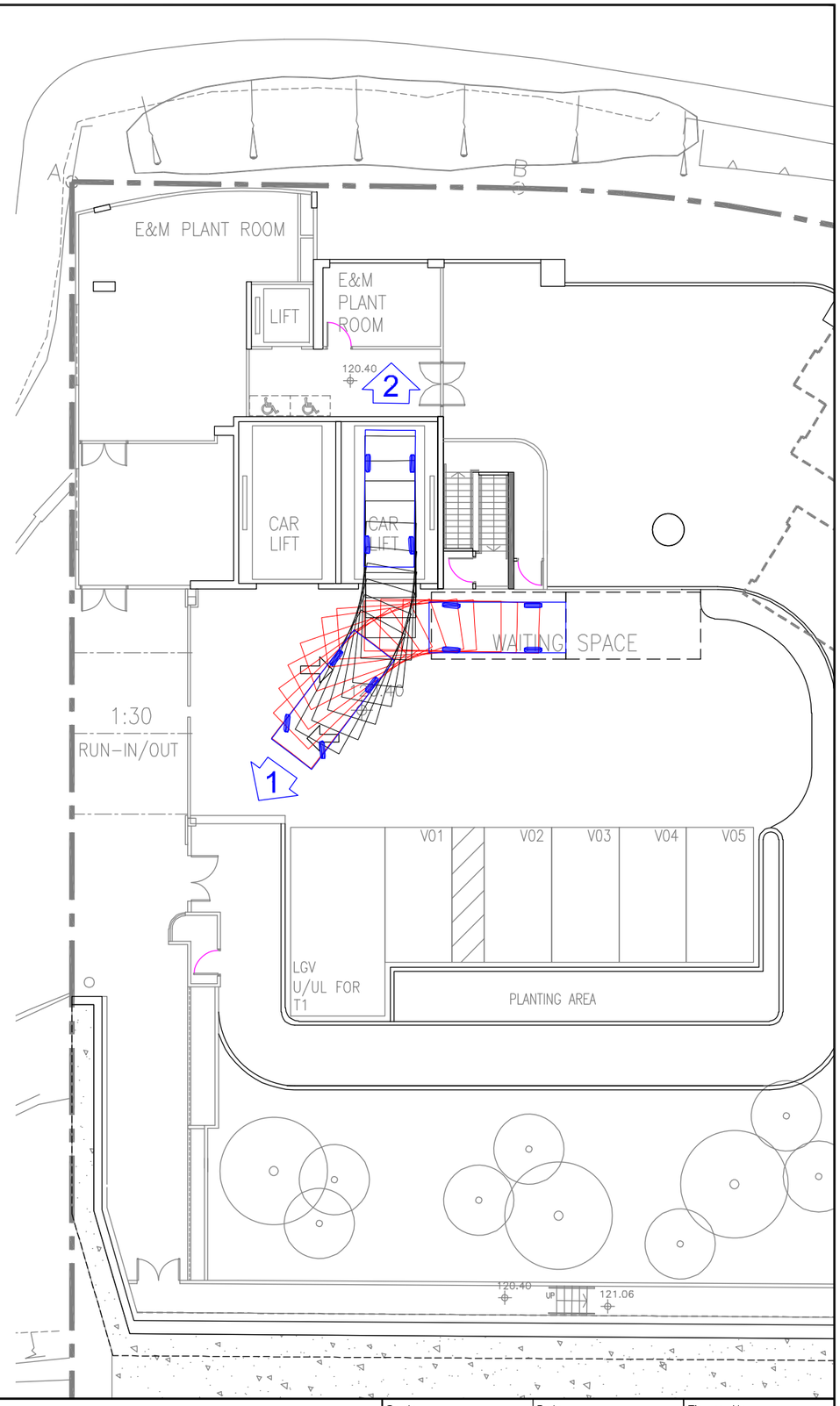

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP3
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO THE CAR LIFT AT GF	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: –

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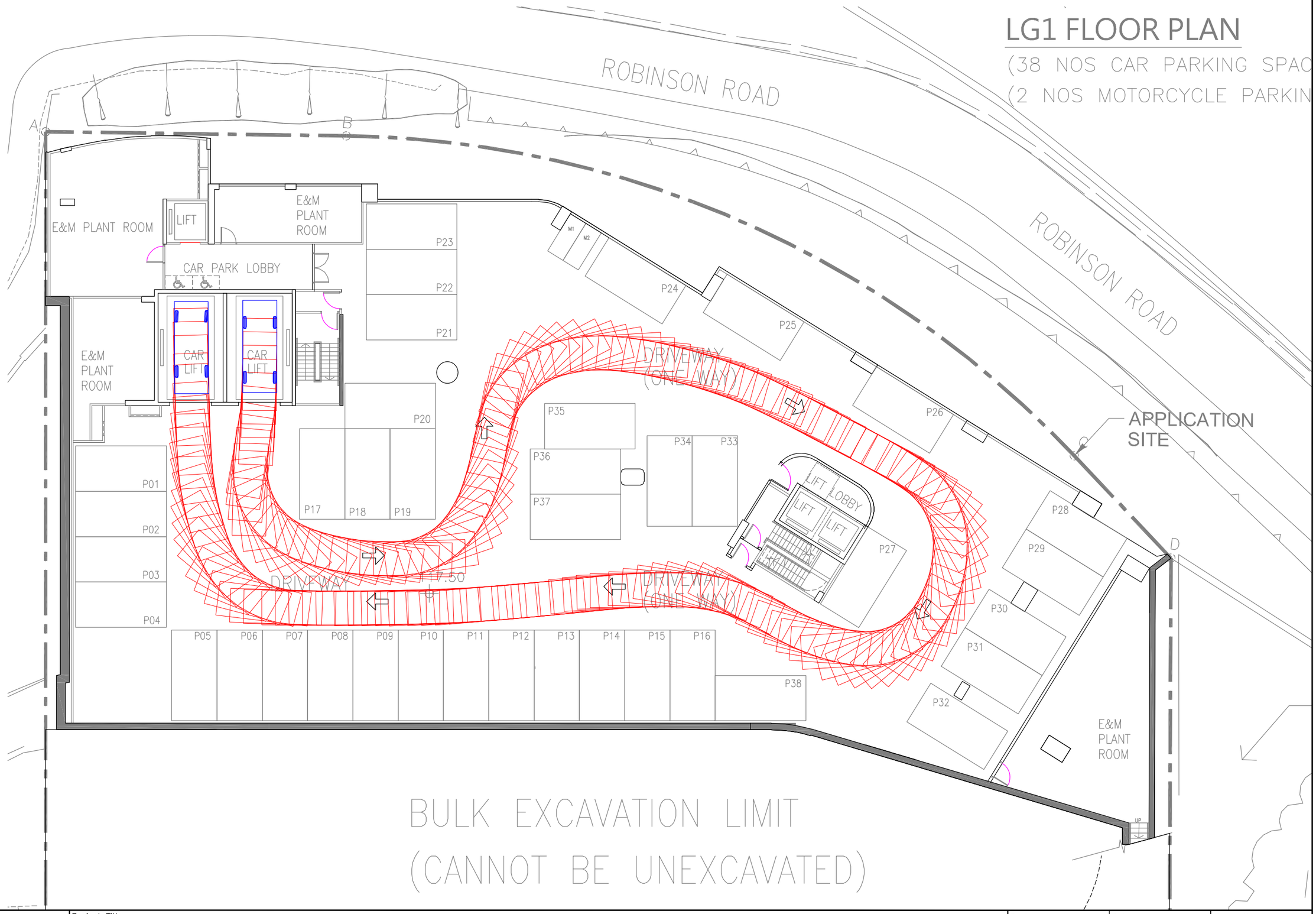
LG1 FLOOR PLAN

(38 NOS CAR PARKING SPAC
(2 NOS MOTORCYCLE PARKIN



HWSPB 何黃 Traffic & Transportation Consultants Ho Wang SPB Limited	Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP4
	Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO THE CAR LIFT AT LG1 FLOOR	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: -

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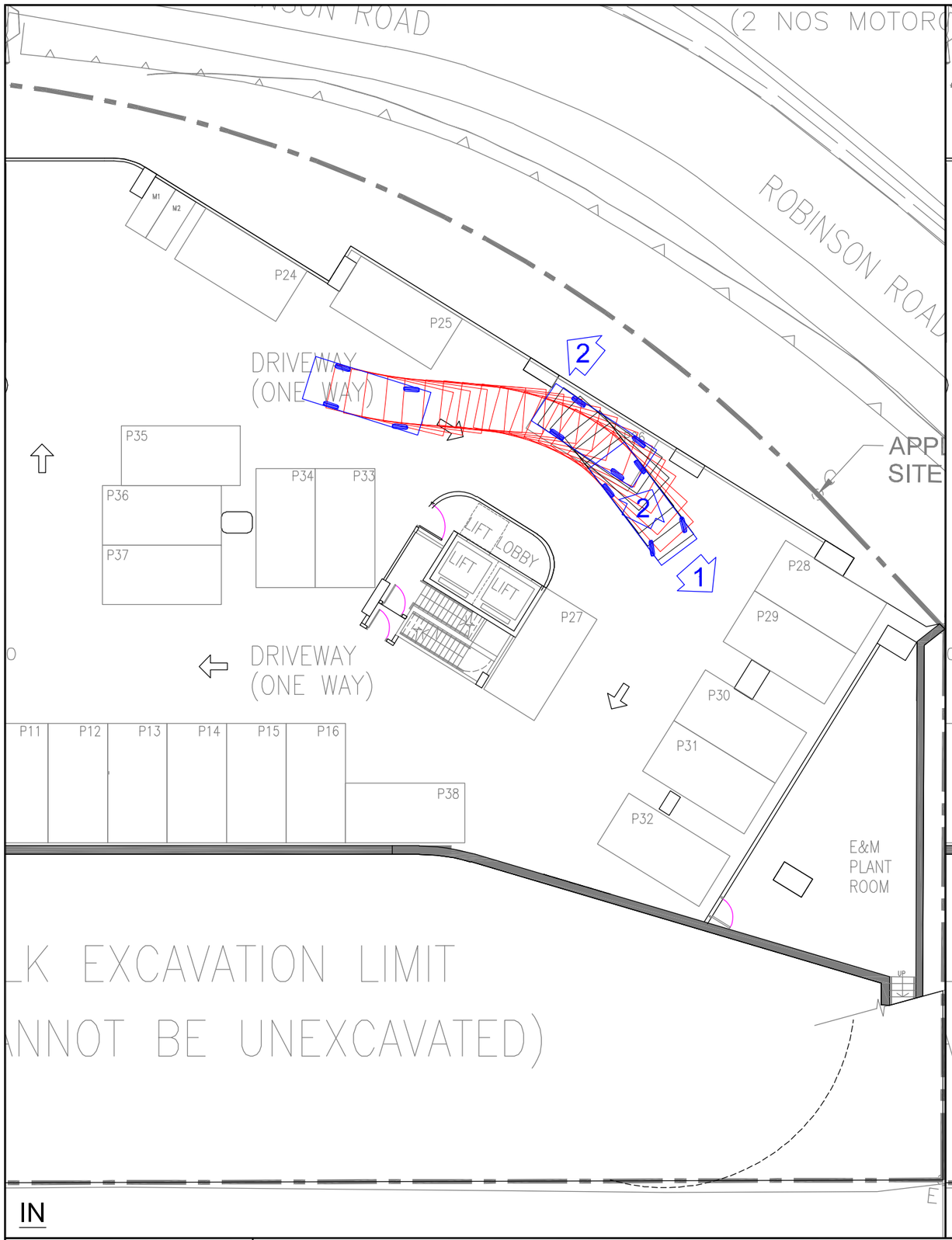

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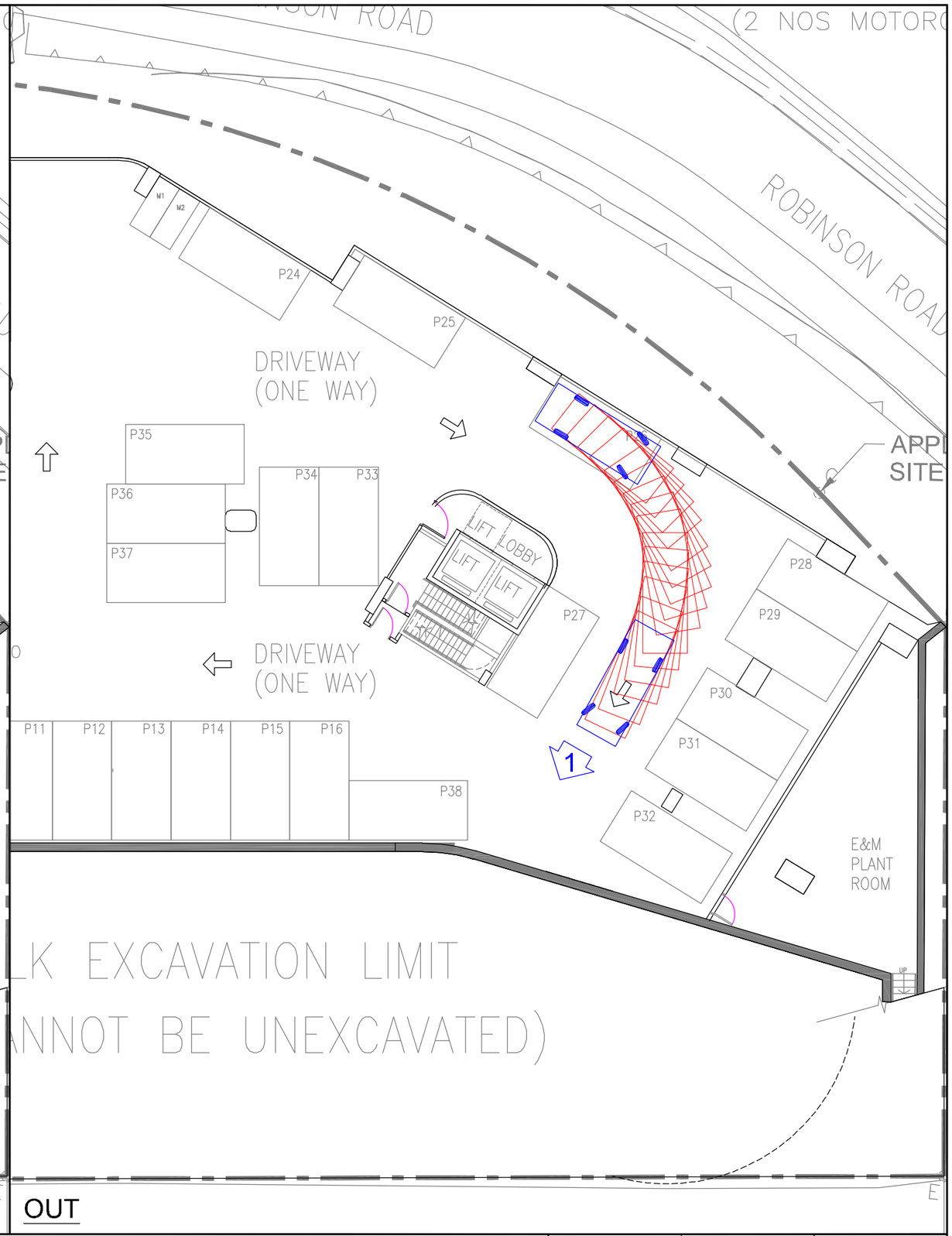

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP5	
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO THE PARKING SPACE AT LG1	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: –	

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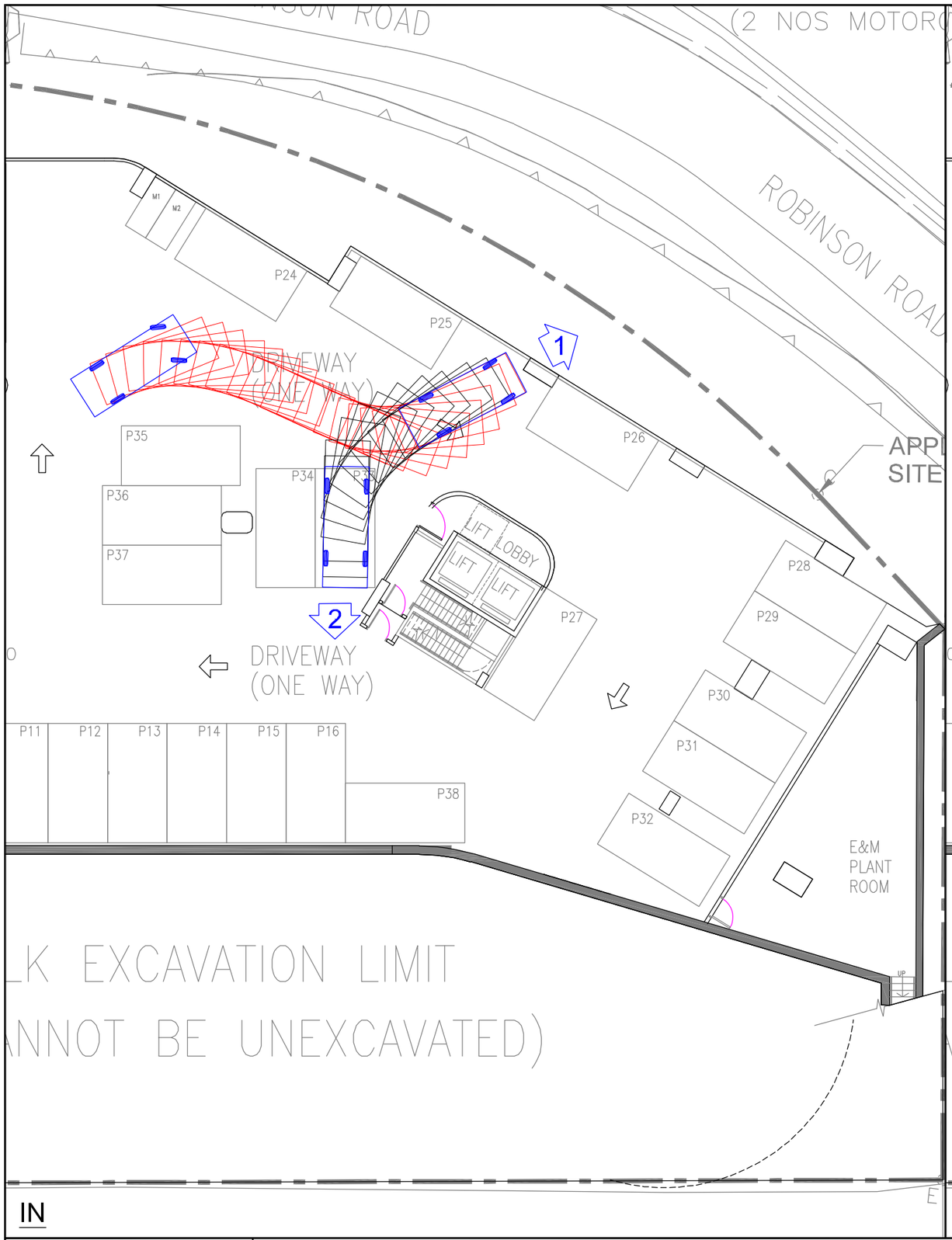

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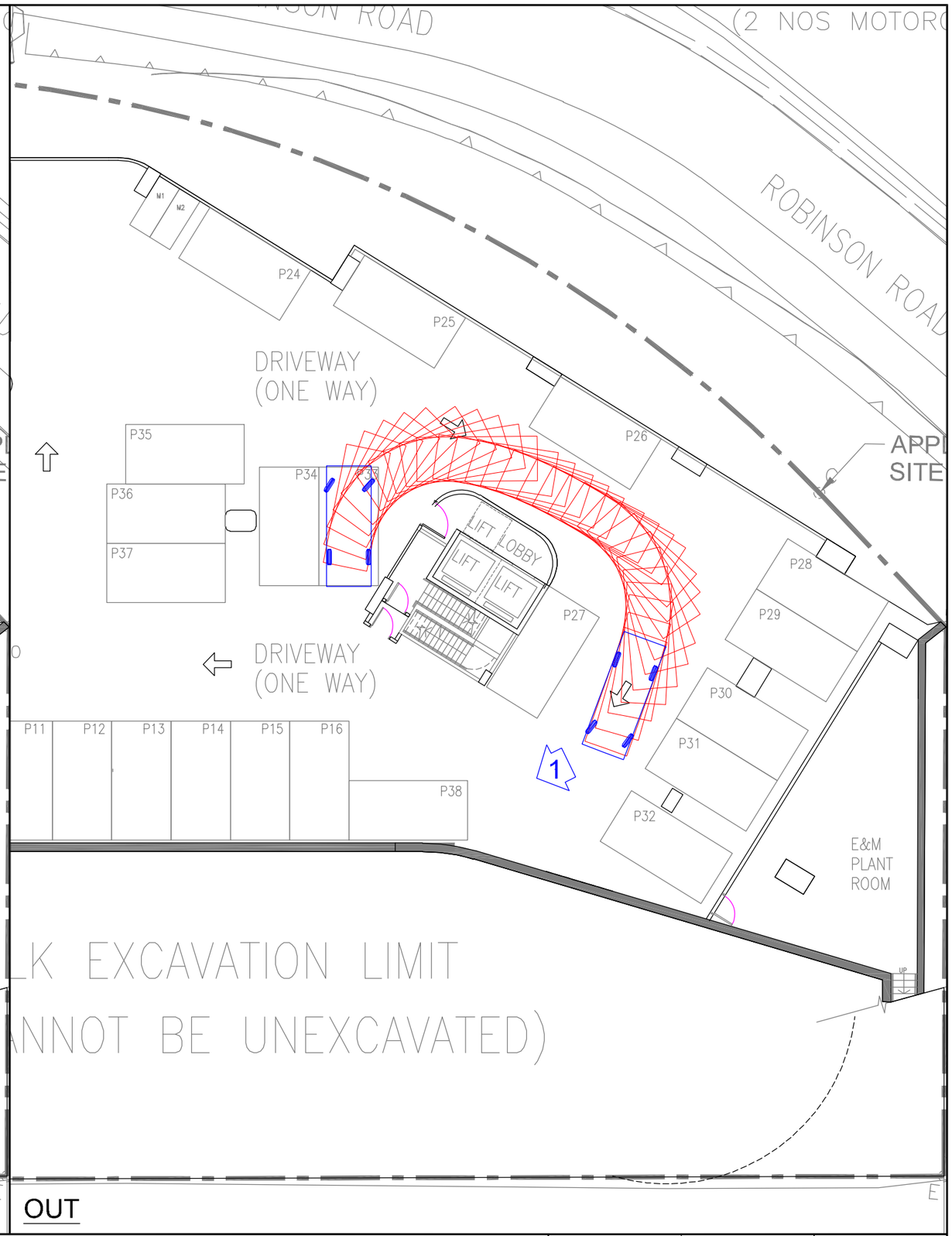

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP6
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO THE PARKING SPACE AT LG1	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: –

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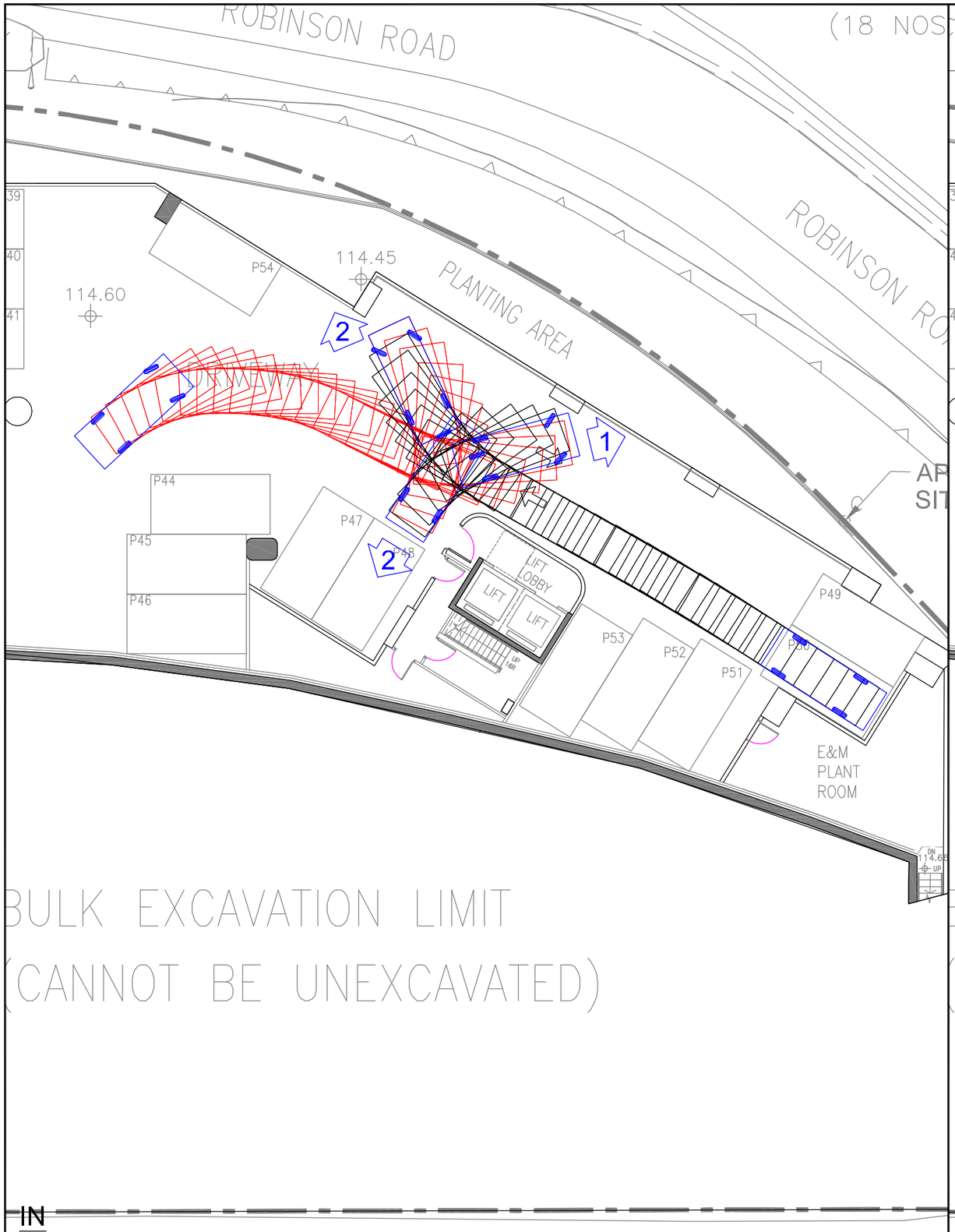

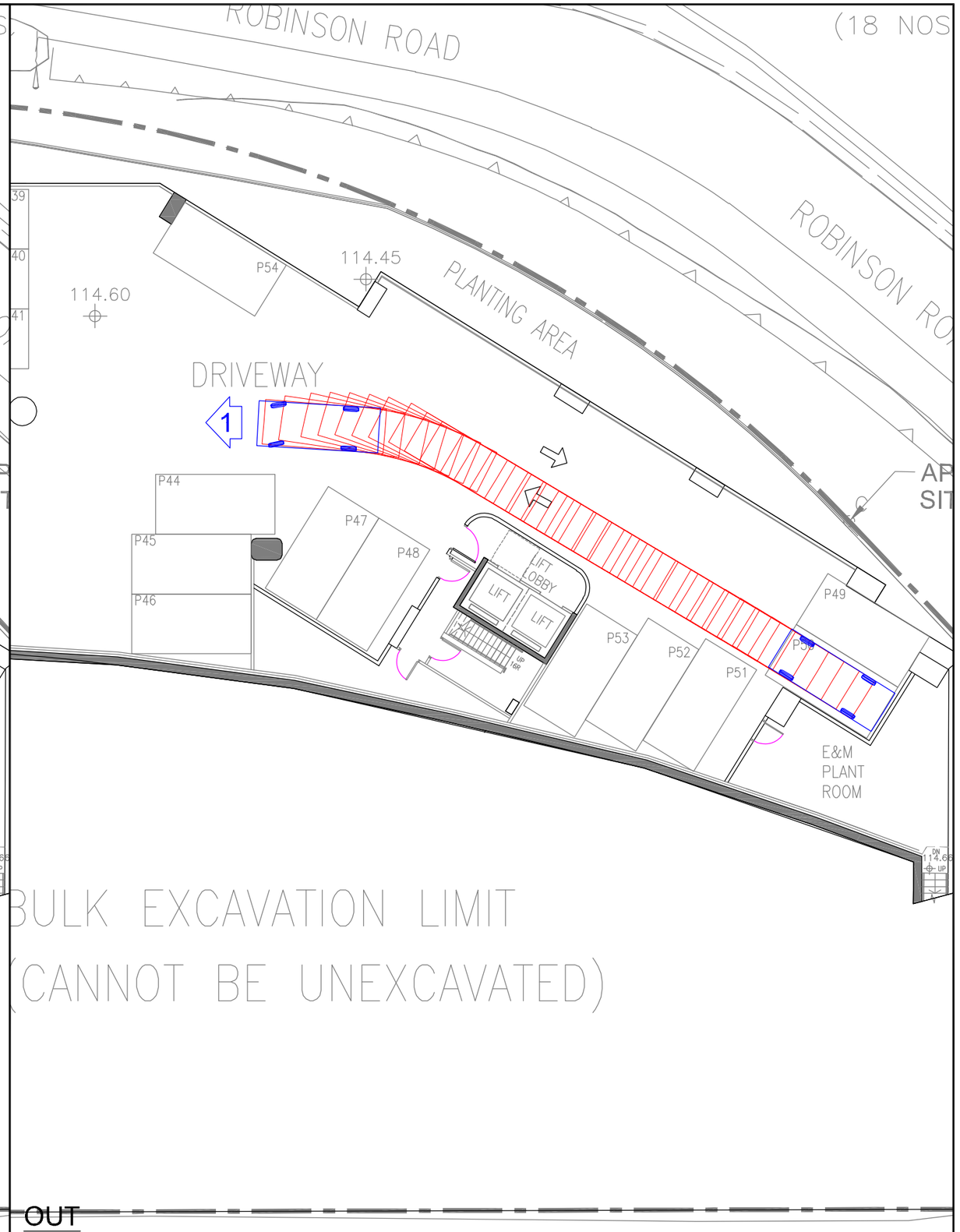

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP7
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO THE PARKING SPACE AT LG2	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: –

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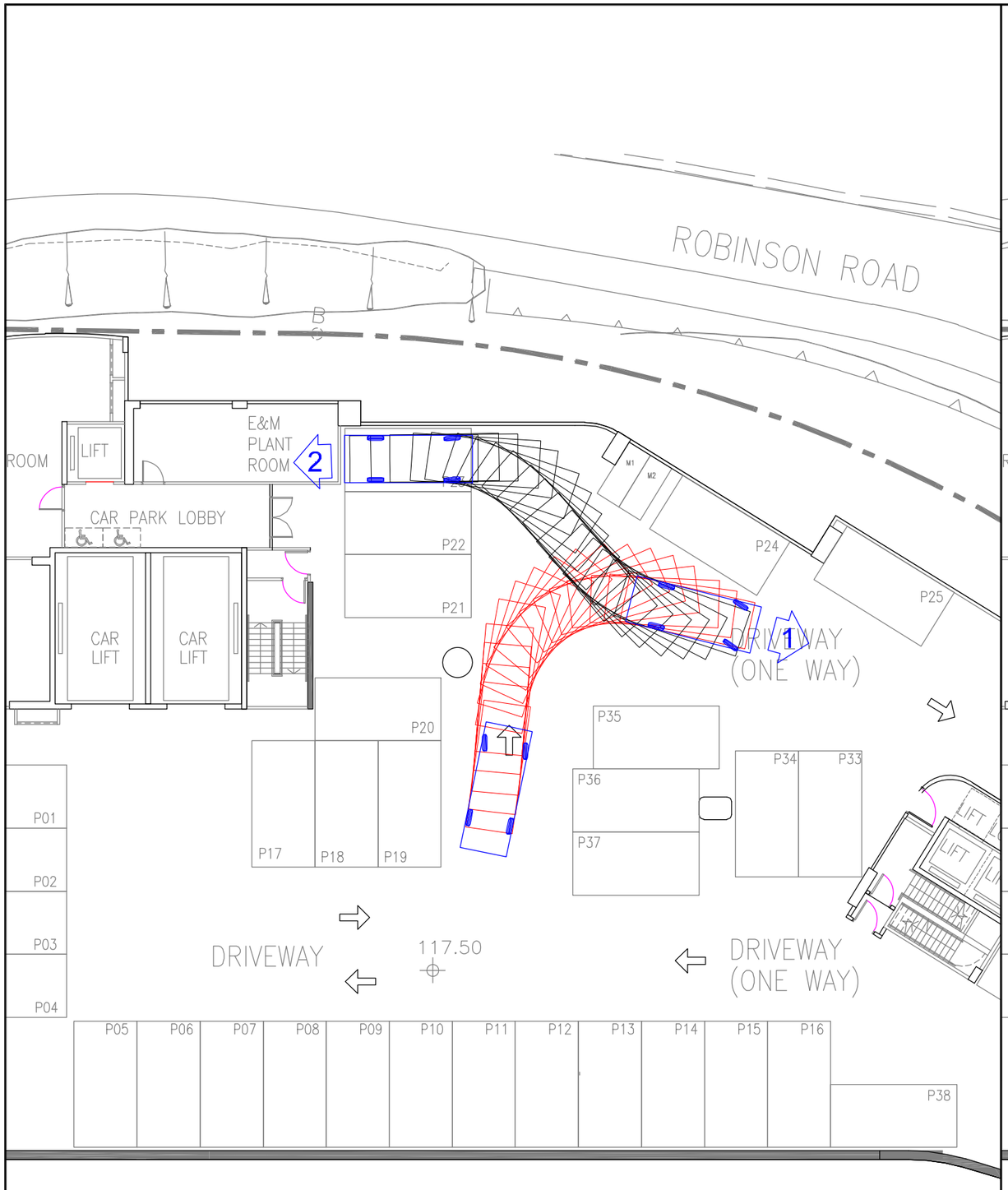

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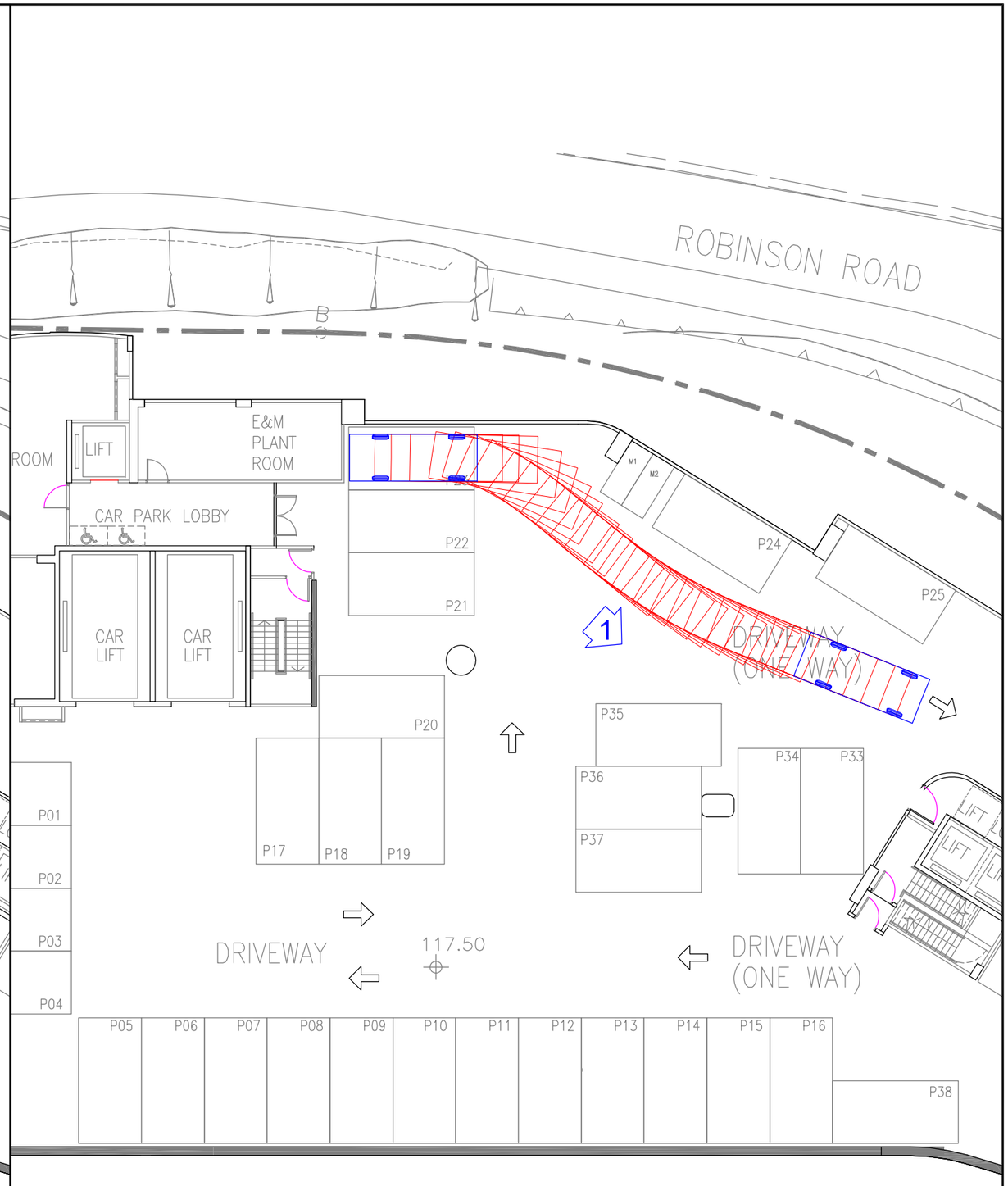

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP8
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO AND OUT OF THE PARKING SPACE AT LG1F	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: -

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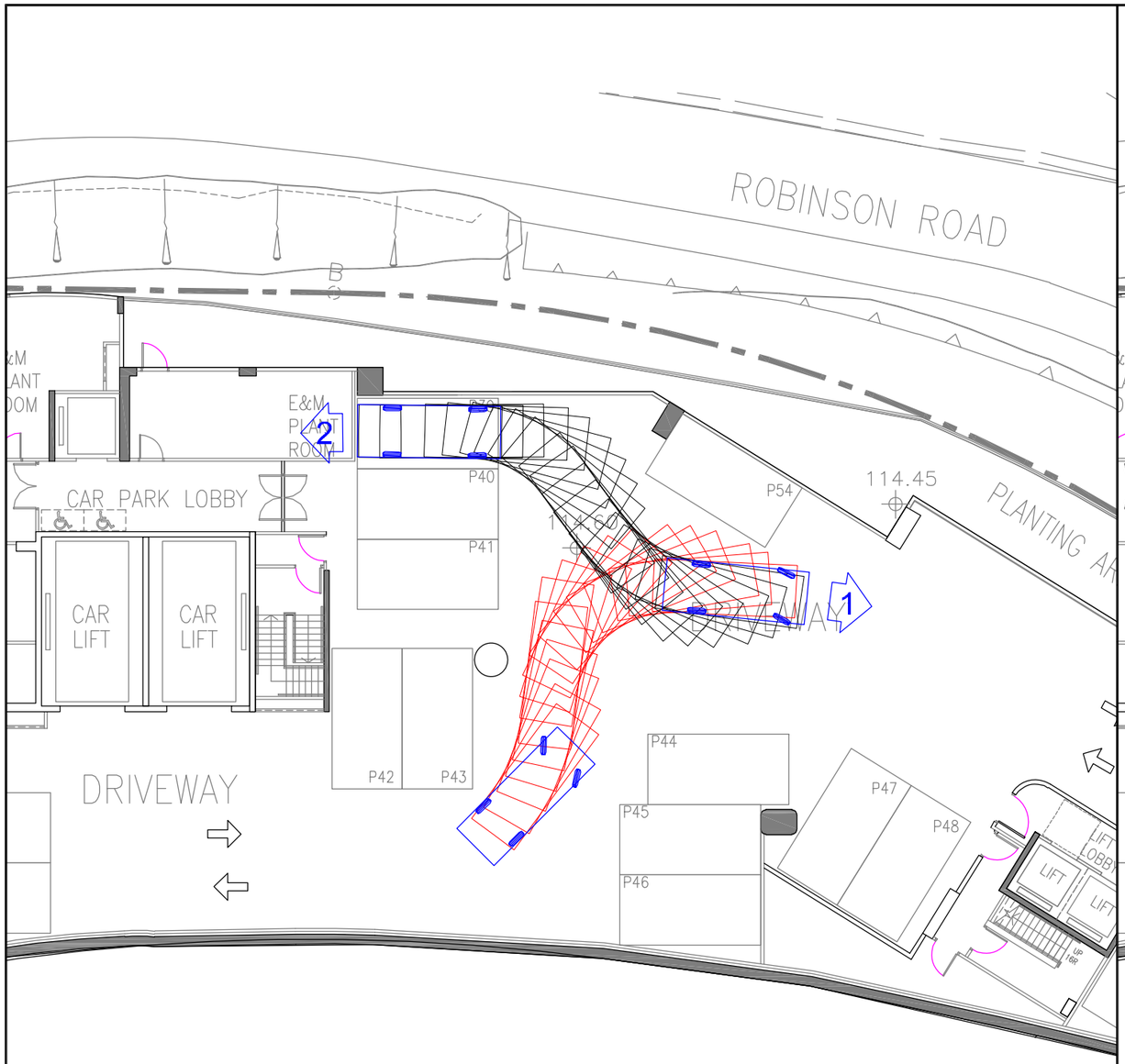

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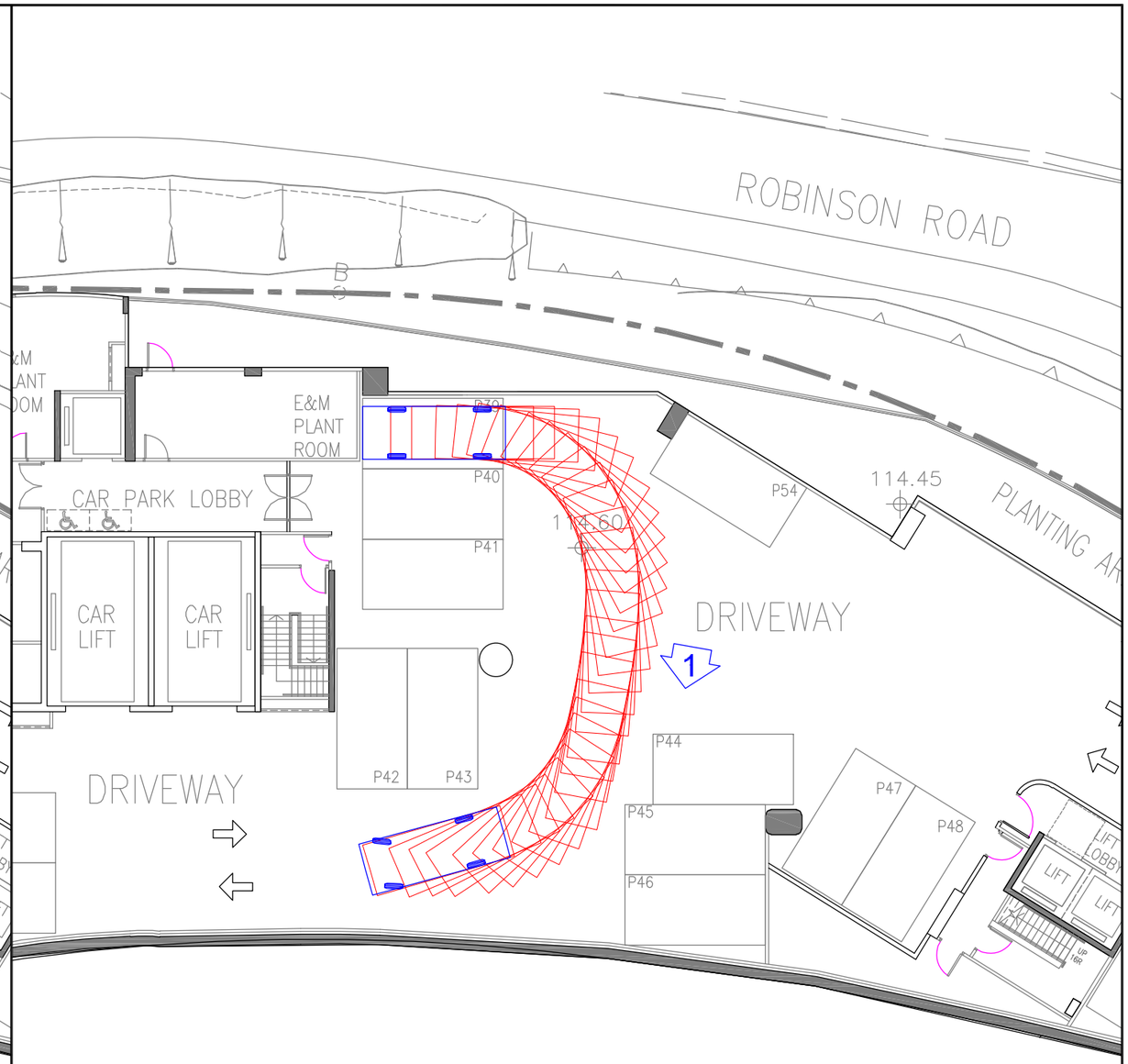

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Project Title: ENQUIRY SUBMISSION FOR 105 ROBINSON ROAD, MID-LEVEL, HONG KONG	Scale: 1 : 200	Date: JAN 2024	Figure No.: SP9
Figure Title: SWEPT PATH ANALYSIS OF 5m CAR MANOEUVRE INTO AND OUT OF THE PARKING SPACE AT LG2F	Project No.: J1494	CAD Ref.: J1494/SWP27/SPATH1/2024-01-18	Rev.: -

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