

TRAFFIC ANALYSIS REPORT FOR

Castle Hill



CONTENTS

1. SUMMARY

1.1. Elevator analysis

2. BUILDING DATA

3. ELEVATORS

3.1. Elevator parameters

3.2. Speed selection

3.3. Kone Recommendations

3.4. Elevator calculation results

3.5. Simulation results

4. Terms

Type: Residential

Status: Prospect

Version: Report 2

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1. SUMMARY

People flow in Castle Hill is analyzed. The building has 19 floors and the travel height is 59.4 meters. The assumed population is 554 persons.
BUILDING TYPE: **Residential**

1.1. ELEVATOR ANALYSIS

DESIGN CRITERIA		
	UP-PEAK	TWO-WAY
Target design criteria	Good	Good
Average waiting time	40 s	40 s
Average time to destination	120 s	120 s
Interval	60 s	80 s
Nominal travel time	32 s	32 s
Peak passenger demand	6 % / 5 min	7 % / 5 min
Car Capacity Factor	50 %	50 %

SIMULATION RESULTS

ELEVATOR GROUP : Lift 5-6 GROUP CONTROL: FULL COLLECTIVE CONTROL

No of Elevators 2 | Floors/Stops -3,-2,-1,0-15 / 19 | Rated Load (kg) 1600 | Rated Capacity (persons) 18 | Passenger Capacity (persons) 14 | Speed (m/s) 2.5 | NTT (s) 23.8 | Population 554

TRAFFIC TYPE	DEMAND (% / 5 min)	DEMAND (persons / 5 min)	CCF (% of passenger capacity)	AWT (s)	% of long waits	ATTD (s)	% of long journeys	PERFORMANCE
Up-peak	6	33	44	34	6	92	4	Good
Two-way	7	39	43	62	27	113	15	Unsatisfactory

DISCLAIMER

The results of the report are valid exploring theoretical vertical-traffic planning scenarios which involve KONE products, services, and people flow planning tools. The results of the report are sensitive to the parameter values used and data which is used as input, and are applicable only with the input values shown in the report. Therefore, results should not be interpreted as any kind of representation or warranty of the performance of any actual elevator installation. KONE shall in no event be liable for any damage caused by or incurred in connection with the use of the results. The user shall have no right to make copies of, or reproduce, disassemble, decompile, reverse engineer or modify the results of the report or disclose it to any third party.

2. BUILDING DATA

Assumed population is 554 persons

Floor	Comment	Height (m)	Travel (m)	Population	Entry %
15			59.4	10	0
14		3.3	56.1	29	0
13		3.3	52.8	33	0
12		3.3	49.5	33	0
11		3.3	46.2	33	0
10		3.3	42.9	33	0
9		3.3	39.6	33	0
8		3.3	36.3	33	0
7		3.3	33	33	0
6		3.3	29.7	33	0
5		3.3	26.4	33	0
4		3.3	23.1	32	0
3		3.3	19.8	33	0
2		3.3	16.5	45	0
1		3.3	13.2	42	0
0		3.3	9.9	36	72
-1		3.3	6.6	30	8
-2		3.3	3.3	0	10
-3		3.3	0	0	10

3. ELEVATORS

3.1. ELEVATOR PARAMETERS

ELEVATOR GROUP PARAMETERS

Number of elevators in group	2
Rated speed	2.5 m/s
Acceleration	0.8 m/s ²
Jerk	1.2 m/s ³
Rated Load	1600 kg
Rated Capacity	18 persons
Passenger Capacity	14 persons
Loading Limit	80 %
Avg Person Weight	75 kg

DOOR PARAMETERS

Type	High duty
Opening	Center
Width	1000 mm
Closing time	2.9 s
Opening time	1.4 s
Two-way transfer times per passenger	2.5 s
Photocell delay	1.2 s
Start delay	0.7 s

ADVANCE DOOR OPENING	
Distance	0.15 m
Speed	0.3 m/s

3.2. SPEED SELECTION

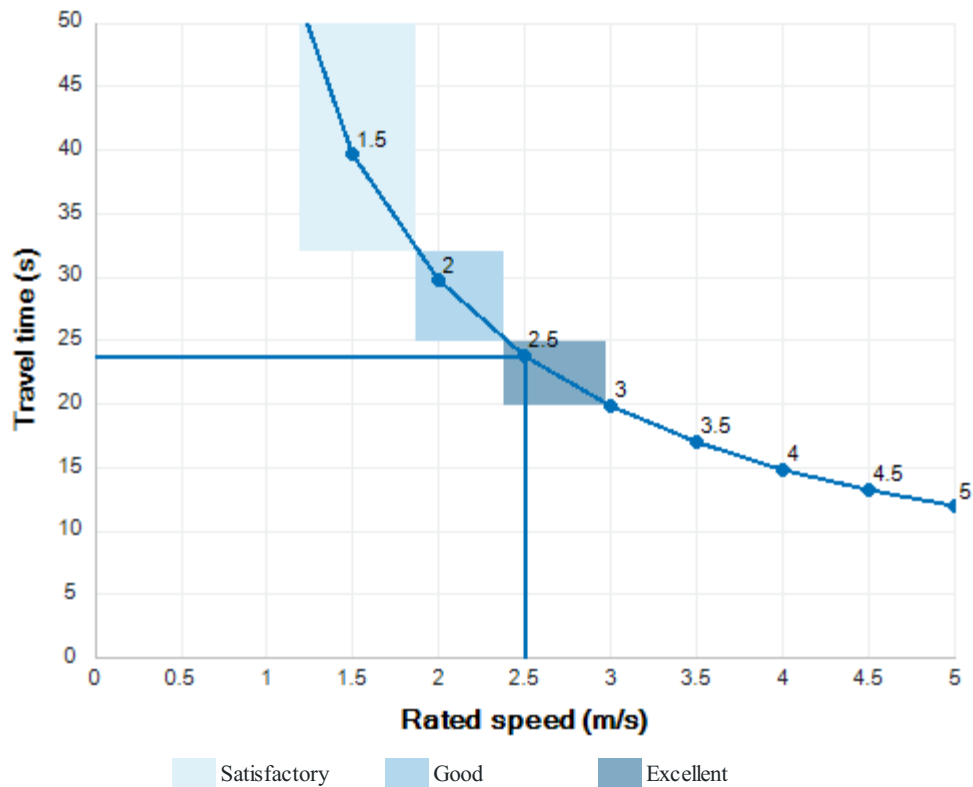
RECOMMENDED SPEEDS	
Satisfactory	1.2 - 1.9 m/s
Good	1.9 - 2.4 m/s
Excellent	2.4 - 3 m/s

RATED SPEED CLASSIFICATION	
Rated speed	2.5 m/s
Travel height	59.4 m
Floors/Stops	-3,-2,-1,0-15/19
Nominal travel time	23.8 s Excellent
Minimum flight distance where full speed is reached	9.48 m

NOMINAL TRAVEL TIME GRAPH - FULL COLLECTIVE CONTROL

Nominal travel time graph for Lift 5-6

NTT = 23.8 s | Flight time = 27.55 s | $v = 2.5 \text{ m/s}$ | $a = 0.8 \text{ m/s}^2$ | $j = 1.2 \text{ m/s}^3$ | Total travel = 59.4 m



3.3. KONE RECOMMENDATIONS

KONE ratings for Handling Capacity and Performance

BUILDING TYPE	TRAFFIC TYPE	5HC	SATISFACTORY			GOOD			EXCELLENT		
	Incoming, Outgoing, Interfloor		CCF	WT	TTD	CCF	WT	TTD	CCF	WT	TTD
Office Single tenant	(100%, 0%, 0%)	14%	90%	40s	120s	80%	30s	100s	65%	25s	80s
	(40%, 40%, 20%)	13%	65%	40s	120s	50%	30s	100s	45%	25s	80s
Office Multi-tenant	(100%, 0%, 0%)	12%	90%	40s	120s	80%	30s	100s	65%	25s	80s
	(45%, 45%, 10%)	11%	65%	40s	120s	50%	30s	100s	45%	25s	80s
Hotel	(100%, 0%, 0%)	12%	90%	40s	120s	80%	30s	100s	50%	25s	80s
	(50%, 50%, 0%)	12%	65%	40s	120s	50%	30s	100s	45%	25s	80s
Residential	(100%, 0%, 0%)	6%	75%	60s	150s	50%	40s	120s	40%	30s	100s
	(50%, 50%, 0%)	7%	75%	60s	150s	50%	40s	120s	40%	30s	100s

KONE ratings for Handling Capacity and Performance for up-peak calculation

BUILDING TYPE	5HC	SATISFACTORY		GOOD		EXCELLENT	
		CCF	INT	CCF	INT	CCF	INT
Office Single tenant	14%	90%	40s	80%	32s	65%	25s
Office Multi-tenant	12%	90%	40s	80%	32s	65%	25s
Hotel	12%	90%	40s	80%	32s	50%	25s
Residential	6%	75%	80s	50%	60s	40%	40s

3.4. ELEVATOR CALCULATION RESULTS

OVERALL CLASSIFICATION	
Target design criteria	KONE - Good
Overall performance	Satisfactory

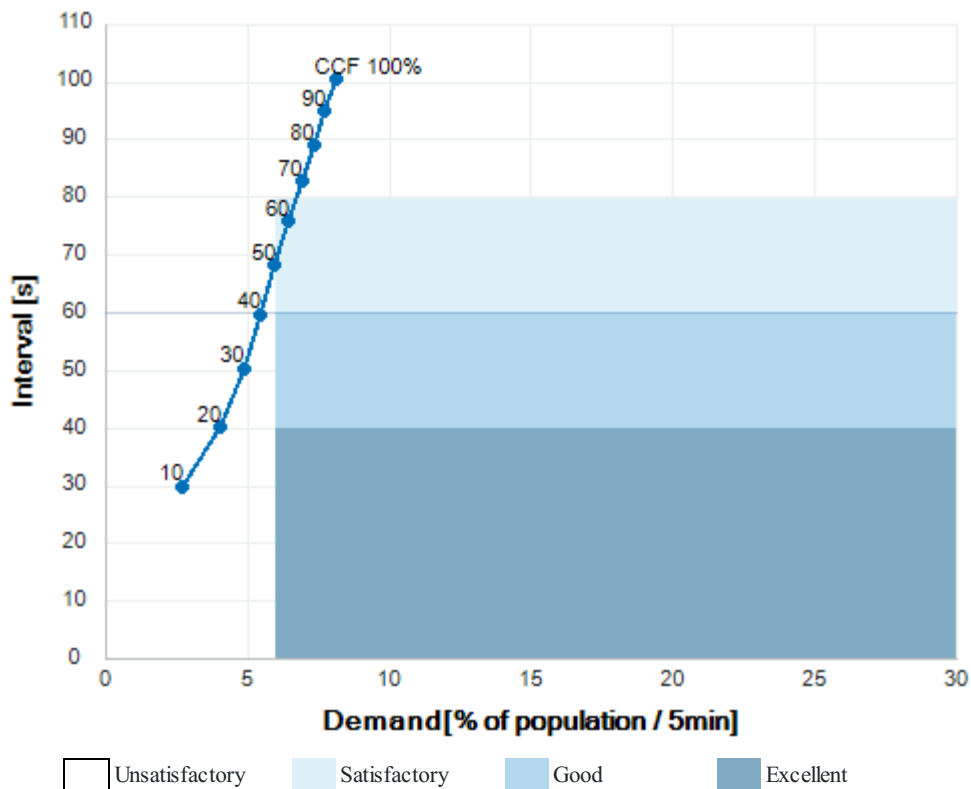
UP-PEAK RESULTS	
Handling Capacity (HC5)	45.2 persons / 5 min
Relative Handling Capacity (%HC5)	8.2 % / 5 min Good
Car Capacity Factor (CCF)	49.9% (7 persons)
Average Round Trip Time	135.9 s
Average Interval	67.9 s- Satisfactory

Note: Handling capacity, interval and round trip time are only for Full collective control. Car Capacity Factor, Round Trip Time and Interval are at Peak Passenger Demand.

PERFORMANCE GRAPH - FULL COLLECTIVE CONTROL

Performance Graph

Total population 554(persons), | 2 elevators, | Rated Load 1600 (kgs), | Passenger Capacity 14 (persons), | Rated speed 2.5 m/s

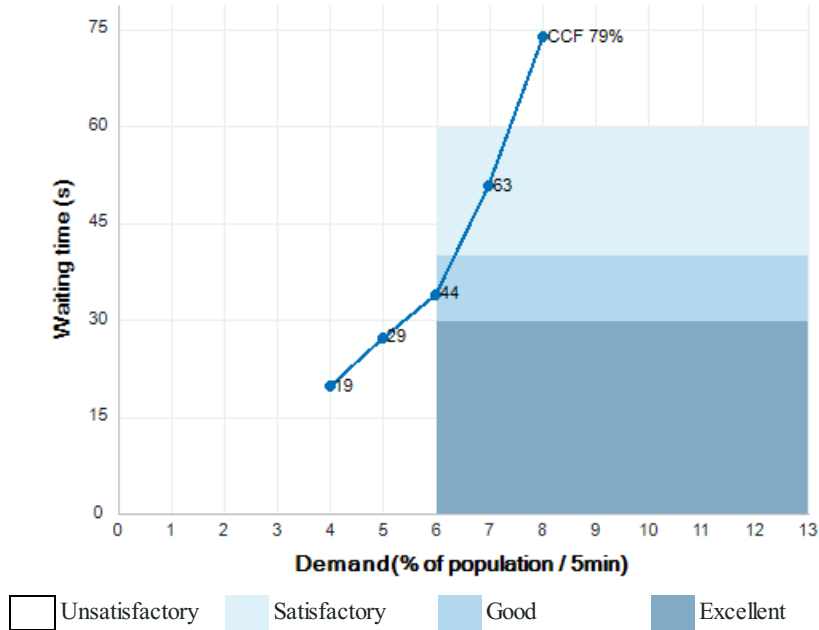


3.5. SIMULATION RESULTS

Simulation settings		
NAME	UP-PEAK	TWO-WAY
Simulation time (h)	2	2
Traffic components (incoming – outgoing – interfloor)	100-0-0	50-50-0
Peak passenger demand (% of pop./ 5 min)	6	7

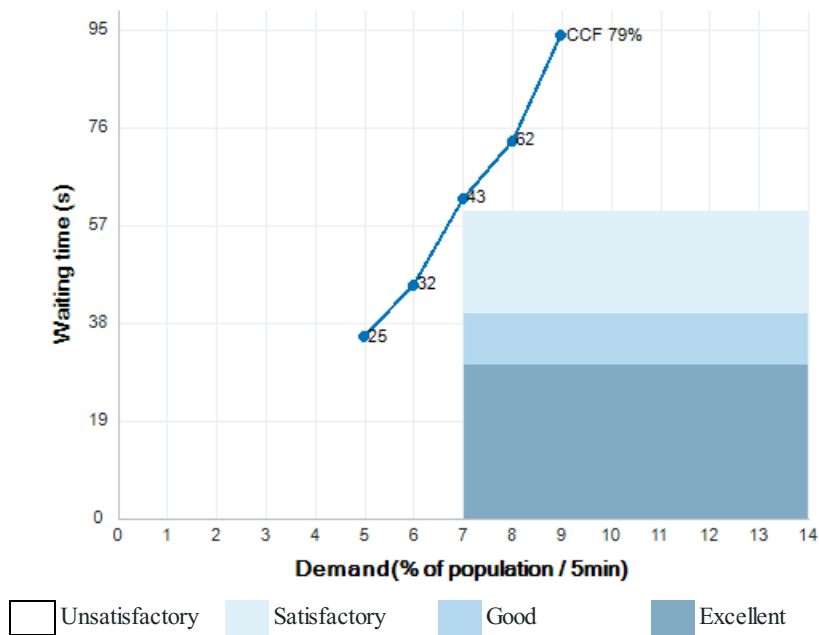
UP-PEAK WAITING TIMES

Lift 5-6



TWO-WAY TRAFFIC WAITING TIME

Lift 5-6



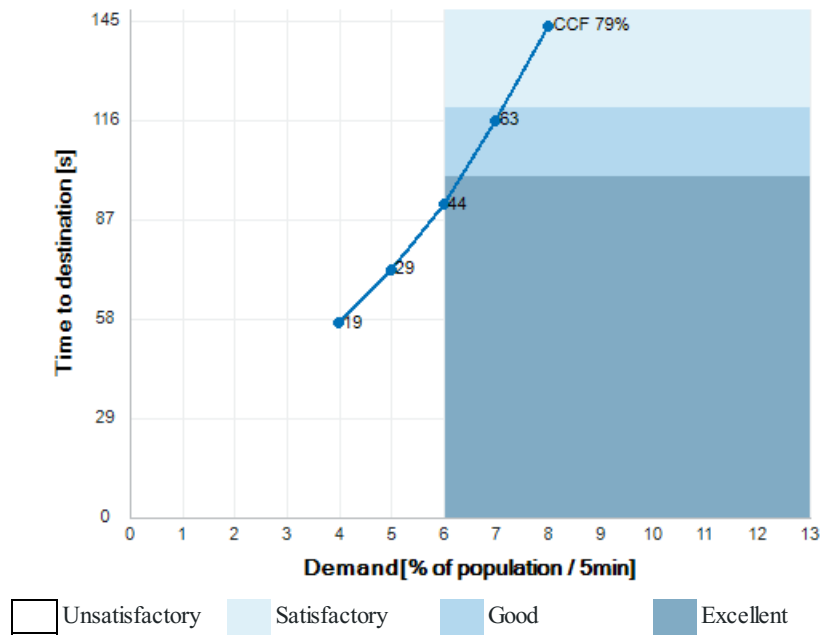
AVERAGE WAITING TIMES

LIFT 5-6

UP-PEAK			TWO-WAY		
DEMAND (% / 5 min)	DEMAND (persons/5 min)	AWT (s)	DEMAND (% / 5 min)	DEMAND (persons/5 min)	AWT (s)
4	22	19.63	5	28	35.27
5	28	27.25	6	33	45.36
6	33	33.91	7	39	62.22
7	39	50.63	8	44	73.33
8	44	73.68	9	50	93.77

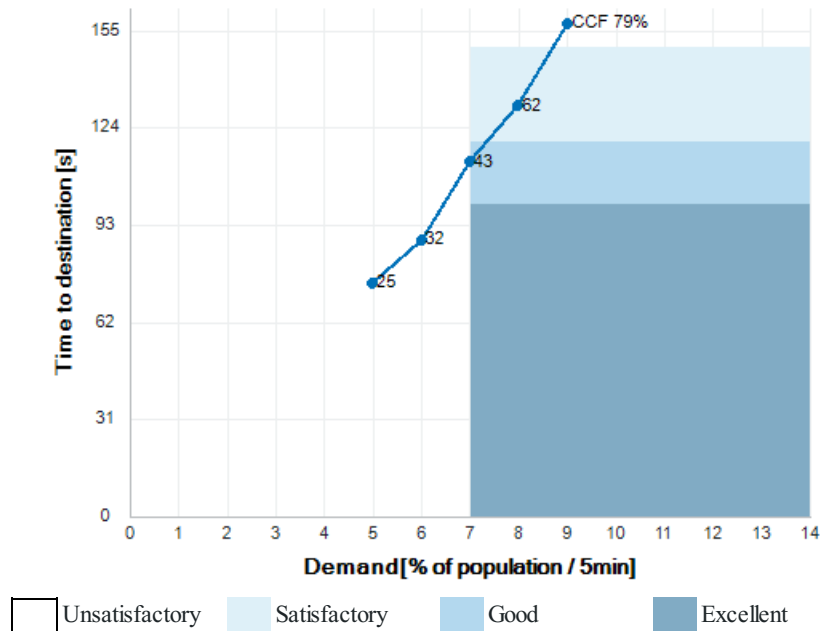
UP-PEAK TIME TO DESTINATION

Lift 5-6



TWO-WAY TRAFFIC TIME TO DESTINATION

Lift 5-6



AVERAGE TIME TO DESTINATION

LIFT 5-6

UP-PEAK			TWO-WAY		
DEMAND (% / 5 min)	DEMAND (persons/5 min)	ATTD (s)	DEMAND (% / 5 min)	DEMAND (persons/5 min)	ATTD (s)
4	22	56.93	5	28	74.53
5	28	72.52	6	33	88.47
6	33	91.5	7	39	113.18
7	39	115.97	8	44	131.11
8	44	143.61	9	50	157.22

4. TERMS

Handling Capacity (HC) is 80% of the theoretical Transportation Capacity considering randomness in passenger arrivals and saturation in queuing.

Transportation Capacity (TC) is the theoretical number of persons per hour the system can transport.

Car Capacity Factor (CCF) is the maximum number of passengers in percent of passenger capacity during elevator round trip.

Utilization Factor (UF) is the actual demand in percent of transportation capacity.

Level of Service (LOS) shows the pedestrian space around, classified to A-F. Level A is spacious, level F is very tight.

Interval shows how often elevators leave the lobby during up-peak.

Nominal travel time (NTT) is obtained by dividing the travel height by the elevator rated speed.

Average waiting time (AWT) is the time from when a passenger either registers a landing call, or joins a queue, until the responding elevator begins to open its doors at the boarding floor.

Average time to destination (ATTD) is the time from when a passenger either registers a landing call or joins a queue until the passenger alights at the destination floor.

Percentage of long waits is the proportion of passengers whose waiting time exceeds 60 seconds.

Percentage of long journeys is the proportion of passengers whose Time to destination exceeds 120 seconds.

Average queue length (AQL) shows the line of people with constant traffic.

Full Collective (FC) control with up and down call buttons at landings and elevator serves the landing calls according to the running direction.

Destination Control System (DCS) with Destination Operation Panels at the landings and people with the same destination calls are allocated in the same cars.

Destination Operation Panel (DOP) is a keypad at a landing where passenger can directly give the destination floor call to the elevator group.

Brake to brake time begins when the elevator car starts to move and ends when the elevator car has stopped after the run.

Door closed to brake closed begins when the door is closed and ends when the elevator car has stopped after the run.

Door closed to beginning of door opening begins when the door is closed and ends when the door starts to open near the end of the run before the car has stopped.

Door to door performance time begins when the door starts to close and ends when the door is 800 mm open after the run.