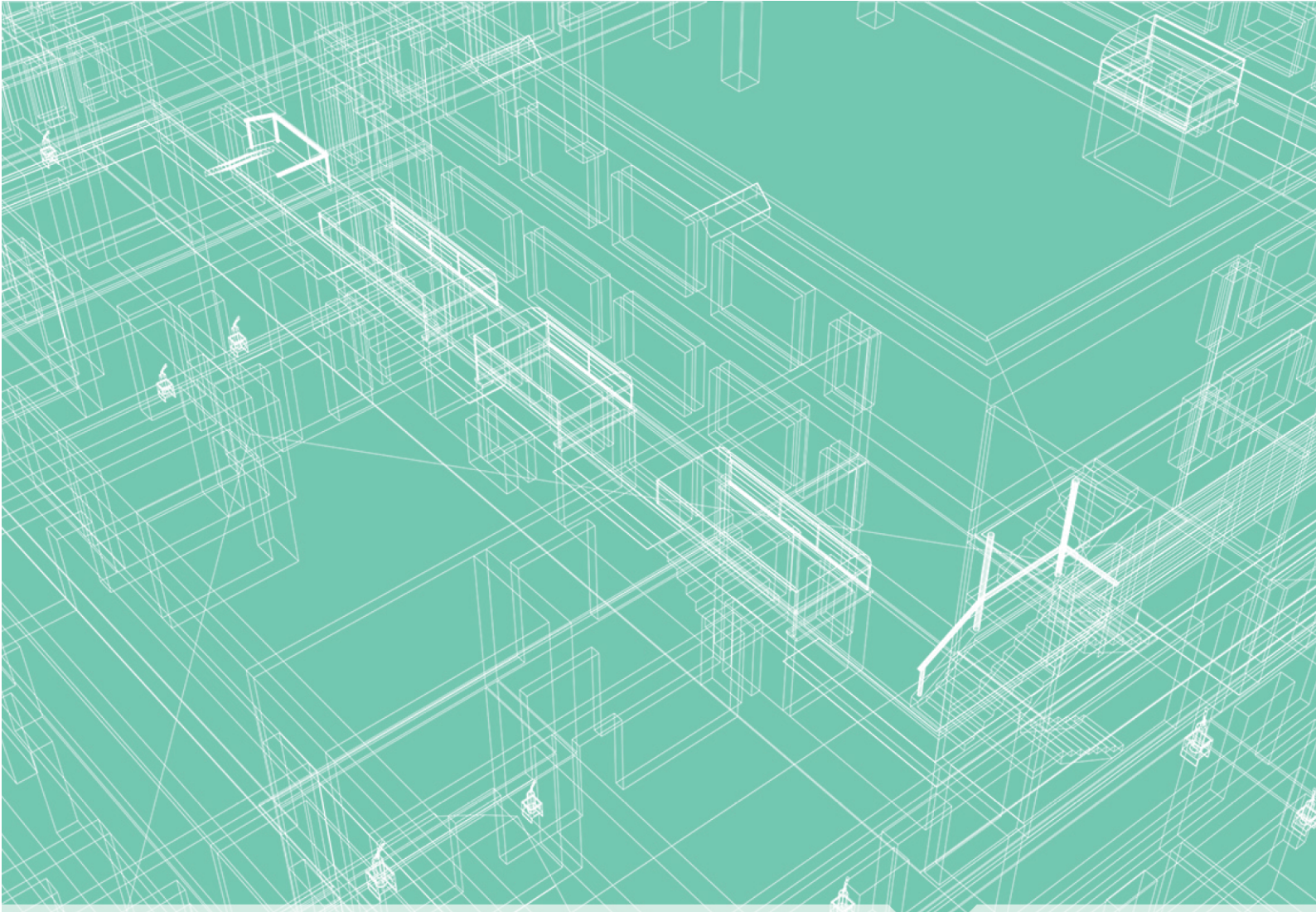

CONCEPT DESIGN REPORT

PARRAMATTA ROAD FIVE DOCK MIXED-USE DEVELOPMENT

VERTICAL TRANSPORTATION SERVICES

JHA

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This report is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

DOCUMENT CONTROL SHEET

Project Number	240242
Project Name	129-153 Parramatta Road and 53-75 Queens Road, Five Dock
Description	Vertical Transportation Concept Design Report
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CONTENTS

1 INTRODUCTION

1.1 GENERAL

This VT Services Traffic Study Report accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act), in support of a State Significant Development Application (SSDA) for the construction and operation of proposed mixed-use development, reference SSD-73228210.

1.2 GENERAL DESIGN DOCUMENTS

The brief is a document formalised to provide a reference to agreements between JHA and that of the Client and/or their representatives.

JHA in developing the brief shall endeavour to provide value-added advice, providing suitable solutions to Cost benefits and buildability.

The brief is designed to achieve a summarised, succinct and coherent written description of the scope of the services to be designed. The document is not designed as a Specification or Bill of Materials. Nor is it intended to provide detail of the equipment selection in the main. The document provides for a description of the end outcome services to be provided within the building.

This document intends to represent a sign-off of the project's Vertical Transportation Services to be provided for the client by JHA Consulting Engineers.

1.3 PROJECT DESCRIPTION

The proposed development seeks consent for a new mixed-use development, inclusive of shop top housing with in-fill affordable housing and an indoor recreation facility. The proposal will include:

- Construction of 6 residential towers up to 31 storeys above 5-7 level podiums with a mix of retail tenancies, commercial floor space, residential apartments and an indoor recreation facility
- Excavation for basement levels with car parking and associated services, and a tunnel connecting two parking lots below proposed council road
- Removal of existing trees on site
- Landscaping and a connected public space network that incorporates new public open space, the new Spencer Street road extension, and new pedestrian-focused through-site links
- 16 stratum subdivision lots
- Off-site works for William Street widening and temporary embellishment of 3m setback to Queens Road and 6m setback to Parramatta Road (as per the VPA).

The proposal seeks to utilise the Infill Affordable Housing provisions of the Housing SEPP by providing affordable housing in compliance with the requirements of the EPI.

1.4 REFERENCE DOCUMENTATION

The CDR has been developed with the project briefing document in consultation with the project team, and client stakeholder. The services design intent has been formulated based on the following project reference documents:

Table 1-1: Reference documentation

DOCUMENT	DESCRIPTION
Turner plan and GA Sections issued on 05/09/24	For information architectural GA floor plan, Turner

1.5 ABBREVIATIONS

Abbreviation	Meaning
ARD	Automatic Rescue Device
AS	Australian Standard
AS/NZS	Australian / New Zealand Standard
BCA	Building Code of Australia
BMCS	Building Management and Control System
BMS	Building Management System
CBD	Central Business District
CCTV	Closed Circuit Television
CI	Car Indicator
COP	Car Operating Panel
DA	Development Application
DCS	Destination Control System
EP&A	Environmental Planning and Assessment Act
EWIS	Emergency Warning and Intercommunication System
FRL	Fire Resistance Level in minutes (Structure Adequacy / Integrity / Insulation)
HGO	Hazardous Goods Operation
LCS	Landing Call Station
LI	Landing Indicator
LS	Landing Signalisation
MCP	Maintenance and Controller Panel
MRL	Machine-Room-Less Lift
NCC	National Construction Code of Australia
RFID	Radio Frequency Identification
TfNSW	Transport for New South Wales
UPS	Uninterruptible Power Supply
VT	Vertical Transportation
VTC	Vertical Transportation Contractor
WHS	Work Health and Safety
WIP	Warden Intercom Point

1.6 LIMITATIONS

This CDR is preliminary in nature and represents JHA's understanding of the required systems and services needed to support this Project: the information outlined within this Report will need review and acceptance by relevant stakeholders in order to appropriately inform the next phase of this Project.

2 VERTICAL TRANSPORTATION SERVICES

2.1 GENERAL

This section outlines the Vertical Transportation (VT) Services design for the 129-153 Parramatta Road & 53-74 Queens Road, Five Dock is a multi-storey residential/retail mixed-use development.

It is the intent of this document to represent a sign-off of the project's Vertical Transportation Services provided for the client by JHA.

The proposed vertical transportation scope of work will include:

- Building A1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building A2: Three (3) new electric passenger lifts, Machine-Room less (MRL) type
- Building B1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B2: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B3: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B4: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building C: Three (3) new electric passenger lifts, Machine-Room less (MRL) type
- Building D: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E2: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E3: Two (2) new electric passenger lifts, Machine-Room less (MRL) type

2.2 STANDARDS AND REGULATIONS

There are several design standards, guidelines, and codes that are applicable to the VT service design for this project, and they have been listed in the table below.

Table 2-1: Referenced standards and regulations

Australian Standards	
AS 1735.1.1:2022	Lifts, escalators and moving walks, Part 1.1: General requirements
AS 1735.1.2:2021	Part 1.2: Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Passenger and goods passenger lifts [EN 81-20:2020]
AS 1735.1.3:2021	Part 1.3: Safety rules for the construction and installation of lifts - Examinations and tests - Design rules, calculations, examinations and tests of lift components [EN 81-50:2020]
AS 1735.11-1986	Part 11: Fire-rated landing doors
AS 1735.12:2020	Part 12: Facilities for persons with disabilities (EN 81-70:2018, MOD)
AS 1735.19-2019	Part 19: Safety rule for the construction and installation of lifts - Lifts for the transport of persons and goods - Remote alarm on passenger and goods passenger lifts [EN 81-28:2018+AC:2019]
AS 4431-2019	Guidelines for safe working on new lift installations in new constructions
Authorities	
2022 (TBC)	National Construction Code
Other relevant Codes and Standards	
AS/NZ 3000:2018 Amdt 3	Electrical Installations (known as the Australian/New Zealand Wiring Rules). Wiring requirements for lift installations;
AS 1668.1:2015	Ventilation and Air-conditioning in Buildings – Fire and Smoke Control
AS 1668.2-2012 Amdt 2	Acceptable Ventilation Guidelines
AS 1170.4-2007 Amdt 2	Earthquake actions in Australia
ISO 9001	Quality Systems (Manufacturers shall provide evidence of accreditation)
ISO 18738-1:2012	Measurement of ride quality — Part 1: Lifts (elevators)
	WHS Act 2011 and WHS Regulation 2017

3 DESIGN

3.1 LIFT LOCATION AND LOBBY DESIGN

The lifts shall be in areas that provide the most efficient and effective means to transport people or goods through the building, also should also be easily accessible.

The lift lobbies shall not intersect with other traffic flows and be wide enough to allow for passenger to wait and turning space for people with wheelchairs, stretchers, and trolleys.

3.2 LIFTWELL DESIGN

The liftwell shall not be used for any purpose other than the lift, including during any building stages prior to commissioning of the lift. Conduits, ducts, and other equipment not associated with the lift shall not be installed in the liftwell.

3.3 LIFT FEATURES

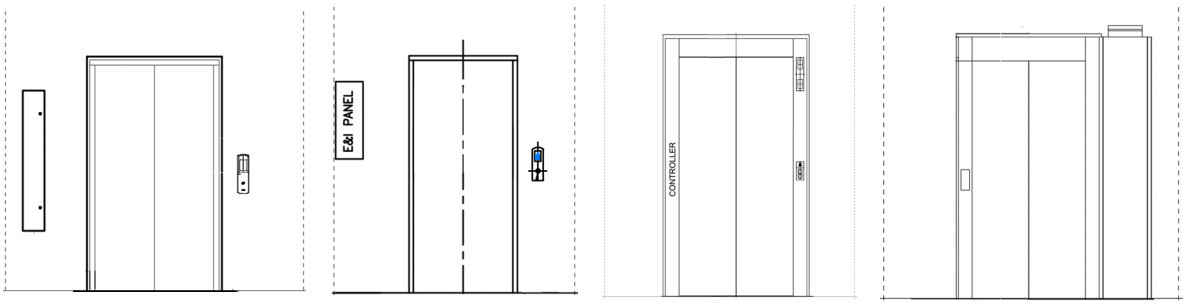
The lifts shall include the following features:

- Provision for swipe card reader in the lift car and at the landings,
- Provision for CCTV cabling within the lift car trailing cables,
- Two Car Operating Panels (COP),
- Landing Call Station (LCS) and Indicators on each served level.

3.4 MAINTENANCE AND CONTROLLER PANEL LOCATION

MRL type lifts have a Maintenance and Controller Panel (MCP) and usually they are located at the top floor served. Each supplier has a specific design or configuration for their own MCP that is not interchangeable with other suppliers. The figures below show the general appearance with their nominal sizing. A clear working space of 500 W x 700 D x 2,100 H is required in front of the unit.

Figure 1 – View of the 4 types of MCPs



Nominal size
200 W x 1,300 H
sits 100 proud

Nominal size
260 W x 560 H
flush with the surrounding wall

included in the door frame

Nominal size
320 W x 2,200 H
flush with the surrounding wall, raw opening is 340mm wider to one side

3.5 TRAFFICABLE ITEMS AND PERSONS

All lifts are sized to accommodate wheelchair usage and can accommodate ambulance stretcher.

Figure 2 – Typical wheelchair

Figure 3 – Ambulance stretcher Stryker Power-PRO XT

4 NEW LIFT DESIGN

4.1 BUILDNG A1 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-1: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	1.0 m/s
Travel	25,900 mm
Levels: Served | Front | Rear	8 | 8 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm

4.2 BUILDNG A2 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-2: Lift preliminary technical schedule

Item	Details
Number of lifts	Three (3)
Capacity	1,500 kg
Passenger rating	20
Speed	3.0 m/s
Travel	112,600 mm
Levels: Served | Front | Rear	34 | 34 | 0
Service classification	Passenger
Control and group control	Microprocessor, triplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm

4.3 BUILDNG B1, B2 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-3: Lift preliminary technical schedule

Item	Details
Number of lifts	Four (4)
Capacity	1,500 kg
Passenger rating	20
Speed	1.0 m/s
Travel	26,400 mm
Levels: Served | Front | Rear	8 | 8 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm

4.4 BUILDNG B3 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-4: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	1.0 m/s
Travel	42,500 mm
Levels: Served | Front | Rear	13 | 13 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm

4.5 BUILDNG B4 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-5: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	3.0 m/s
Travel	80,900 mm
Levels: Served | Front | Rear	25 | 25 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	5,600 mm
Pit	3,000 mm, *may require pit access subject to supplier*

4.6 BUILDNG C RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-6: Lift preliminary technical schedule

Item	Details
Number of lifts	Three (3)
Capacity	1,500 kg
Passenger rating	20
Speed	2.0 m/s
Travel	84,800 mm
Levels: Served | Front | Rear	26 | 26 | 0
Service classification	Passenger
Control and group control	Microprocessor, triplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,600 mm
Pit	2,000 mm

4.7 BUILDNG D RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-7: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	3.0 m/s
Travel	97,800 mm
Levels: Served | Front | Rear	30 | 30 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	5,600 mm
Pit	3,000 mm, *may require pit access subject to supplier*

4.8 BUILDNG E1 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-8: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	3.0 m/s
Travel	92,500 mm
Levels: Served | Front | Rear	28 | 28 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	5,600 mm
Pit	3,000 mm, *may require pit access subject to supplier*

4.9 BUILDNG E2 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-9: Lift preliminary technical schedule

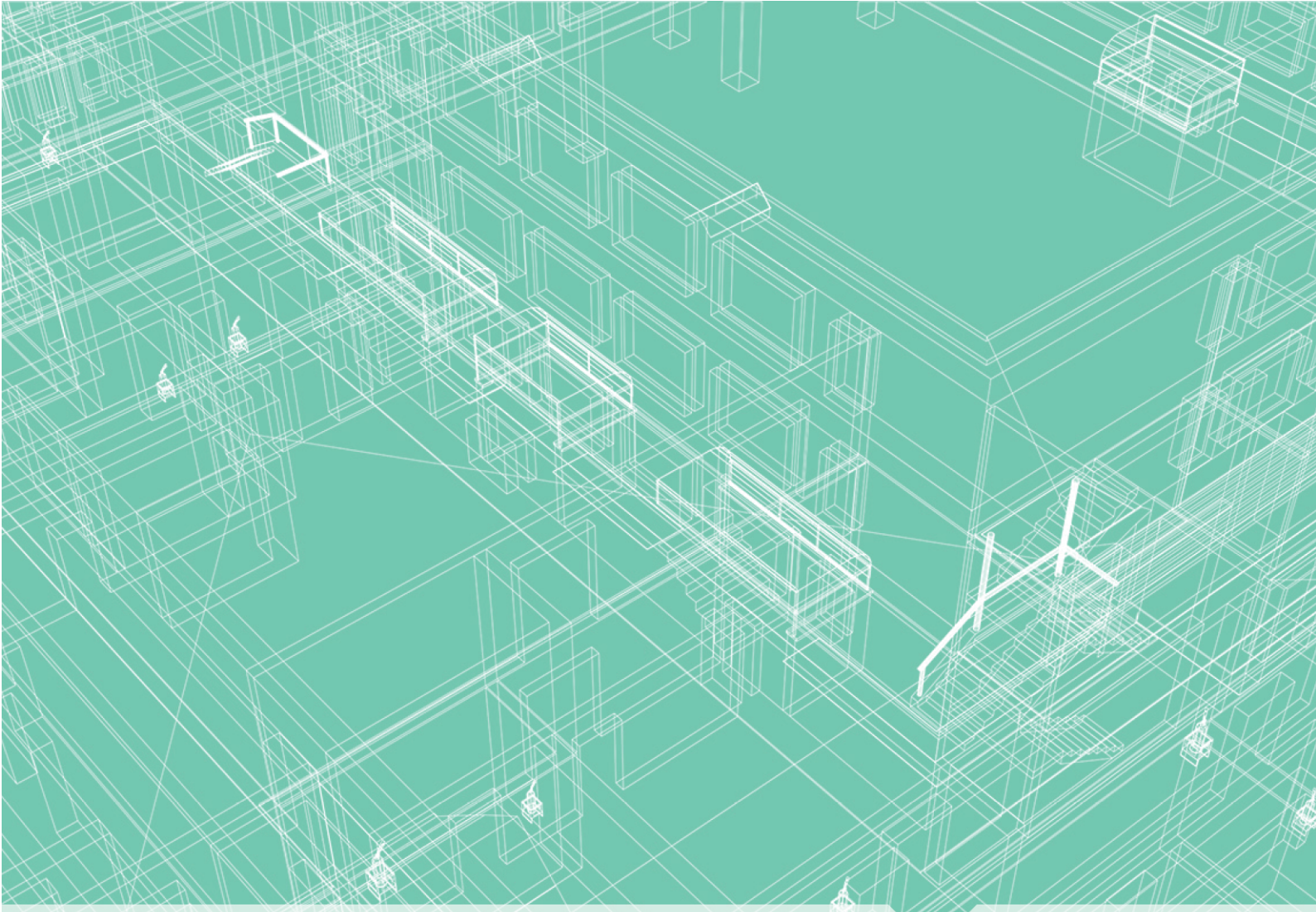
Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	1.0 m/s
Travel	28,400 mm
Levels: Served | Front | Rear	8 | 8 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm

4.10 BUILDNG E3 RESIDENTIAL LIFTS

The lifts are located internally within the building. Their primary purpose is to provide vertical circulation of residents, for disability access and transportation of light weight goods including furniture. These lifts will also accommodate ambulance stretcher and have fire service. The lift type will be a machine room less *(MRL)*. The table below details the passenger lift design.

Table 4-10: Lift preliminary technical schedule

Item	Details
Number of lifts	Two (2)
Capacity	1,500 kg
Passenger rating	20
Speed	1.0 m/s
Travel	34,900 mm
Levels: Served | Front | Rear	10 | 10 | 0
Service classification	Passenger
Control and group control	Microprocessor, duplex
Car dimensions	1,500 mm W x 2,100 mm D x 2,400 mm H
Entrance dimensions and type	1,100 mm W x 2,100 mm H, two panel centre opening (2PC)
Liftwell dimensions	2,500 mm W x 2,500 mm D, *excludes dividing wall between each lift*
Headroom	4,400 mm
Pit	1,400 mm



TRAFFIC STUDY REPORT

PARRAMATTA ROAD FIVE DOCK MIXED-USE DEVELOPMENT

VERTICAL TRANSPORTATION SERVICES

JHA

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Project Number	240242
Project Name	129-153 Parramatta Road and 53-75 Queens Road, Five Dock
Description	Vertical Transportation Services Traffic Study Report
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CONTENTS

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The brief is designed to achieve a summarised, succinct and coherent written description of the scope of the services to be designed. The document is not designed as a Specification or Bill of Materials. Nor is it intended to provide detail of the equipment selection in the main. The document provides for a description of the end outcome services to be provided within the building.

This document intends to represent a sign-off of the project's Vertical Transportation Services to be provided for the client by JHA Consulting Engineers.

1.3 LIMITATIONS

This brief is preliminary in nature and represents JHA's understanding of the required systems and services needed to support this Project: the information outlined within this Report will need review and acceptance by relevant stakeholders to appropriately inform the next phase of this Project.

1.4 REFERENCE DOCUMENTATION

The brief has been developed with the project briefing document in consultation with the project team, and client stakeholder. The services design intent has been formulated based on the following project reference documents:

Table 1-1: Reference documentation

DOCUMENT	DESCRIPTION
Turner plan and GA Sections issued on 05/09/24	For information architectural GA floor plan, Turner
CIBSE Guide D 2020	CIBSE Guide D Transportation systems in buildings
ISO 8100-32: 2020	Planning and selection of passenger lifts to be installed in office, hotel and residential buildings

2 VERTICAL TRANSPORTATION SERVICES

2.1 GENERAL

This section outlines the Vertical Transportation (VT) Services design and includes:

- Building A1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building A2: Three (3) new electric passenger lifts, Machine-Room less (MRL) type
- Building B1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B2: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B3: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building B4: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building C: Three (3) new electric passenger lifts, Machine-Room less (MRL) type
- Building D: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E1: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E2: Two (2) new electric passenger lifts, Machine-Room less (MRL) type
- Building E3: Two (2) new electric passenger lifts, Machine-Room less (MRL) type

2.2 BUILDING PLAN

The sketch below provides a visual representation of typical floor plan of residential spaces.

Figure 2-1: Image shows typical floor plan of residential spaces, *ref: DA-110-020 Rev. H*

2.3 STANDARDS AND REGULATIONS

There are several design standards, guidelines, and codes that are applicable to the VT service design for this project, and they have been listed in the table below.

Table 2-1: Referenced standards and regulations

Australian Standards	AS 1735.1.1:2022	Lifts, escalators and moving walks, Part 1.1: General requirements
	AS 1735.1.2:2021	Part 1.2: Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Passenger and goods passenger lifts [EN 81-20:2020]
	AS 1735.11-1986	Part 11: Fire-rated landing doors
	AS 1735.12:2020	Part 12: Facilities for persons with disabilities (EN 81-70:2018, MOD)
	AS 1735.19-2019	Part 19: Safety rule for the construction and installation of lifts - Lifts for the transport of persons and goods - Remote alarm on passenger and goods passenger lifts [EN 81-28:2018+AC:2019]
	AS 4431-2019	Guidelines for safe working on new lift installations in new constructions
Authorities	2022	National Construction Code
Other relevant Codes and Standards	AS/NZ 3000:2018 Amd 3	Electrical Installations (known as the Australian/New Zealand Wiring Rules). Wiring requirements for lift installations;
	AS 1668.1:2015	Ventilation and Air-conditioning in Buildings – Fire and Smoke Control
	AS1668.2-2012 Amd 2	Acceptable Ventilation Guidelines
	AS1170.4-2007 Amd 2	Earthquake actions in Australia
	ISO 9001	Quality Systems (Manufacturers shall provide evidence of accreditation)
		WHS Act 2011 and WHS Regulation 2017
	ISO 8100-32:2020	Planning and selection of passenger lifts to be installed in office, hotel and residential buildings

3 TRAFFIC STUDY SUMMARY

3.1 SIMULATION RESULTS AND COMMENTARY

Lift traffic simulations were run for the proposed design of residential lifts of the 129-153 Parramatta Road, Five Dock project based on:

- Turner plan and GA Sections issued on 24/06/24
- SEARS Application GFA schedule issued on 20/06/24
- Total estimated population of 3271 residents based on 1066 units

The table below shows the Average Waiting Times (AWT) for the recommended values (overall and quality levels) and the results from the simulations.

Table 3-1: Results of residential lifts traffic study

			Simulated	AWT Requirement			
Building		Scenario	AWT	Target Overall	Luxury	Standard	Basic
A1	Base	Two (2) Lifts, 1.0m/s	< 15 s ✓	≤ 60 s Standard	40-50 s	50-60 s	50-70 s
	Redundancy	One (1) Lift, 1.0m/s	20 s ✓				
A2	Base	Three (3) Lifts, 3.0m/s	54 s ✓	≤ 60 s Standard			
	Redundancy	Two (2) Lifts, 3.0m/s	> 500 s ✗				
B1	Base	Two (2) Lifts, 1.0m/s	< 15 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 1.0m/s	19 s ✓				
B2	Base	Two (2) Lifts, 1.0m/s	< 15 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 1.0m/s	< 15 s ✓				
B3	Base	Two (2) Lifts, 1.0m/s	23 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 1.0m/s	84 s ✗				
B4	Base	Two (2) Lifts, 3.0m/s	60 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 3.0m/s	> 500 s ✗				
C	Base	Three (3) Lifts, 2.0m/s	51 s ✓	≤ 70 s Basic			
	Redundancy	Two (2) Lifts, 3.0m/s	95 s ✗				
D	Base	Two (2) Lifts, 3.0m/s	69 s ✓	≤ 70 s Basic			
	Redundancy	One (1) Lifts, 3.0m/s	> 500 s ✗				
E1	Base	Two (2) Lifts, 3.0m/s	81 s ✗	≤ 60 s Standard			
	Redundancy	One (1) Lifts, 3.0m/s	> 500 s ✗				
E2	Base	Two (2) Lifts, 1.0m/s	< 15 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 1.0m/s	< 20 s ✓				
E3	Base	Two (2) Lifts, 1.0m/s	< 20 s ✓	≤ 60 s Standard			
	Redundancy	One (1) Lift, 1.0m/s	85 s ✗				

The results above generally show that the base lift quantities will meet the overall requirement and fall in their respective range using Conventional Group Control (CGC).

The traffic analysis for Building C indicates that a single lift core with three lifts would yield better results compared to two cores with two lifts each.

We recommend one additional lift in each Buildings B4, D and E1.

Note: Redundancy results are included to show indicative times when one lift of the base group is out-of-service during maintenance or repairs, or during resident turnover and the lift is used for moving furniture.

3.2 REQUIREMENTS

The recommended lift performance requirements have been drawn from ISO 8100-32:2020 (E) and are summarised in the tabled below.

Table 3-2: Summary of lift performance requirements

Parameter	Value
Average Waiting Time (AWT)	≤ 60 s
Handling capacity	7%/5-min
Traffic profile	Incoming 50%, outgoing 50%, Inter-floor 0%

Figure 3-1: Extract from ISO 8100:32 showing recommended performance requirements

Table 3 — Typical design criteria for simulation method, depending on building type

Building type and traffic mix	Required handling capacity $\%C_{h,req}$ % of population per 5 min	Required average waiting time $t_{aw,req}$ s
Office:		
— uppeak traffic (100 % incoming); or	≥12 %	≤30
— mixed uppeak traffic (85 % incoming, 10 % outgoing, 5 % interfloor); and	≥12 %	≤35
— lunch traffic (40 % incoming, 40 % outgoing, 20 % interfloor); or	≥11 %	≤40
— lunch traffic (45 % incoming, 45 % outgoing, 10 % interfloor)	≥11 %	≤40
Hotel:		
— two-way traffic (50 % incoming, 50 %outgoing)	≥12 %	≤40
NOTE Hotel chains can have their own design criteria.		
Residential:		
— two-way traffic (50 % incoming, 50 % outgoing)	≥7 %	≤60

3.3 ASSUMPTIONS

3.3.1 CAR PARK ENTRY BIAS

The Australia Bureau of Statistics (ABS) 2016 census was used to determine the percentage of people driving to work in the Five Dock area. This data is used to determine the entry bias to the car park in addition to the main entry on Floor G. The data shows that 57.1% of people used a car to travel to work and the average car occupancy rate is 1.1. The traffic study was based on 60% car usage (allow for future change to demographics) and 1.1 for car occupancy rate.

Entry bias for Buildings A2, B4, C1, D, and E1 are assumed 5% each for levels B3 and B2.

Figure 3-2: Extract from ABS 2016 Census for Five Dock

Travel to work, top responses *Employed people aged 15 years and over*	Five Dock	%	New South Wales	%	Australia	%
Car, as driver	2,501	53.3	1,953,399	57.8	6,574,571	61.5
Bus	616	13.1	133,903	4.0	323,201	3.0
Worked at home	213	4.5	163,026	4.8	503,582	4.7
Car, as passenger	178	3.8	144,820	4.3	489,922	4.6
Walked only	135	2.9	130,957	3.9	370,427	3.5
People who travelled to work by public transport	1,043	22.1	540,215	16.0	1,225,668	11.5
People who travelled to work by car as driver or passenger	2,835	60.1	2,182,854	64.6	7,305,271	68.4

In Five Dock, on the day of the Census, the most common methods of travel to work for employed people included Car, as driver 53.3%, Bus 13.1%, Worked at home 4.5%, Car, as passenger 3.8% and Walked only 2.9%. On the day, 22.1% of employed people used public transport (train, bus, ferry, tram/light rail) as at least one of their methods of travel to work and 60.1% used car (either as driver or as passenger).

View the data quality statement for Method of travel to work (MTWP)

3.4 RESIDENTIAL STACKING PLANS

3.4.1 BUILDING A1 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-3: Building A1 residential population and entry bias summary

									Lifts 1 & 2														Occupancy Factors					car park use factor	60%		
																							1.8	3	4	5			people/car	1.1		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																					-	-	-	-	-	-					
																					-	-	-	-	-	-					
																					-	-	-	-	-	-					
DA-110-040	B	9	4				18,200	3,300	X	F							Residential	3	1	1		5	5	3	4	-	12					
DA-110-030	B	8	3				14,900	3,200	X	F		✓					Residential	4	5	-		9	7	15	-	-	22					
DA-110-020	B	7	2				11,700	3,300	X	F		✓					Residential	4	5	-		9	7	15	-	-	22					
DA-110-010	D	6	1				8,400	4,700	X	F		✓					Residential	3	4	2		9	5	12	8	-	25					
DA-110-009	D	5	G	ME			3,700	4,000	X	F		✓					Retail					-	-	-	-	-	-					73%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement					-	-	-	-	-	-		2	2	2	2%
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-		14	10	10	12%
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement					-	-	-	-	-	-		14	10	10	12%
								Qty	8	8	0		0	0	0			14	15	3	-	32	25	45	12	-	81	-	30	22	22	

3.4.2 BUILDING A2 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below. *See Note 2 regarding entry bias.*

Table 3-4: Building A2 residential population and entry bias summary

									Lifts 1, 2 & 3														Occupancy Factors					car park use factor	60%		
																							1.8	3	4	5			people/car	1.1		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
								-														-	-	-	-	-	-					
																	Plant					-	-	-	-	-	-					
		36	Roof				104,900	3,300									R	-				-	-	-	-	-	-					
DA-110-300	A	35	30				101,600	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-290	A	34	29				98,400	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-280	A	33	28				95,200	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-270	A	32	27				92,000	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-260	A	31	26				88,800	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-250	A	30	25				85,600	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-240	A	29	24				82,400	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-230	B	28	23				79,200	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-220	B	27	22				76,000	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-210	B	26	21				72,800	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-200	B	25	20				69,600	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-190	B	24	19				66,400	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-180	B	23	18				63,200	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-170	B	22	17				60,000	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-160	B	21	16				56,800	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-150	B	20	15				53,600	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-140	B	19	14				50,400	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-130	B	18	13				47,200	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-120	B	17	12				44,000	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-110	B	16	11				40,800	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-100	B	15	10				37,600	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-090	B	14	9				34,400	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-080	B	13	8				31,200	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-070	B	12	7				28,000	3,200	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-060	B	11	6				24,800	3,300	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-050	B	10	5				21,500	3,300	X	F		✓					Residential	-	4	2		6	-	12	8	-	20					
DA-110-040	B	9	4				18,200	3,300	X	F		✓					Residential	2	3	3		8	4	9	12	-	25					
DA-110-030	B	8	3				14,900	3,200	X	F		✓					Residential	5	4	2		11	9	12	8	-	29					
DA-110-020	B	7	2				11,700	3,300	X	F		✓					Residential	5	4	2		11	9	12	8	-	29					
DA-110-010	D	6	1				8,400	4,700	X	F		✓					Residential	5	4	2		11	9	12	8	-	29					
DA-110-009	D	5	G	ME			3,700	4,000	X	F		✓					Retail					-	-	-	-	-	-					89%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement					-	-	-	-	-	-		11	8	8	1%
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-		85	57	57	5%
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement					-	-	-	-	-	-		86	57	57	5%
								Qty	34	34	0		0	0	0			17	119	61	-	197	31	357	244	-	632	-	182	122	122	

3.4.3 BUILDING B1 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-5: Building B1 residential population and entry bias summary

									Lifts 1 & 2															Occupancy Factors					car park use factor	60%			
																								1.8	3	4	5		people/car	1.1			
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																							-	-	-	-	-					
																							-	-	-	-	-					
																							-	-	-	-	-					
DA-110-040	B	9	4				18,700	3,200	X	F							Residential	1	5	-		6	2	15	-	-	17					
DA-110-030	B	8	3				15,500	3,200	X	F		✓					Residential	1	5	-		6	2	15	-	-	17					
DA-110-020	B	7	2				12,300	3,200	X	F		✓					Residential	1	5	-		6	2	15	-	-	17					
DA-110-010	D	6	1				9,100	5,100	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-009	D	5	G	ME			4,000	4,300	X	F		✓					Retail				-	-	-	-	-	-	-					74%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	2	2	2	3%	
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	11	8	8	11%	
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement				-	-	-	-	-	-	-	11	8	8	11%	
								Qty	8	8	0		0	0	0			3	20	1	-	24	5	60	4	-	70	-	24	18	18	

3.4.4 BUILDING B2 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-6: Building B2 residential population and entry bias summary

									Lifts 1 & 2															Occupancy Factors					car park use factor	60%			
																								1.8	3	4	5		people/car	1.1			
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																											-					
																											-					
DA-110-040	B	9	4				18,700	3,200	X	F							Residential	2	2			4	4	6	-	-	10					
DA-110-030	B	8	3				15,500	3,200	X	F		✓					Residential	2	2			4	4	6	-	-	10					
DA-110-020	B	7	2				12,300	3,200	X	F		✓					Residential	2	2			4	4	6	-	-	10					
DA-110-010	D	6	1				9,100	5,100	X	F		✓					Residential	1	1			2	2	3	-	-	5					
DA-110-009	D	5	G	ME			4,000	4,300	X	F		✓					Retail				-	-	-	-	-	-	-					69%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	1	1	1	3%	
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	7	5	5	14%	
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement				-	-	-	-	-	-	-	7	5	5	14%	
								Qty	8	8	0		0	0	0			7	7	-	-	14	13	21	-	-	35	-	15	11	11	

3.4.5 BUILDING B3 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-7: Building B3 residential population and entry bias summary

									Lifts 1 & 2															Occupancy Factors					car park use factor	60%			
																								1.8	3	4	5		people/car	1.1			
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																						-	-	-	-	-	-					
																						-	-	-	-	-	-					
DA-110-090	B	14	9				34,800	3,200	X	F							Residential	2	2	2		6	4	6	8	-	18					
DA-110-080	B	13	8				31,600	3,200	X	F		✓					Residential	2	2	2		6	4	6	8	-	18					
DA-110-070	B	12	7				28,400	3,200	X	F		✓					Residential	2	2	2		6	4	6	8	-	18					
DA-110-060	B	11	6				25,200	3,300	X	F		✓					Residential	2	2	2		6	4	6	8	-	18					
DA-110-050	B	10	5				21,900	3,200	X	F		✓					Residential	2	2	2		6	4	6	8	-	18					
DA-110-040	B	9	4				18,700	3,200	X	F		✓					Residential	3	5	2		10	5	15	8	-	28					
DA-110-030	B	8	3				15,500	3,200	X	F		✓					Residential	3	5	2		10	5	15	8	-	28					
DA-110-020	B	7	2				12,300	3,200	X	F		✓					Residential	4	4	2		10	7	12	8	-	27					
DA-110-010	D	6	1				9,100	5,100	X	F		✓					Residential	2	1	-		3	4	3	-	-	7					
DA-110-009	D	5	G	ME			4,000	4,300	X	F		✓					Retail				-	-	-	-	-	-	-					77%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	4	3	3	2%	
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement				-	-	-	-	-	-	-	28	19	19	11%	
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement				-	-	-	-	-	-	-	28	19	19	11%	
								Qty	13	13	0		0	0	0			22	25	16	-	63	40	75	64	-	180	-	60	41	41	

3.4.6 BUILDING B4 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below. *See Note 2 regarding entry bias.*

Table 3-8: Building B4 residential population and entry bias summary

										Lifts 1 & 2							
DWG Ref	Rev	Floor	Marking	ET	F1	F2		FFL	FTF	S	F	R	FTF	S	F	R	FTF
DA-110-210	B	26	21					73,200	3,200	X	F						
DA-110-200	B	25	20					70,000	3,200	X	F		✓				
DA-110-190	B	24	19					66,800	3,200	X	F		✓				
DA-110-180	B	23	18					63,600	3,200	X	F		✓				
DA-110-170	B	22	17					60,400	3,200	X	F		✓				
DA-110-160	B	21	16					57,200	3,200	X	F		✓				
DA-110-150	B	20	15					54,000	3,200	X	F		✓				
DA-110-140	B	19	14					50,800	3,200	X	F		✓				
DA-110-130	B	18	13					47,600	3,200	X	F		✓				
DA-110-120	B	17	12					44,400	3,200	X	F		✓				
DA-110-110	B	16	11					41,200	3,200	X	F		✓				
DA-110-100	B	15	10					38,000	3,200	X	F		✓				
DA-110-090	B	14	9					34,800	3,200	X	F		✓				
DA-110-080	B	13	8					31,600	3,200	X	F		✓				
DA-110-070	B	12	7					28,400	3,200	X	F		✓				
DA-110-060	B	11	6					25,200	3,300	X	F		✓				
DA-110-050	B	10	5					21,900	3,200	X	F		✓				
DA-110-040	B	9	4					18,700	3,200	X	F		✓				
DA-110-030	B	8	3					15,500	3,200	X	F		✓				
DA-110-020	B	7	2					12,300	3,200	X	F		✓				
DA-110-010	D	6	1					9,100	5,100	X	F		✓				
DA-110-009	D	5	G	ME				4,000	4,300	X	F		✓				
DA-110-008	D	3	B1	AE	CP		-	300	3,700	X	F		✓				
DA-110-007	D	2	B2	AE	CP		-	4,000	3,700	X	F		✓				
DA-110-006	A	1	B3	AE	CP		-	7,700		X	F		✓				
									Qty	25	25	0		0	0	0	

							Occupancy Factors					car park use factor			60%	
							1.8	3	4	5				people/car	1.1	
DWG Ref	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
						-	-	-	-	-	-					
						-	-	-	-	-	-					
DA-110-210	Residential	-	4	3		7	-	12	12	-	24					
DA-110-200	Residential	-	4	3		7	-	12	12	-	24					
DA-110-190	Residential	-	4	3		7	-	12	12	-	24					
DA-110-180	Residential	-	4	3		7	-	12	12	-	24					
DA-110-170	Residential	-	4	3		7	-	12	12	-	24					
DA-110-160	Residential	-	4	3		7	-	12	12	-	24					
DA-110-150	Residential	-	4	3		7	-	12	12	-	24					
DA-110-140	Residential	-	4	3		7	-	12	12	-	24					
DA-110-130	Residential	-	4	3		7	-	12	12	-	24					
DA-110-120	Residential	-	4	3		7	-	12	12	-	24					
DA-110-110	Residential	-	4	3		7	-	12	12	-	24					
DA-110-100	Residential	-	4	3		7	-	12	12	-	24					
DA-110-090	Residential	-	4	3		7	-	12	12	-	24					
DA-110-080	Residential	-	4	3		7	-	12	12	-	24					
DA-110-070	Residential	-	4	3		7	-	12	12	-	24					
DA-110-060	Residential	-	4	3		7	-	12	12	-	24					
DA-110-050	Residential	-	4	3		7	-	12	12	-	24					
DA-110-040	Residential	3	1	2		6	5	3	8	-	16					
DA-110-030	Residential	3	1	2		6	5	3	8	-	16					
DA-110-020	Residential	3	1	2		6	5	3	8	-	16					
DA-110-010	Residential	3	3	1		7	5	9	4	-	18					
DA-110-009	Retail					-	-	-	-	-	-					89%
DA-110-008	Basement					-	-	-	-	-	-		8	6	6	1%
DA-110-007	Basement					-	-	-	-	-	-		62	41	41	5%
DA-110-006	Basement						-	-	-	-	-		63	42	42	5%
		12	74	58	-	144	22	222	232	-	474	-	133	89	89	

3.4.7 BUILDING C STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below. *See Note 2 regarding entry bias.*

Table 3-9: Building C1 residential population and entry bias summary

										Lifts 1, 2 & 3							
DWG Ref	Rev	Floor	Marking	ET	F1	F2		FFL	FTF	S	F	R	FTF	S	F	R	FTF
DA-110-220	B	27	22					77,100	3,200	X	F						
DA-110-210	B	26	21					73,900	3,200	X	F		✓				
DA-110-200	B	25	20					70,700	3,200	X	F		✓				
DA-110-190	B	24	19					67,500	3,200	X	F		✓				
DA-110-180	B	23	18					64,300	3,200	X	F		✓				
DA-110-170	B	22	17					61,100	3,200	X	F		✓				
DA-110-160	B	21	16					57,900	3,200	X	F		✓				
DA-110-150	B	20	15					54,700	3,200	X	F		✓				
DA-110-140	B	19	14					51,500	3,200	X	F		✓				
DA-110-130	B	18	13					48,300	3,200	X	F		✓				
DA-110-120	B	17	12					45,100	3,200	X	F		✓				
DA-110-110	B	16	11					41,900	3,200	X	F		✓				
DA-110-100	B	15	10					38,700	3,200	X	F		✓				
DA-110-090	B	14	9					35,500	3,200	X	F		✓				
DA-110-080	B	13	8					32,300	3,200	X	F		✓				
DA-110-070	B	12	7					29,100	3,200	X	F		✓				
DA-110-060	B	11	6					25,900	3,300	X	F		✓				
DA-110-050	B	10	5					22,600	3,200	X	F		✓				
DA-110-040	B	9	4					19,400	3,200	X	F		✓				
DA-110-030	B	8	3					16,200	3,200	X	F		✓				
DA-110-020	B	7	2					13,000	3,800	X	F		✓				
DA-110-010	D	6	1					9,200	4,600	X	F		✓				
DA-110-009	D	5	G	ME				4,600	4,900	X	F		✓				
DA-110-008	D	3	B1	AE	CP		-	300	3,700	X	F		✓				
DA-110-007	D	2	B2	AE	CP		-	4,000	3,700	X	F		✓				
DA-110-006	A	1	B3	AE	CP		-	7,700		X	F		✓				
									Qty	26	26	0		0	0	0	

							Occupancy Factors					car park use factor			60%	
							1.8	3	4	5				people/car	1.1	
DWG Ref	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
						-	-	-	-	-	-					
DA-110-220	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-210	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-200	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-190	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-180	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-170	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-160	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-150	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-140	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-130	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-120	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-110	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-100	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-090	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-080	Residential	-	7	1	-	8	-	21	4	-	25					
DA-110-070	Residential	2	6	1	-	9	4	18	4	-	26					
DA-110-060	Residential	2	6	1	-	9	4	18	4	-	26					
DA-110-050	Residential	2	6	1	-	9	4	18	4	-	26					
DA-110-040	Residential	3	13	-	-	16	5	39	-	-	44					
DA-110-030	Residential	3	13	-	-	16	5	39	-	-	44					
DA-110-020	Residential	4	12	-	-	16	7	36	-	-	43					
DA-110-010	Retail					-	-	-	-	-	-					
DA-110-009	Retail					-	-	-	-	-	-					90%
DA-110-008	Basement					-	-	-	-	-	-			-	-	0%
DA-110-007	Basement					-	-	-	-	-	-		90	60	60	5%
DA-110-006	Basement						-	-	-	-	-		90	60	60	5%
		16	161	18	-	195	29	483	72	-	584	-	180	120	120	

3.4.8 BUILDING D STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below. *See Note 2 regarding entry bias.*

Table 3-10: Building D residential population and entry bias summary

									Lifts 1 & 2																Occupancy Factors					car park use factor	60%		
																									1.8	3	4	5		people/car	1.1		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																						-	-	-	-	-	-					
																						-	-	-	-	-	-					
DA-110-260	A	31	26				90,100	3,200	X	F							Residential	-	3	2		5	-	9	8	-	17					
DA-110-250	A	30	25				86,900	3,400	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-240	A	29	24				83,500	3,000	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-230	B	28	23				80,500	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-220	B	27	22				77,300	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-210	B	26	21				74,100	3,300	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-200	B	25	20				70,800	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-190	B	24	19				67,600	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-180	B	23	18				64,400	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-170	B	22	17				61,200	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-160	B	21	16				58,000	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-150	B	20	15				54,800	3,200	X	F		✓					Residential	-	3	2		5	-	9	8	-	17					
DA-110-140	B	19	14				51,600	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-130	B	18	13				48,400	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-120	B	17	12				45,200	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-110	B	16	11				42,000	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-100	B	15	10				38,800	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-090	B	14	9				35,600	3,200	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-080	B	13	8				32,400	3,300	X	F		✓					Residential	-	5	1		6	-	15	4	-	19					
DA-110-070	B	12	7				29,100	3,200	X	F		✓					Residential	3	3	1		7	5	9	4	-	18					
DA-110-060	B	11	6				25,900	3,300	X	F		✓					Residential	3	3	1		7	5	9	4	-	18					
DA-110-050	B	10	5				22,600	3,200	X	F		✓					Residential	3	3	1		7	5	9	4	-	18					
DA-110-040	B	9	4				19,400	3,200	X	F		✓					Residential	8	3	-		11	14	9	-	-	23					
DA-110-030	B	8	3				16,200	3,200	X	F		✓					Residential	8	3	-		11	14	9	-	-	23					
DA-110-020	B	7	2				13,000	3,800	X	F		✓					Residential	8	3	-		11	14	9	-	-	23					
DA-110-010	D	6	1				9,200	4,600	X	F		✓					Retail					-	-	-	-	-	-					
DA-110-009	D	5	G	ME			4,600	4,900	X	F		✓					Retail					-	-	-	-	-	-					89%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement					-	-	-	-	-	-	7	5	5	1%	
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-	72	48	48	5%	
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement					-	-	-	-	-	-	72	48	48	5%	
								Qty	30	30	0		0	0	0			33	89	34	-	156	59	267	136	-	460	-	151	101	101		

3.4.9 BUILDING E1 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below. *See Note 2 regarding entry bias.*

Table 3-11: Building E1 residential population and entry bias summary

									Lifts 1 & 2																Occupancy Factors					car park use factor	60%		
																									1.8	3	4	5		people/car	1.2		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																						-	-	-	-	-	-					
																						-	-	-	-	-	-					
DA-110-240	A	29	24				84,800	3,200	X	F							Residential	-	1	5		6	-	3	20	-	23					
DA-110-230	B	28	23				81,600	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-220	B	27	22				78,400	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-210	B	26	21				75,200	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-200	B	25	20				72,000	3,400	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-190	B	24	19				68,600	3,000	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-180	B	23	18				65,600	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-170	B	22	17				62,400	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-160	B	21	16				59,200	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-150	B	20	15				56,000	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-140	B	19	14				52,800	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-130	B	18	13				49,600	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-120	B	17	12				46,400	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-110	B	16	11				43,200	3,200	X	F		✓					Residential	-	1	5		6	-	3	20	-	23					
DA-110-100	B	15	10				40,000	3,200	X	F		✓					Residential	2	6	-		8	4	18	-	-	22					
DA-110-090	B	14	9				36,800	3,200	X	F		✓					Residential	2	6	-		8	4	18	-	-	22					
DA-110-080	B	13	8				33,600	3,200	X	F		✓					Residential	2	6	-		8	4	18	-	-	22					
DA-110-070	B	12	7				30,400	3,200	X	F		✓					Residential	2	6	-		8	4	18	-	-	22					
DA-110-060	B	11	6				27,200	3,200	X	F		✓					Residential	2	3	-		5	4	9	-	-	13					
DA-110-050	B	10	5				24,000	3,300	X	F		✓					Residential	2	3	-		5	4	9	-	-	13					
DA-110-040	B	9	4				20,700	3,200	X	F		✓					Residential	4	5	1		10	7	15	4	-	26					
DA-110-030	B	8	3				17,500	3,200	X	F		✓					Residential	4	5	1		10	7	15	4	-	26					
DA-110-020	B	7	2				14,300	3,800	X	F		✓					Residential	6	3	1		10	11	9	4	-	24					
DA-110-010	D	6	1				10,500	6,000	X	F		✓					Retail					-	-	-	-	-	-					
DA-110-009	D	5	G	ME			4,500	4,800	X	F		✓					Retail					-	-	-	-	-	-					89%
DA-110-008	D	3	B1	AE	CP		300	3,700	X	F		✓					Basement					-	-	-	-	-	-	7	6	6	1%	
DA-110-007	D	2	B2	AE	CP		4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-	72	52	52	5%	
DA-110-006	A	1	B3	AE	CP		7,700		X	F		✓					Basement					-	-	-	-	-	-	72	52	52	5%	
								Qty	28	28	0		0	0	0			26	57	73	-	156	47	171	292	-	512	-	151	110	110		

3.4.10 BUILDING E2 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-12: Building E2 residential population and entry bias summary

									Lifts 1 & 2														Occupancy Factors					car park use factor:	60%			
																							1.8	3	4	5			people/car	1.1		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																						-	-	-	-	-						
																						-	-	-	-	-						
DA-110-040	B	9	4				20,700	3,200	X	F							Residential	-	4	1		5	-	12	4	-	16					
DA-110-030	B	8	3				17,500	3,200	X	F		✓					Residential	-	4	1		5	-	12	4	-	16					
DA-110-020	B	7	2				14,300	3,800	X	F		✓					Residential	1	1	2		4	2	3	8	-	13					
DA-110-010	D	6	1				10,500	6,000	X	F		✓					Retail					-	-	-	-	-	-					
DA-110-009	D	5	G	ME			4,500	4,800	X	F		✓					Retail					-	-	-	-	-	-					76%
DA-110-008	D	3	B1	AE	CP	-	300	3,700	X	F		✓					Basement					-	-	-	-	-	-		1	1	1	2%
DA-110-007	D	2	B2	AE	CP	-	4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-		7	5	5	11%
DA-110-006	A	1	B3	AE	CP	-	7,700		X	F		✓					Basement					-	-	-	-	-	-		7	5	5	11%
							Qty		8	8	0		0	0	0			1	9	4	-	14	2	27	16	-	45	-	15	11	11	

3.4.11 BUILDING E3 STACKING PLAN

The stacking plan is a summary of the key data collected, estimated building population, car parking spots, and the entry bias, see below.

Table 3-13: Building E3 residential population and entry bias summary

									Lifts 1 & 2														Occupancy Factors					car park use factor:	60%			
																							1.8	3	4	5			people/car	1.2		
DWG Ref	Rev	Floor	Marking	ET	F1	F2	FFL	FTF	S	F	R	FTF	S	F	R	FTF	Use	BR-1	BR-2	BR-3	BR-4	T U	1B	2B	3B	4B	T P	MB	CP	CP	Total	%
																						-	-	-	-	-						
DA-110-060	B	11	6				27,200	3,200	X	F							Residential	2	3	1		6	4	9	4	-	17					
DA-110-050	B	10	5				24,000	3,300	X	F		✓					Residential	2	3	1		6	4	9	4	-	17					
DA-110-040	B	9	4				20,700	3,200	X	F		✓					Residential	4	13	-		17	7	39	-	-	46					
DA-110-030	B	8	3				17,500	3,200	X	F		✓					Residential	4	22	-		26	7	66	-	-	73					
DA-110-020	B	7	2				14,300	3,800	X	F		✓					Residential	4	12	-		16	7	36	-	-	43					
DA-110-010	D	6	1				10,500	6,000	X	F		✓					Retail					-	-	-	-	-	-					
DA-110-009	D	5	G	ME			4,500	4,800	X	F		✓					Retail					-	-	-	-	-	-					74%
DA-110-008	D	3	B1	AE	CP	-	300	3,700	X	F		✓					Basement					-	-	-	-	-	-		3	3	3	2%
DA-110-007	D	2	B2	AE	CP	-	4,000	3,700	X	F		✓					Basement					-	-	-	-	-	-		33	24	24	12%
DA-110-006	A	1	B3	AE	CP	-	7,700		X	F		✓					Basement					-	-	-	-	-	-		33	24	24	12%
							Qty		10	10	0		0	0	0			16	53	2	-	71	29	159	8	-	196	-	69	51	51	

Table 3-14: Legend to colour codes in the stacking plans above

	Main Entrance	ME
	Additional Entrance	AE
	Emergency Exit	EE
	Not Served	NS
	Plant	PL
	Suspended Pit	SP
	Communal	CO
	Car Parking	CP

Notes:

1. Any changes to the above stacking plans will require re-assessment to determine the VT system meets the guidelines.
2. Entry bias for Buildings A2, B4, C, D, and E1 are assumed 5% each for levels B3 and B2.

3.5 SIMULATION PARAMETERS

Traffic simulations have been run using an estimated population in the stacking plan and the additional parameters below.

Table 3-15: Analysis data

ANALYSIS DATA	
Analysis Type	Simulation
Measurement system	Metric
Dispatcher Algorithm	Group Collective
Time slice between simulation calculations (s)	0.10
No of time slices between screen updates	10
No of simulations to run for each configuration	10
No of learning runs	0
Random number seed for passenger generator	1
Energy Model	Off

Table 3-16: Passenger data

PASSENGER DATA	
Arrangement	Conventional
Template	ISO 8100-32:2020
Demand (% pop per 5 mins)	7.00
Incoming (%)	50.00
Outgoing (%)	50.00
Interfloor (%)	0.00
Start Time (hrs:mins)	17:00
End Time (hrs:mins)	19:00
Passenger Mass (kg)	75
Passenger Area (m^2)	0.21
Loading Time (s)	1.00
Unloading Time (s)	1.00
Stair Factor (%)	0.00
Capacity Factor by Mass (%)	80.00
Capacity Factor by Area (%)	100.00

Table 3-17: Lift data, Buildings A and B

LIFT DATA	A1	A2	B1	B2	B3	B4
	Lifts 1 & 2	Lifts 1, 2 & 3	Lifts 1 & 2	Lifts 1 & 2	Lifts 1 & 2	Lifts 1 & 2
Type	Single Deck	Single Deck	Single Deck	Single Deck	Single Deck	Single Deck
Capacity (kg)	1,500	1,500	1,500	1,500	1,500	1,500
Car area (m^2)	3.34	3.34	3.34	3.34	3.34	3.34
Door Pre-opening Time (s)	0.00	0.00	0.00	0.00	0.00	0.00
Door Open Time (s)	1.70	1.70	1.70	1.70	1.70	1.70
Door Close Time (s)	2.70	2.70	2.70	2.70	2.70	2.70
Door Dwell 1 (s)	3.00	3.00	3.00	3.00	3.00	3.00
Door Dwell 2 (s)	1.00	1.00	1.00	1.00	1.00	1.00
Speed (m/s)	**1.00**	**3.00**	**1.00**	**1.00**	**1.00**	**3.00**
Acceleration (m/s^2)	0.60	1.00	0.60	0.60	0.80	1.00
Jerk (m/s^3)	0.80	1.00	0.80	0.80	1.00	1.00
Start Delay (s)	0.50	0.50	0.50	0.50	0.50	0.50
Levelling Delay (s)	0.00	0.00	0.00	0.00	0.00	0.00
Home Floor	G		G	G	G	G

Table 3-18: Lift data, Buildings C, D, and E

LIFT DATA	C	D	E1	E2	E3
	Lifts 1, 2 & 3	Lifts 1 & 2	Lifts 1 & 2	Lifts 1 & 2	Lifts 1 & 2
Type	Single Deck	Single Deck	Single Deck	Single Deck	Single Deck
Capacity (kg)	1,500	1,500	1,500	1,500	1,500
Car area (m^2)	3.34	3.34	3.34	3.34	3.34
Door Pre-opening Time (s)	0.00	0.00	0.00	0.00	0.00
Door Open Time (s)	1.70	1.70	1.70	1.70	1.70
Door Close Time (s)	2.70	2.70	2.70	2.70	2.70
Door Dwell 1 (s)	3.00	3.00	3.00	3.00	3.00
Door Dwell 2 (s)	1.00	1.00	1.00	1.00	1.00
Speed (m/s)	**2.00**	**3.00**	**3.00**	**1.00**	**1.00**
Acceleration (m/s^2)	1.00	1.00	1.00	0.60	0.80
Jerk (m/s^3)	1.00	1.00	1.00	0.80	1.00
Start Delay (s)	0.50	0.50	0.50	0.50	0.50
Levelling Delay (s)	0.00	0.00	0.00	0.00	0.00
Home Floor	G			G	G

4 LIFT TECHNICAL SCHEDULE

4.1 RESIDENTIAL BUILDING A1, B1, B2, B3, E2, E3

These residential towers consist of two lifts each configured as duplex, machine-room-less (MRL) type. Their purpose is to provide vertical circulation for residents and their guests, the transportation of goods e.g. furniture. The table below details the lift design.

Table 4-1: Lifts preliminary technical schedule

Item	Details
Number of lifts	Two (2) each tower
Capacity / Passenger rating	1,500 kg 20
Speed	1.0 m/s
Well size W x D, each lift	2,500 x 2,500, *excludes dividing wall between lifts* *
Headroom height	4,400
Pit depth	1,400

4.2 RESIDENTIAL BUILDING B4, D, E1

These residential towers consist of two lifts each configured as duplex, all lifts are machine-room-less (MRL) type. Their purpose is to provide vertical circulation for residents and their guests, the transportation of goods e.g. furniture. The table below details the lift design.

Table 4-2: Lifts preliminary technical schedule

Item	Details
Number of lifts	Two (2) each tower
Capacity / Passenger rating	1,500 kg 20
Speed	3.0 m/s
Well size W x D, each lift	2,500 x 2,500, *excludes dividing wall between lifts* *
Headroom height	5,600
Pit depth	3,000 *may require pit access subject to supplier*

4.3 RESIDENTIAL BUILDING C

Tower C consists of three lifts configured as triplex, all lifts are machine-room-less (MRL) type. Their purpose is to provide vertical circulation for residents and their guests, the transportation of goods e.g. furniture. The table below details the lift design.

Table 4-3: Lifts preliminary technical schedule

Item	Details
Number of lifts	Three (3)
Capacity / Passenger rating	1,500 kg 20
Speed	2.0 m/s
Well size W x D, each lift	2,500 x 2,500, *excludes dividing wall between lifts* *
Headroom height	4,600
Pit depth	2,000

4.4 RESIDENTIAL BUILDING A2

Tower A2 consists of three lifts configured as a triplex, machine-room-less (MRL) type. Their purpose is to provide vertical circulation for residents and their guests, the transportation of goods e.g. furniture. The table below details the lift design.

Table 4-4: Lifts preliminary technical schedule

Item	Details
Number of lifts	Three (3)
Capacity / Passenger rating	1,500 kg 20
Speed	3.0 m/s
Well size W x D, each lift	2,500 x 2,500, *excludes dividing wall between each lift**
Headroom height	5,600
Pit depth	3,000 *may require pit access subject to supplier*

** Dividing wall nominal 200 thick subject to structural engineer's advice. If not required, trimmer beams can be supplied by lift contractor, nominal 150 wide.*