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Epping Park - Stage 3 Final Design
Cross Ventilation Study
Building 11 through to 17

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Cross Ventilation Study

Building 11 through to 17

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Table of Contents

1	INTRODUCTION	5
2	NATURAL VENTILATION	6
2.1	General Principles	6
2.2	SEPP 65 - Residential Component	6
3	PROPOSED DEVELOPMENT NATURAL VENTILATION OPPORTUNITIES	7
3.1	RESULTS BUILDING 11	7
3.2	RESULTS BUILDING 12	9
3.3	RESULTS BUILDING 13-14	11
3.4	RESULTS BUILDING 15-16	14
3.5	RESULTS BUILDING 17	17
4	SUMMARY	19
5	CLOSURE	19

TABLES

Table 1	Building 11	7
Table 2	Building 12	9
Table 3	Building 13-14	11
Table 4	Building 15-16	14
Table 5	Building 17	17

FIGURES

Figure 1	Site Location	5
Figure 2	Building 11 - Ground floor, Level 1, 2, 3 and 4	8
Figure 3	Building 11 – Level 5	8
Figure 4	Building 12 – Ground Floor	9
Figure 5	Building 12 – Level 1, 2, 3 and 4	10
Figure 6	Building 12 – Level 5	10
Figure 7	Building 13-14 - Lower Ground	11
Figure 8	Building 13-14 - Ground floor	12
Figure 9	Building 13-14 – Level 1	12
Figure 10	Building 13-14 – Level 2	12
Figure 11	Building 13-14 – Level 3	13
Figure 12	Building 13-14 – Level 4	13
Figure 13	Building 13-14 – Level 5	13
Figure 14	Building 15-16 – Lower Ground	14
Figure 15	Building 15-16 – Ground	15

Table of Contents

Figure 16	Building 15-16 – Level 1, 2, 3 and	15
Figure 17	Building 15-16 – Level 4	16
Figure 18	Building 15-16 – Level 5	16
Figure 19	Building 17 - Ground level	17
Figure 20	Building 17 - Level 1	18
Figure 21	Building 17 – Level 2	18
Figure 22	Building 17 – Level 3	18

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) has been engaged by Meriton Apartments Pty Ltd (Meriton) to qualitatively assess the natural ventilation of all residential apartments in the Epping Park Stage 3 development. Part of the State Environmental Planning Policy 65 requires that at least 60% of apartments have access to natural cross ventilation by either dual frontages or by other innovative design features. This report will assess the number of apartments which effectively achieve this requirement.

The Development is located at 61 Mobbs Lane Epping, NSW. The site is bounded to the south by the Mobbs lane and to the East by Edenlee St. The area surrounding the site consists of a range of buildings mostly consisting of low rise residential. The proposed development consists of 4 separate building with a maximum height of 6 storeys above ground level. There are a total of 326 dwellings in the entire development.

Figure 1 Site Location



2 NATURAL VENTILATION

2.1 General Principles

A key feature of the proposed development is the incorporation of façade openings designed to enable various spaces within the development buildings to make use of wind-induced natural ventilation throughout the year thereby minimising energy costs.

Wind-induced natural ventilation works on the straightforward principle of differential pressure. If a building envelope has multiple openings and there exists a pressure difference between those openings, eg the wind pressure at one opening is greater than the pressure at the other opening, airflow will be pushed through the building in the direction positive to negative.

The resulting amount of airflow through the building envelope will be a function of the magnitude of the pressure differential, size of the various building openings and degree of “blockage” in between. Open plan apartments will operable windows on multiple facades provided high potential for natural ventilation. Corner blocks typically achieve this however apartments that span the width of the building with windows on opposing sides provide the best cross ventilation properties.

2.2 SEPP 65 - Residential Component

The most important role of natural ventilation in the context of the residential apartments is to remove accumulated heat gain during overheated periods. In this case, ventilation is intended to achieve predicted rates of volumetric air change. Also important during the summer months is the role of ventilation in directly improving the perception of thermal comfort by occupants of a space. This is achieved when moving air aids the evaporation of perspiration by passing over the skin. As long as there is some air movement, most people will tolerate somewhat higher temperatures.

Heat build-up within apartments through daytime summer temperatures can be quickly purged with the availability of suitable breezes at the site.

Building design should enable ventilation to be controlled, where comfort levels are maintained for the occupants during the summer and winter extremes. Locations of windows and openings within each apartment are to be suitably in line where possible with each other on opposite sides of the room. It is recommended that building openings be designed such that cross-ventilation is maximised, to minimise heat gain in summer.

Ventilation of building is achieved by permanent openings, windows, doors or other devices which have an aggregate opening or operable size of not less than 5% of the floor area of the ventilated room. The provision of ceiling fans for use in summer months is also encouraged.

In winter it is important to close off heated areas that need warming. The opportunity to open and close balcony doors will allow adequate control to moderate the impact of any higher than comfortable winds. It is recommended that the following initiatives also be incorporated to minimise heat leakage from the building:

- Design detailing of the glazing interface to the window framing system and the provision of adequate sealing in accordance with the Building Code of Australia (BCA).
- Doors leading to hallways, stairwells and non-common use areas provided with draught excluders to limit heat losses during winter months.
- Doors located throughout the development in general-use areas, such as access ways to/from the building, fitted with door closers where it is deemed that their opening will have an adverse effect on heat loss during winter.

SEPP 65 specifies the following rules of thumb:

- Building depth, which support natural ventilation typically range from 10 to 18 meters.

- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within the development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.

3 PROPOSED DEVELOPMENT NATURAL VENTILATION OPPORTUNITIES

The natural ventilation for the proposed residential development has been qualitatively assessed. Ventilation is achieved by the differential pressure between the different building facades. The following comments are made with regard to the proposed natural ventilation system. The following assumptions were made for all buildings:

- All windows, particularly bedroom and Kitchen windows were operable
- Kitchens were open plan design

3.1 RESULTS BUILDING 11

Building 11 had a total of 47 apartments with 35 sufficiently cross ventilated according to the qualitative requirements of SEPP 65 this is equivalent to a pass rate of 74%. The current design Building 11 has exceeded the minimum pass rate of 60%.

Table 1 Building 11

Level	Number of apartments	Number of apartments that are naturally ventilated
G	8	6
1	8	6
2	8	6
3	8	6
4	8	6
5	7	5
Total	47	35

Figure 2 Building 11 - Ground floor, Level 1, 2, 3 and 4



Figure 3 Building 11 – Level 5



3.2 RESULTS BUILDING 12

Building 12 had a total of 83 apartments with 53 sufficiently cross ventilated according to the qualitative requirements of SEPP 65 this is equivalent to a pass rate of 64%. The current design of Building 12 has exceeded the minimum pass rate of 60%.

Table 2 Building 12

Level	Number of apartments	Number of apartments that are naturally ventilated
G	14	9
1	14	9
2	14	9
3	14	9
4	14	9
5	13	8
Total	83	53

Figure 4 Building 12 – Ground Floor

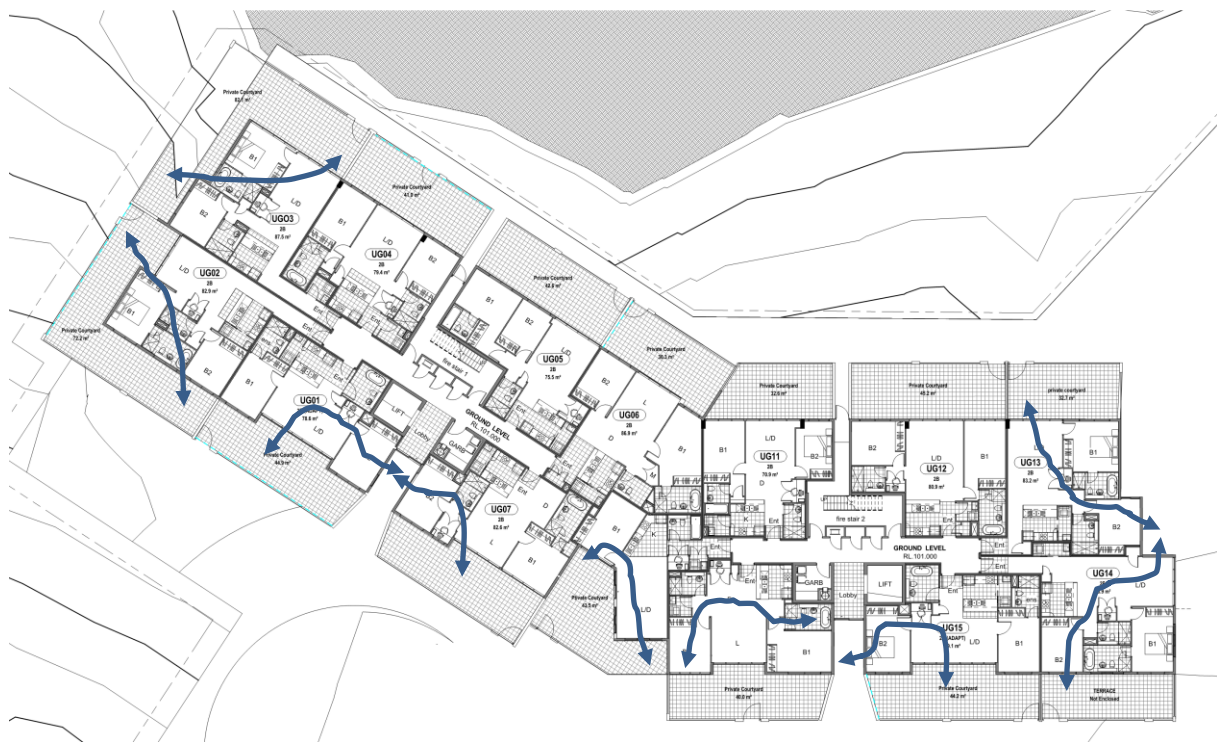


Figure 5 Building 12 – Level 1, 2, 3 and 4

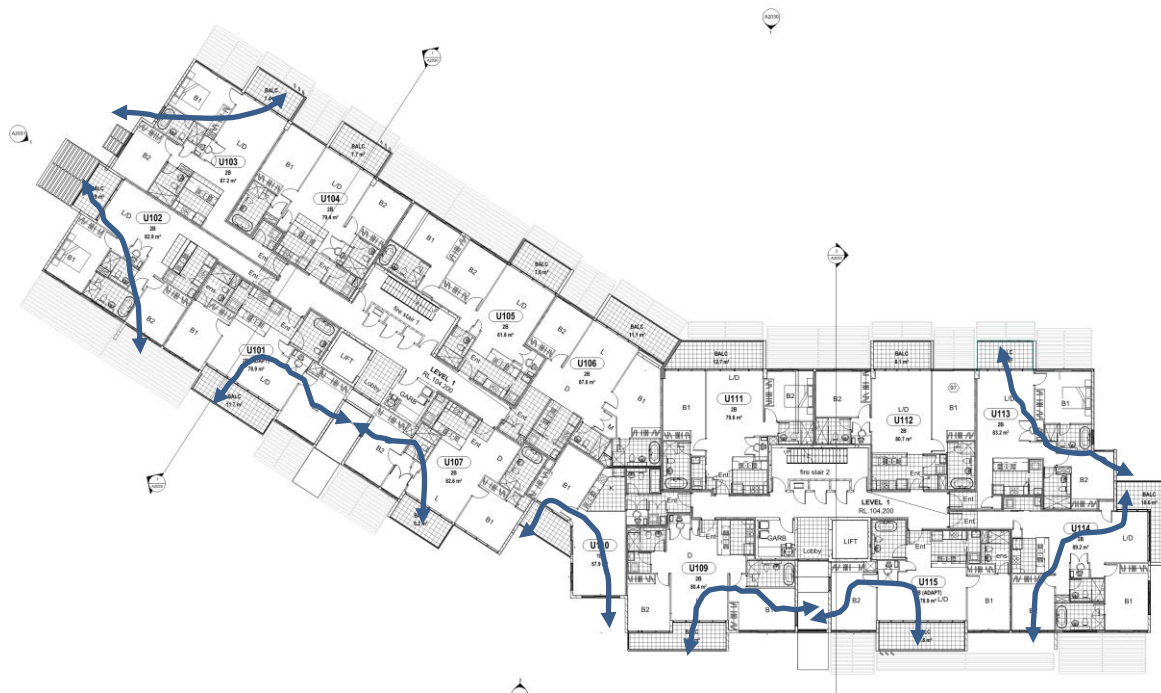
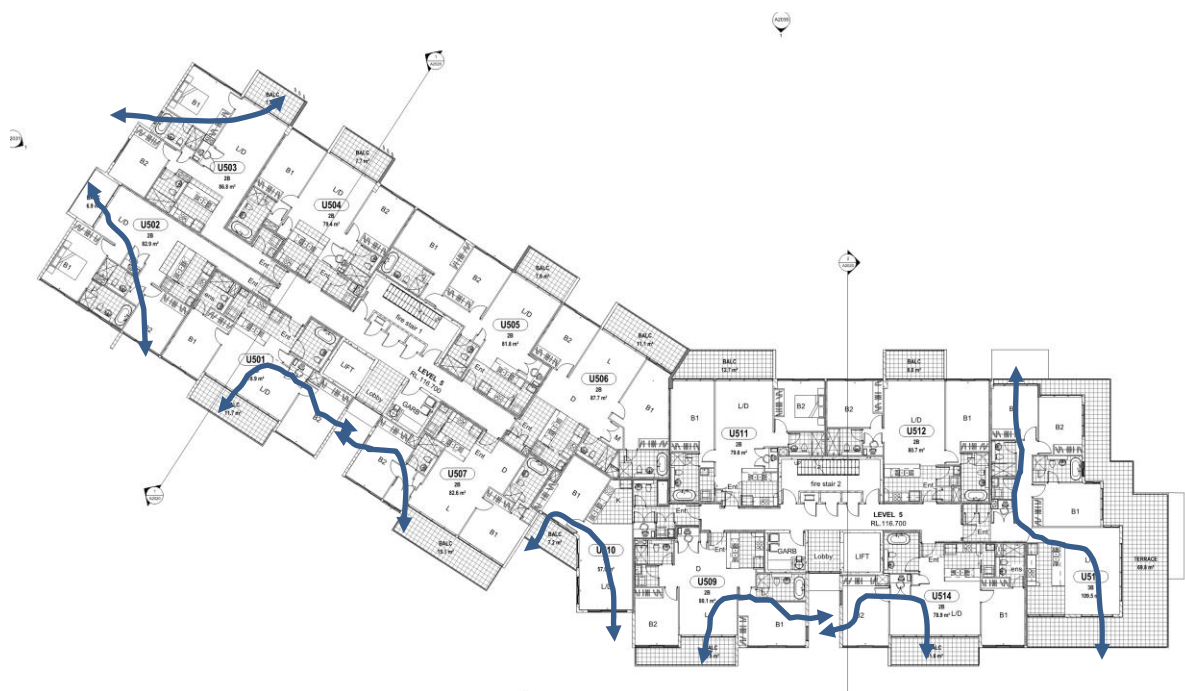


Figure 6 Building 12 – Level 5



3.3 RESULTS BUILDING 13-14

Building 13 and 14 are adjoining apartment blocks with a shared common wall and were considered as one building for the purpose of this assessment. Building 13-14 has a combined total of 69 apartments with 46 sufficiently cross ventilated according to the qualitative requirements of SEPP 65 this is equivalent to a pass rate of 65.2%. The current design of Building 13 - 14 has exceeded the 60% pass rate

Table 3 Building 13-14

Level	Number of apartments	Number of apartments that are naturally ventilated
LG1	4	4
G	14	6
1	14	7
2	12	6
3	10	6
4	10	8
5	5	5
Total	69	45

Figure 7 Building 13-14 - Lower Ground



The floor plan shows a complex arrangement of rooms and corridors. Key areas include:

- Top Section:** Rooms labeled 'LOKAL 100' and 'LOKAL 101'.
- Middle Section:** A large central area with multiple rooms, including 'LOKAL 102', 'LOKAL 103', 'LOKAL 104', 'LOKAL 105', 'LOKAL 106', 'LOKAL 107', 'LOKAL 108', 'LOKAL 109', 'LOKAL 110', 'LOKAL 111', 'LOKAL 112', 'LOKAL 113', 'LOKAL 114', 'LOKAL 115', 'LOKAL 116', 'LOKAL 117', 'LOKAL 118', 'LOKAL 119', 'LOKAL 120', 'LOKAL 121', 'LOKAL 122', 'LOKAL 123', 'LOKAL 124', 'LOKAL 125', 'LOKAL 126', 'LOKAL 127', 'LOKAL 128', 'LOKAL 129', 'LOKAL 130', 'LOKAL 131', 'LOKAL 132', 'LOKAL 133', 'LOKAL 134', 'LOKAL 135', 'LOKAL 136', 'LOKAL 137', 'LOKAL 138', 'LOKAL 139', 'LOKAL 140', 'LOKAL 141', 'LOKAL 142', 'LOKAL 143', 'LOKAL 144', 'LOKAL 145', 'LOKAL 146', 'LOKAL 147', 'LOKAL 148', 'LOKAL 149', 'LOKAL 150', 'LOKAL 151', 'LOKAL 152', 'LOKAL 153', 'LOKAL 154', 'LOKAL 155', 'LOKAL 156', 'LOKAL 157', 'LOKAL 158', 'LOKAL 159', 'LOKAL 160', 'LOKAL 161', 'LOKAL 162', 'LOKAL 163', 'LOKAL 164', 'LOKAL 165', 'LOKAL 166', 'LOKAL 167', 'LOKAL 168', 'LOKAL 169', 'LOKAL 170', 'LOKAL 171', 'LOKAL 172', 'LOKAL 173', 'LOKAL 174', 'LOKAL 175', 'LOKAL 176', 'LOKAL 177', 'LOKAL 178', 'LOKAL 179', 'LOKAL 180', 'LOKAL 181', 'LOKAL 182', 'LOKAL 183', 'LOKAL 184', 'LOKAL 185', 'LOKAL 186', 'LOKAL 187', 'LOKAL 188', 'LOKAL 189', 'LOKAL 190', 'LOKAL 191', 'LOKAL 192', 'LOKAL 193', 'LOKAL 194', 'LOKAL 195', 'LOKAL 196', 'LOKAL 197', 'LOKAL 198', 'LOKAL 199', 'LOKAL 200'.
- Bottom Section:** Rooms labeled 'LOKAL 201' and 'LOKAL 202'.

Blue arrows indicate movement paths between different sections of the building, suggesting a flow of traffic or a sequence of visits.

This detailed floor plan illustrates the 12th floor of the University of Illinois at Chicago. The plan includes numerous rooms, corridors, and service areas. Blue arrows are overlaid on the plan, indicating the primary evacuation routes for people and equipment. These routes generally follow the perimeter of the floor, starting from the central corridor area and moving towards the exits. Key rooms labeled include U201, U202, U203, U204, U205, U206, U207, U208, U209, U210, U211, U212, U213, U214, U215, U216, U217, U218, U219, U220, U221, U222, U223, U224, U225, U226, U227, U228, U229, U230, U231, U232, U233, U234, U235, U236, U237, U238, U239, U240, U241, U242, U243, U244, U245, U246, U247, U248, U249, U250, U251, U252, U253, U254, U255, U256, U257, U258, U259, U260, U261, U262, U263, U264, U265, U266, U267, U268, U269, U270, U271, U272, U273, U274, U275, U276, U277, U278, U279, U280, U281, U282, U283, U284, U285, U286, U287, U288, U289, U290, U291, U292, U293, U294, U295, U296, U297, U298, U299, U300, U301, U302, U303, U304, U305, U306, U307, U308, U309, U310, U311, U312, U313, U314, U315, U316, U317, U318, U319, U320, U321, U322, U323, U324, U325, U326, U327, U328, U329, U330, U331, U332, U333, U334, U335, U336, U337, U338, U339, U340, U341, U342, U343, U344, U345, U346, U347, U348, U349, U350, U351, U352, U353, U354, U355, U356, U357, U358, U359, U360, U361, U362, U363, U364, U365, U366, U367, U368, U369, U370, U371, U372, U373, U374, U375, U376, U377, U378, U379, U380, U381, U382, U383, U384, U385, U386, U387, U388, U389, U390, U391, U392, U393, U394, U395, U396, U397, U398, U399, U400, U401, U402, U403, U404, U405, U406, U407, U408, U409, U410, U411, U412, U413, U414, U415, U416, U417, U418, U419, U420, U421, U422, U423, U424, U425, U426, U427, U428, U429, U430, U431, U432, U433, U434, U435, U436, U437, U438, U439, U440, U441, U442, U443, U444, U445, U446, U447, U448, U449, U450, U451, U452, U453, U454, U455, U456, U457, U458, U459, U460, U461, U462, U463, U464, U465, U466, U467, U468, U469, U470, U471, U472, U473, U474, U475, U476, U477, U478, U479, U480, U481, U482, U483, U484, U485, U486, U487, U488, U489, U490, U491, U492, U493, U494, U495, U496, U497, U498, U499, U500, U501, U502, U503, U504, U505, U506, U507, U508, U509, U510, U511, U512, U513, U514, U515, U516, U517, U518, U519, U520, U521, U522, U523, U524, U525, U526, U527, U528, U529, U530, U531, U532, U533, U534, U535, U536, U537, U538, U539, U540, U541, U542, U543, U544, U545, U546, U547, U548, U549, U550, U551, U552, U553, U554, U555, U556, U557, U558, U559, U560, U561, U562, U563, U564, U565, U566, U567, U568, U569, U570, U571, U572, U573, U574, U575, U576, U577, U578, U579, U580, U581, U582, U583, U584, U585, U586, U587, U588, U589, U590, U591, U592, U593, U594, U595, U596, U597, U598, U599, U600, U601, U602, U603, U604, U605, U606, U607, U608, U609, U610, U611, U612, U613, U614, U615, U616, U617, U618, U619, U620, U621, U622, U623, U624, U625, U626, U627, U628, U629, U630, U631, U632, U633, U634, U635, U636, U637, U638, U639, U640, U641, U642, U643, U644, U645, U646, U647, U648, U649, U650, U651, U652, U653, U654, U655, U656, U657, U658, U659, U660, U661, U662, U663, U664, U665, U666, U667, U668, U669, U670, U671, U672, U673, U674, U675, U676, U677, U678, U679, U680, U681, U682, U683, U684, U685, U686, U687, U688, U689, U690, U691, U692, U693, U694, U695, U696, U697, U698, U699, U700, U701, U702, U703, U704, U705, U706, U707, U708, U709, U710, U711, U712, U713, U714, U715, U716, U717, U718, U719, U720, U721, U722, U723, U724, U725, U726, U727, U728, U729, U730, U731, U732, U733, U734, U735, U736, U737, U738, U739, U740, U741, U742, U743, U744, U745, U746, U747, U748, U749, U750, U751, U752, U753, U754, U755, U756, U757, U758, U759, U760, U761, U762, U763, U764, U765, U766, U767, U768, U769, U770, U771, U772, U773, U774, U775, U776, U777, U778, U779, U780, U781, U782, U783, U784, U785, U786, U787, U788, U789, U790, U791, U792, U793, U794, U795, U796, U797, U798, U799, U800, U801, U802, U803, U804, U805, U806, U807, U808, U809, U810, U811, U812, U813, U814, U815, U816, U817, U818, U819, U820, U821, U822, U823, U824, U825, U826, U827, U828, U829, U830, U831, U832, U833, U834, U835, U836, U837, U838, U839, U840, U841, U842, U843, U844, U845, U846, U847, U848, U849, U850, U851, U852, U853, U854, U855, U856, U857, U858, U859, U860, U861, U862, U863, U864, U865, U866, U867, U868, U869, U870, U871, U872, U873, U874, U875, U876, U877, U878, U879, U880, U881, U882, U883, U884, U885, U886, U887, U888, U889, U890, U891, U892, U893, U894, U895, U896, U897, U898, U899, U900, U901, U902, U903, U904, U905, U906, U907, U908, U909, U910, U911, U912, U913, U914, U915, U916, U917, U918, U919, U920, U921, U922, U923, U924, U925, U926, U927, U928, U929, U930, U931, U932, U933, U934, U935, U936, U937, U938, U939, U940, U941, U942, U943, U944, U945, U946, U947, U948, U949, U950, U951, U952, U953, U954, U955, U956, U957, U958, U959, U960, U961, U962, U963, U964, U965, U966, U967, U968, U969, U970, U971, U972, U973, U974, U975, U976, U977, U978, U979, U980, U981, U982, U983, U984, U985, U986, U987, U988, U989, U990, U991, U992, U993, U994, U995, U

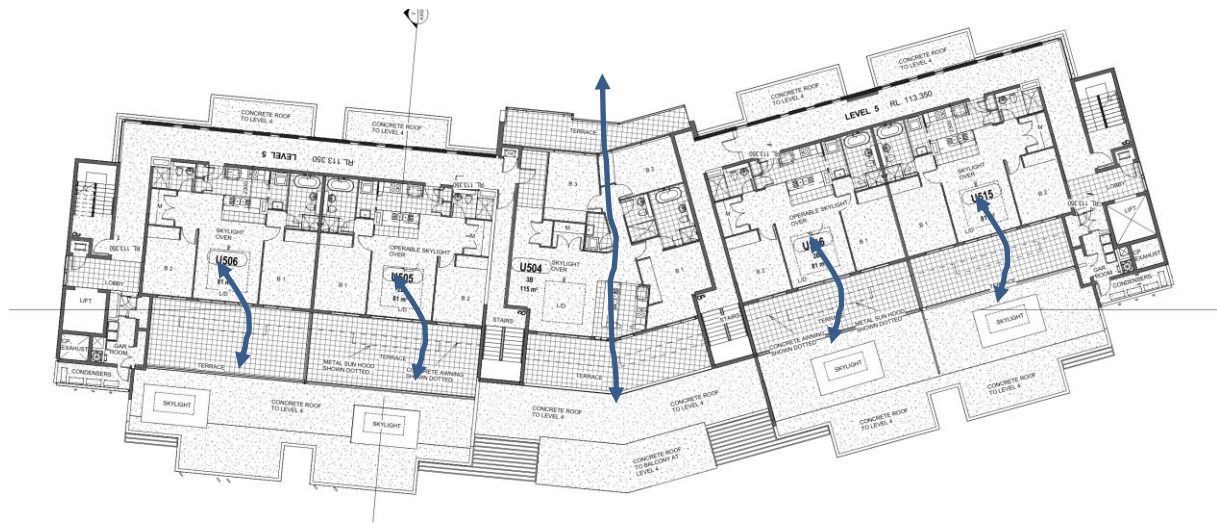
Figure 11 Building 13-14 – Level 3



Figure 12 Building 13-14 – Level 4



Figure 13 Building 13-14 – Level 5



3.4 RESULTS BUILDING 15-16

Building 15 and 16 are adjoining apartment blocks with a shared common wall and were considered as one building for the purpose of this assessment. Building 15-16 has a combined total of 83 apartments with 53 sufficiently cross ventilated according to the qualitative requirements of SEPP 65 this is equivalent to a pass rate of 63.9%. The current design of Building 15 - 16 meets the 60% pass rate.

Table 4 Building 15-16

Level	Number of apartments	Number of apartments that are naturally ventilated
LG1	4	4
G	16	12
1	14	8
2	14	8
3	14	8
4	14	9
5	7	4
Total	83	53

Figure 14 Building 15-16 – Lower Ground

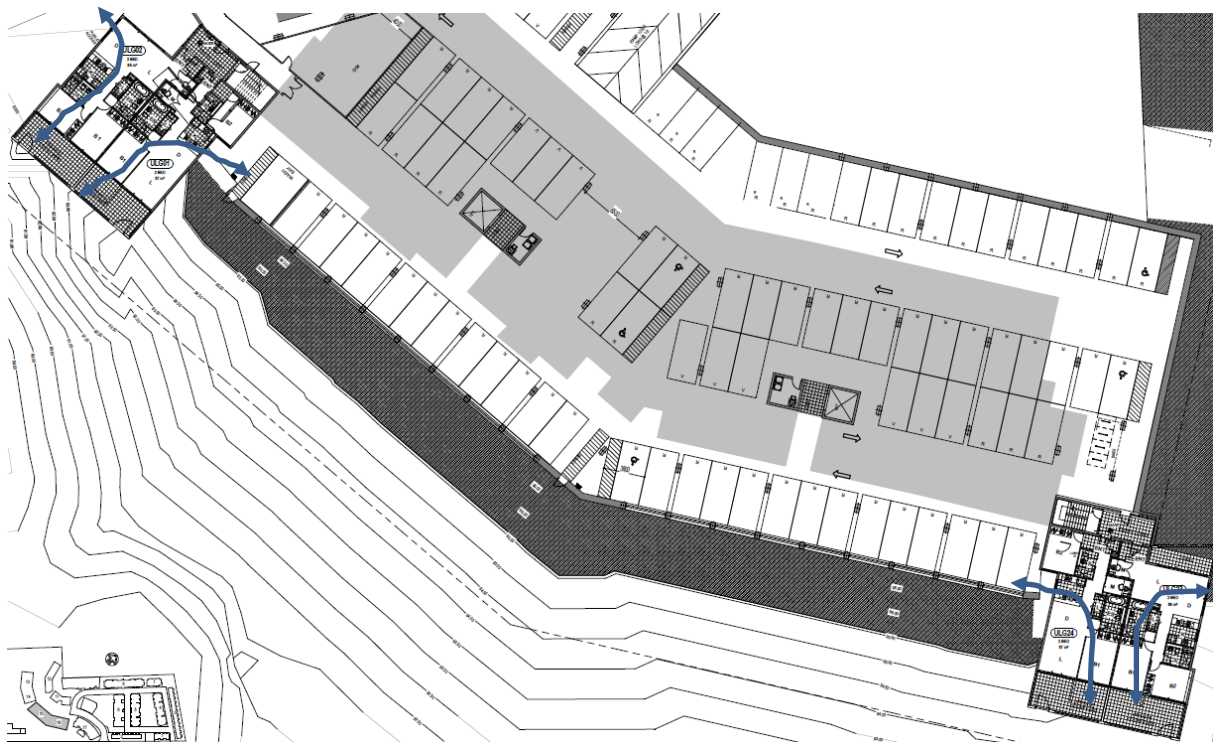


Figure 15 Building 15-16 – Ground



Figure 16 Building 15-16 – Level 1, 2, 3 and



Figure 17 Building 15-16 – Level 4



Figure 18 Building 15-16 – Level 5



3.5 RESULTS BUILDING 17

Building 17 has a of 42 apartments with 26 sufficiently cross ventilated according to the qualitative requirements of SEPP 65 this is equivalent to a pass rate of 61.9%. The current design of Building 17 meets the 60% pass rate.

Table 5 Building 17

Level	Number of apartments	Number of apartments that are naturally ventilated
G	12	8
1	12	8
2	12	8
3	6	2
Total	42	26

Figure 19 Building 17 - Ground level

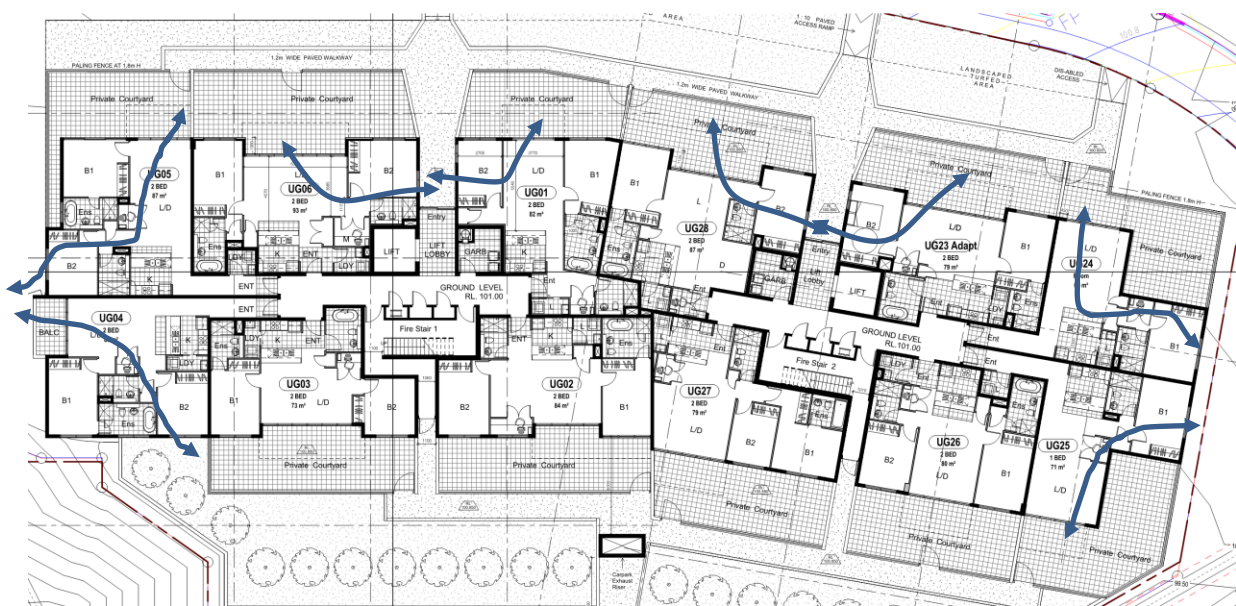


Figure 20 Building 17 - Level 1

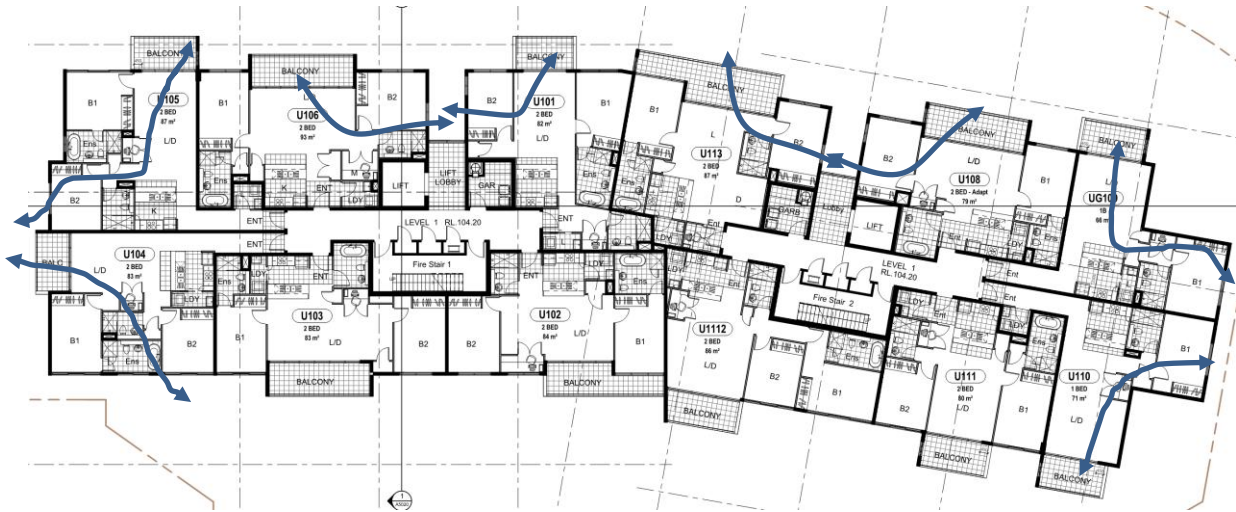


Figure 21 Building 17 – Level 2

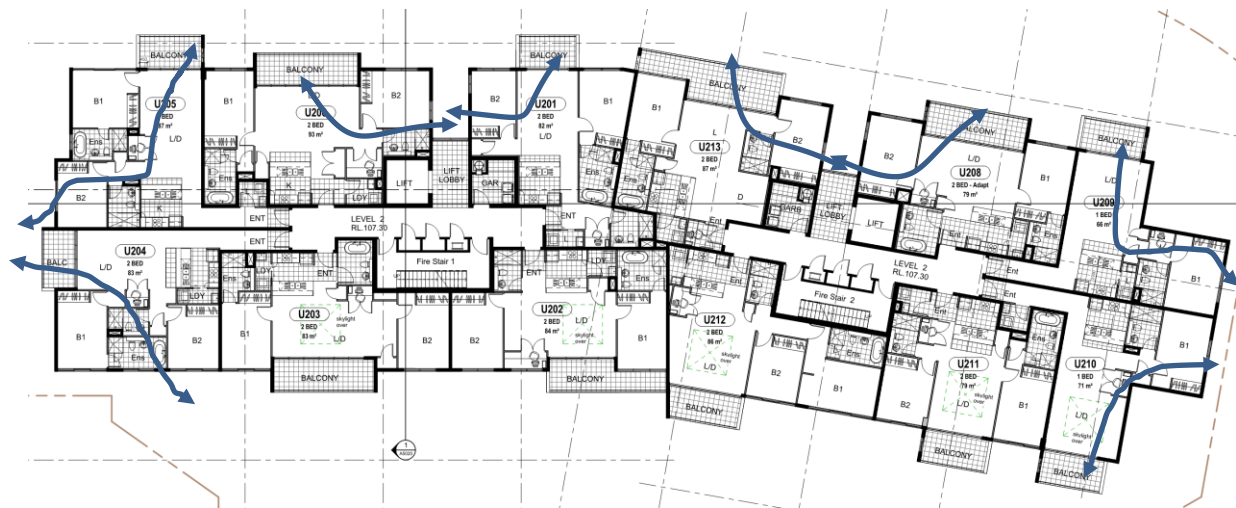
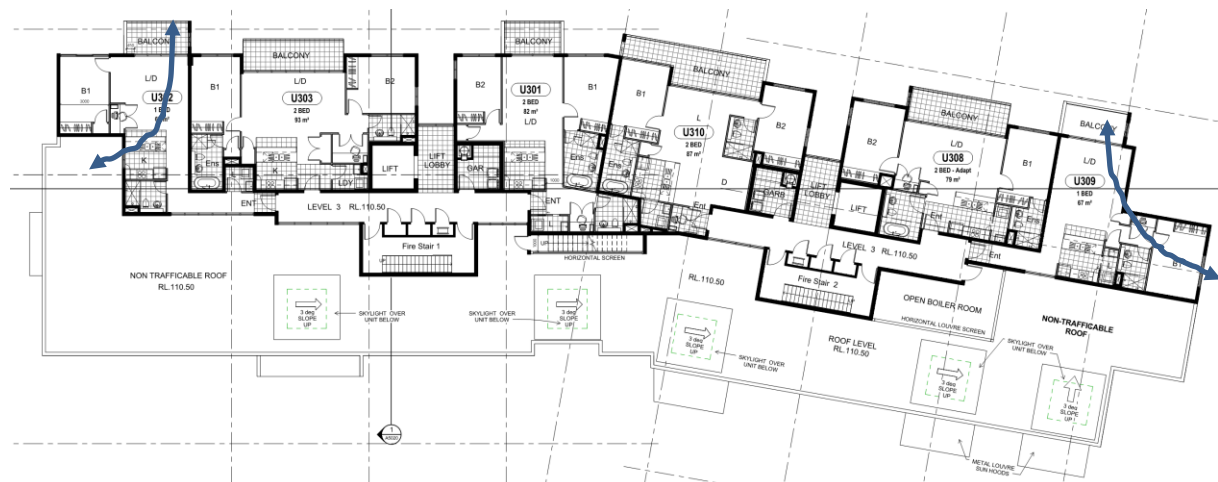


Figure 22 Building 17 – Level 3



4 SUMMARY

SLR Consulting has been engaged by Meriton to assess the environmental impact of the proposed development with respect to the natural ventilation of the residential apartments. This study has concluded that each building within the stage three development meets the SEPP 65 requirement that 60% of apartments in a development should have access to natural cross ventilation.

5 CLOSURE

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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