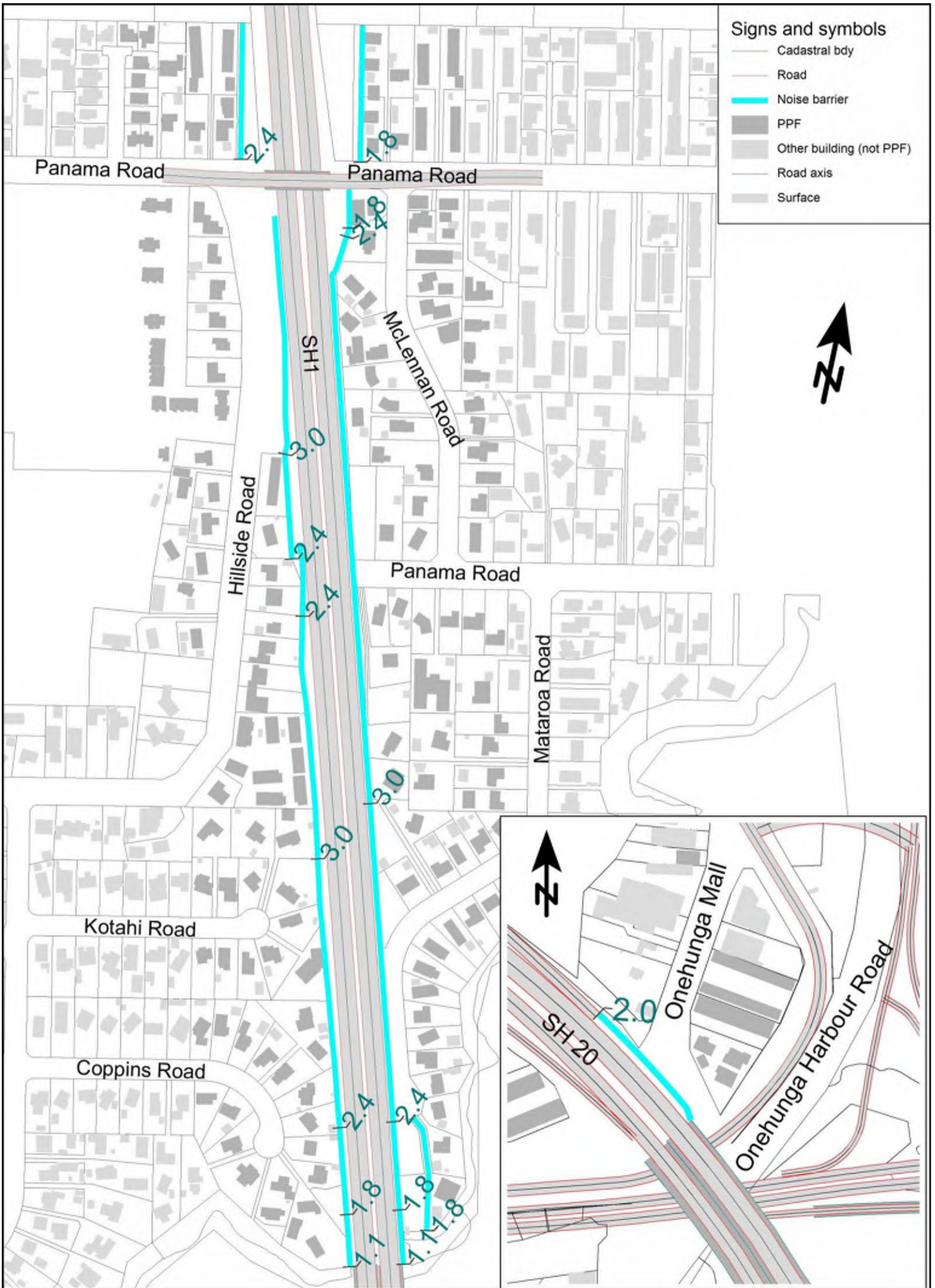


Appendix F

Preferred Noise Barrier Heights and Locations



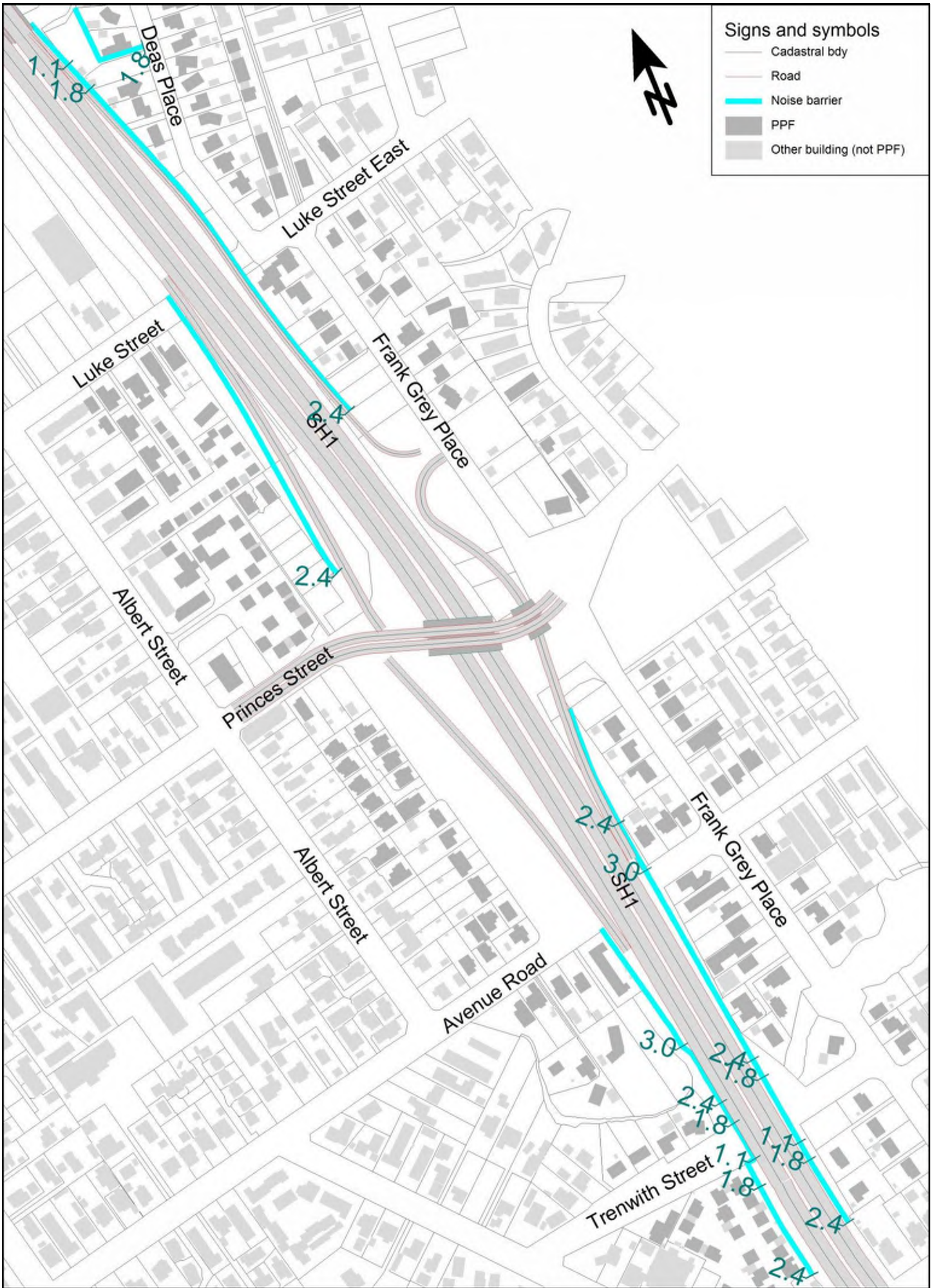
A	ISSUED FOR INFORMATION ONLY	SW	SW	Draft	26/10/16
No	Issued Status	Drawn	App'd	Check'd	Date

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Drawn Siri Wilkening	Drafting Check	Design Manager Reviewed Siri Wilkening	Approved Alliance Manager
Designed Siri Wilkening	Design Check		
Scale: 1:2500	Original Size: A3	Contract No PA4041	

Drawing Title NOISE & VIBRATION BPO Barriers Areas 1, 2 and 5	
Drawing Number GIS-NV-AEE-016	Rev No. A



A ISSUED FOR INFORMATION ONLY					
No	Issued Status	Drawn	App'd	Check'd	Date
		SW	SW	Draft	26/10/16

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Drawn Siri Wilkening	Drafting Check	Design Manager Reviewed Siri Wilkening	Approved Alliance Manager
Designed Siri Wilkening	Design Check	Contract No PA4041	
Scale: 1:2500	Original Size: A3		

Drawing Title NOISE & VIBRATION BPO Barriers Areas 3, 4, 6 and 7	
Drawing Number GIS-NV-AEE-017	Rev No. A

Appendix G

Noise level predictions–Noise level contours



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

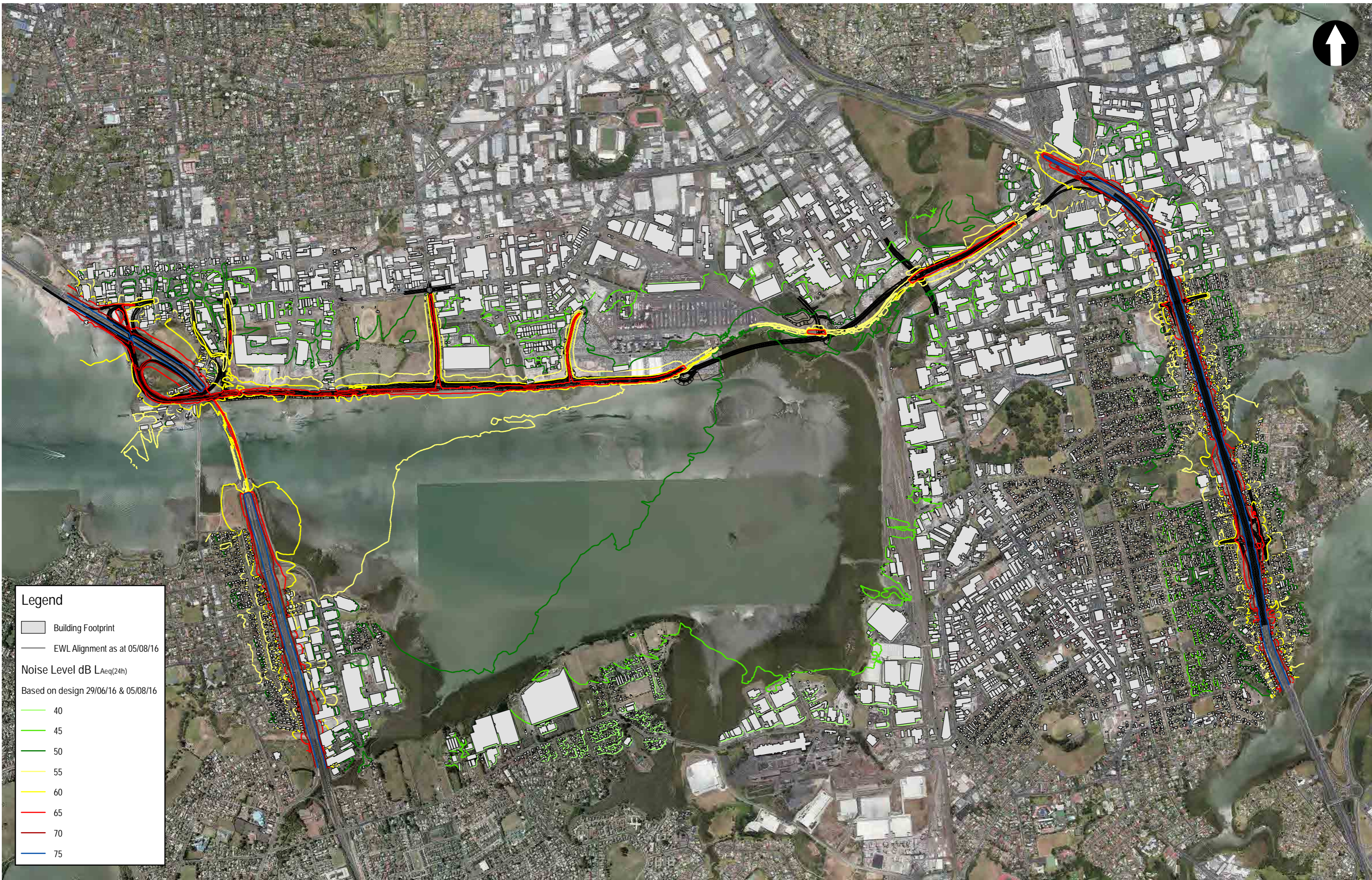
A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:20,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model Overview	
Drawing Number	GIS-NV-AEE-063	Rev No. A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design 29/06/16 & 05/08/16

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

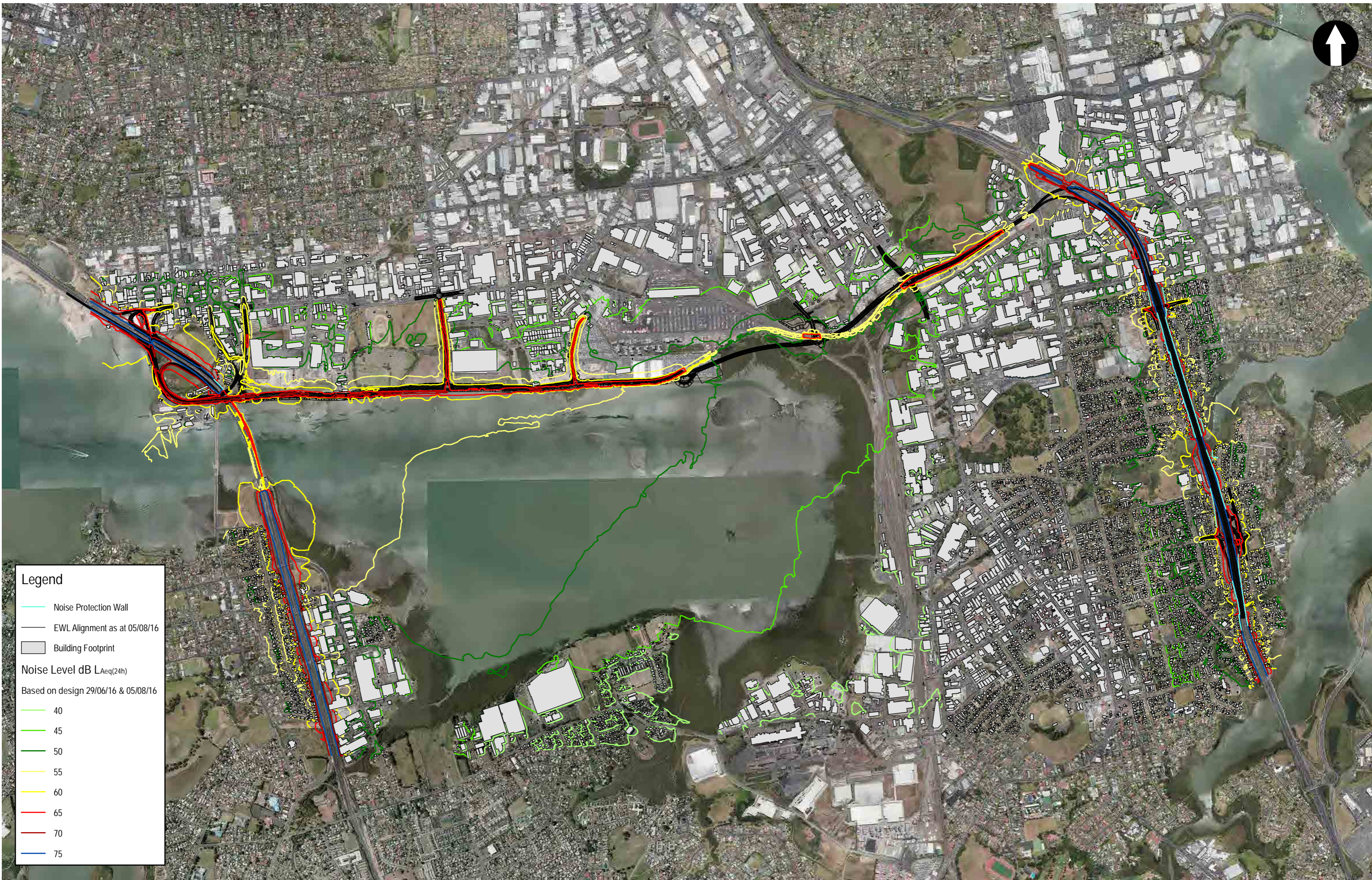
A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

DISCLAIMER
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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:19,263	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model Overview	
Drawing Number	GIS-NV-AEE-72	
Rev No.	A	



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
Based on design 29/06/16 & 05/08/16

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

DISCLAIMER
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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:20,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Preferred Option Overview	
Drawing Number	GIS-NV-AEE-81	
Rev No.	A	



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-055	Rev No. A



Legend

Building Footprint

Noise Level $dB_{Aeq}(24h)$

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-056	Rev No. A



Legend

- Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY					
No	Issued Status	Drawn	Check'd	App'd	Date
		Bap	SW	SW	20/10/16

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-057	Rev No. A



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY					
No	Issued Status	Drawn	Check'd	App'd	Date
		Bap	SW	SW	20/10/16

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NZ TRANSPORT AGENCY
WAKA KOTAHĪ

East West Link

Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-058	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

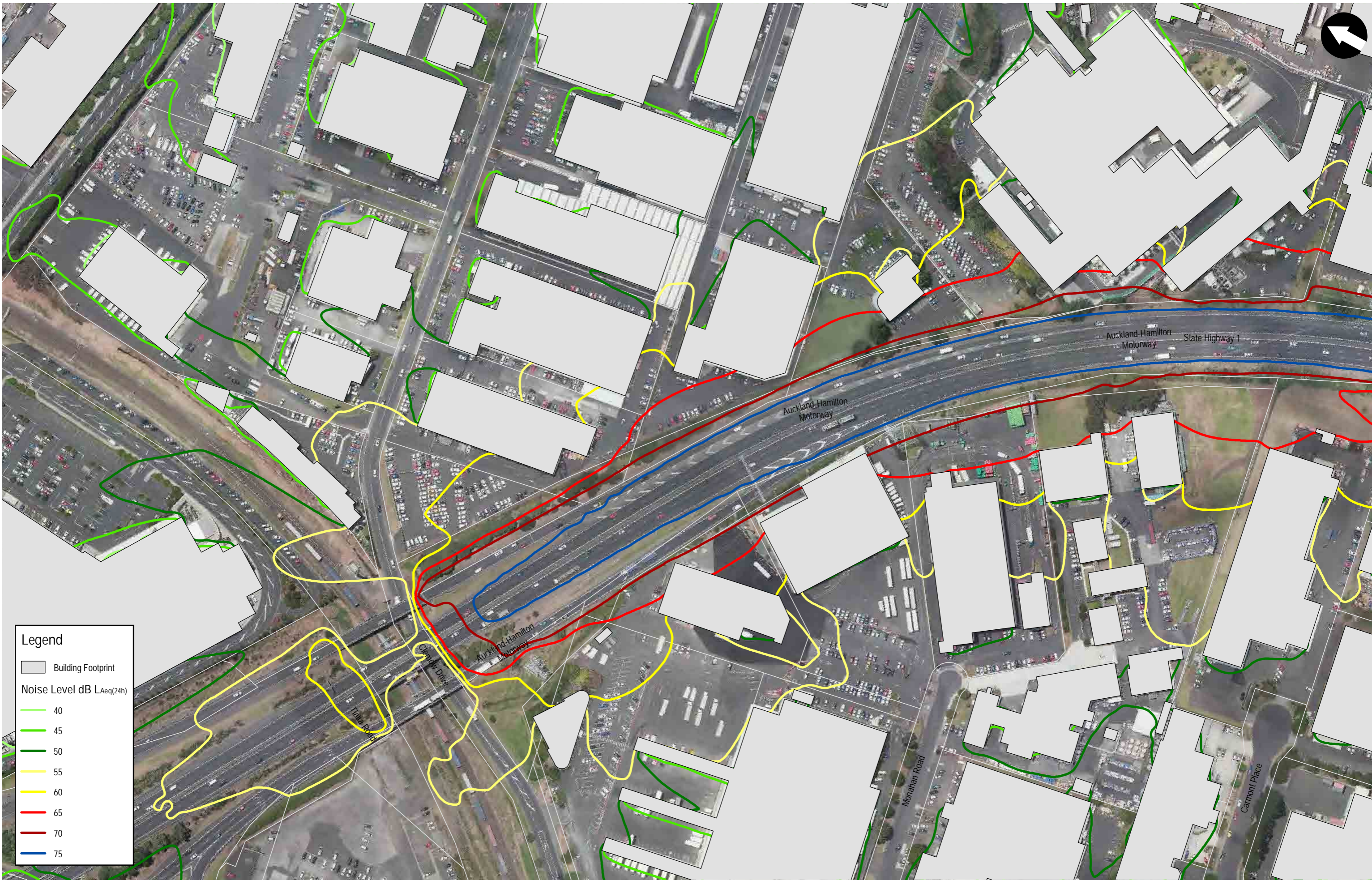
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No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-059	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

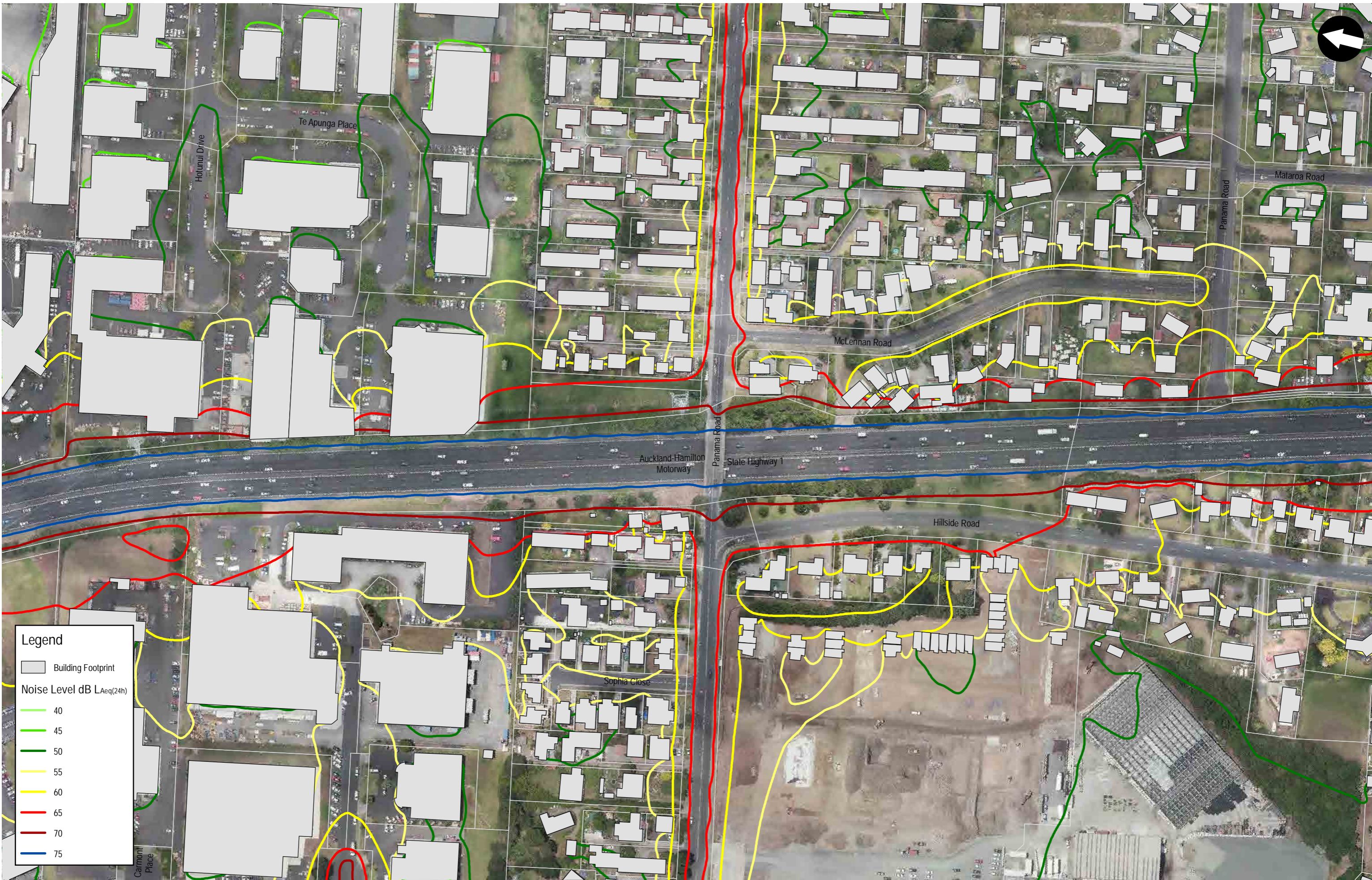
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		Drawn	Check'd	App'd
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-060	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Bap	SW	20/10/16
		Drawn	Check'd	App'd
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-061	Rev No. A



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

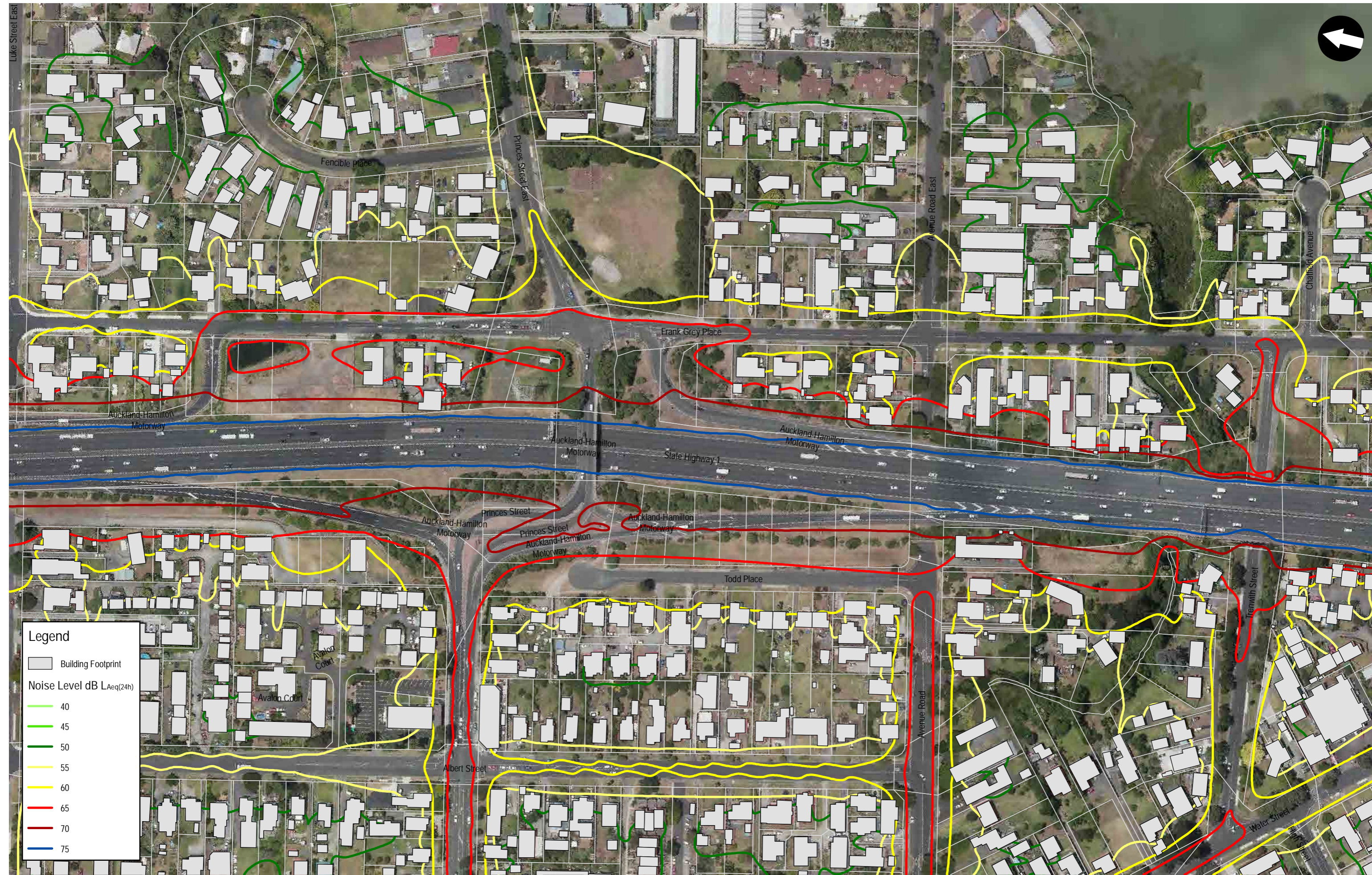
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No	Issued Status	Drawn	Check'd	App'd	Date		

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-062	Rev No: A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Bap	SW	20/10/16
		Drawn	Check'd	App'd
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model	
Drawing Number	GIS-NV-AEE-063	
Rev No.	A	



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

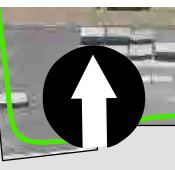
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No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model
Drawing Number	GIS-NV-AEE-065
Rev No.	A



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY					
No	Issued Status	Drawn	Check'd	App'd	Date
		Bap	SW	SW	20/10/16

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-066	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Bap	SW	20/10/16
		Drawn	Check'd	App'd
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model
Drawing Number	GIS-NV-AEE-067
Rev No.	A



Legend

- Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

No	Issued Status	Drawn	Check'd	App'd	Date
A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-068	Rev No. A



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-069	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

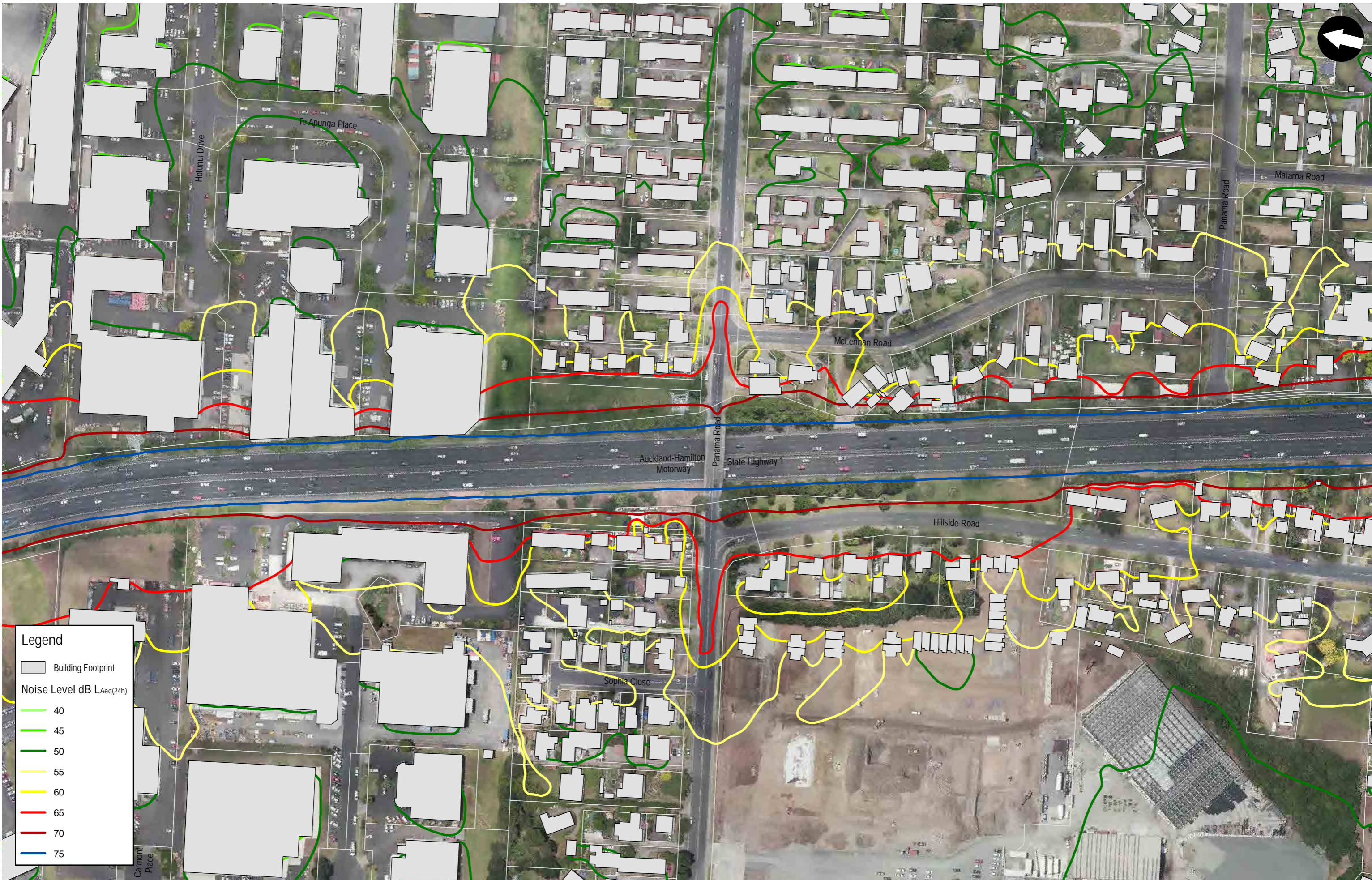
A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-070	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY					
No	Issued Status	Drawn	Check'd	App'd	Date
		Bap	SW	SW	20/10/16

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-071	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-072	Rev No. A



Legend

- Building Footprint
- Noise Level dB LAeq(24h)**
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Nothing Noise Model	
Drawing Number	GIS-NV-AEE-073	
Rev No.	A	



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model		
Drawing Number	GIS-NV-AEE-075	Rev No.	A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model		
Drawing Number	GIS-NV-AEE-076		
Rev No.	A		



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model		
Drawing Number	GIS-NV-AEE-077	Rev No.	A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

A	ISSUED FOR INFORMATION ONLY	Bap	SW	SW	20/10/16
No	Issued Status	Drawn	Check'd	App'd	Date

DISCLAIMER
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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model		
Drawing Number	GIS-NV-AEE-078	Rev No.	A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB L_{Aeq}(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

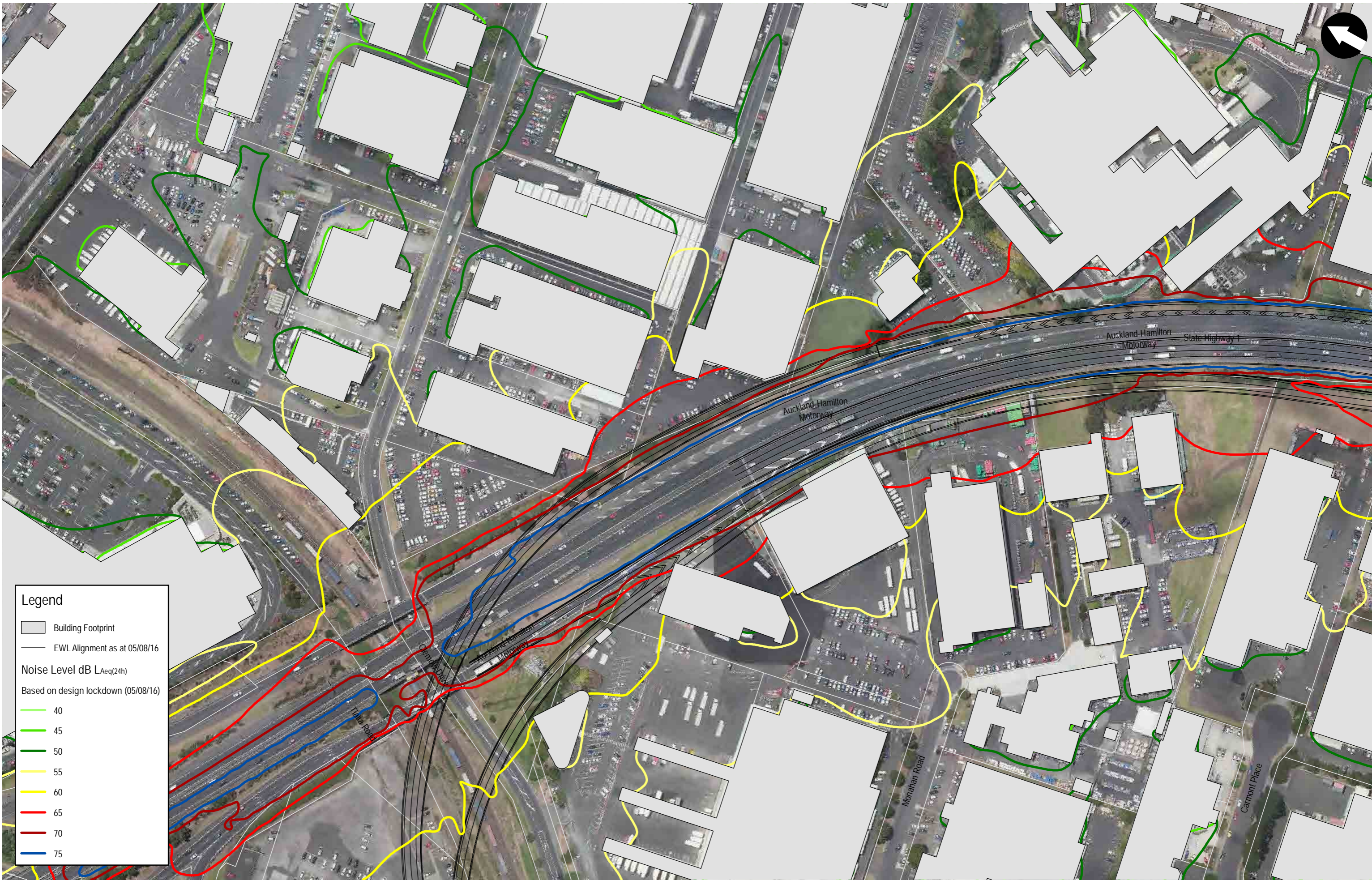
A ISSUED FOR INFORMATION ONLY				
No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
				20/10/16
				Date

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model	
Drawing Number	GIS-NV-AEE-079	Rev No. A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75

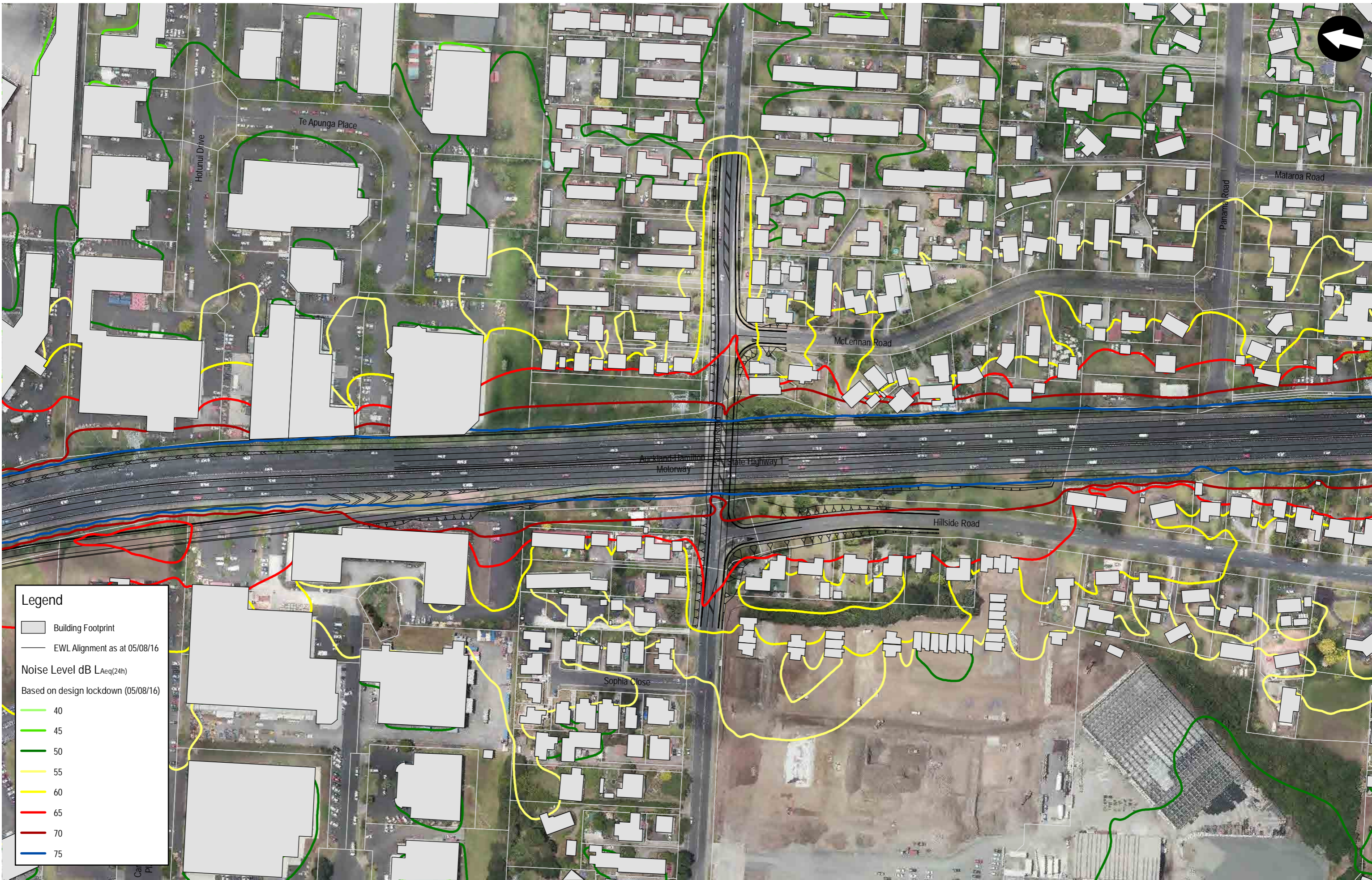
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No	Issued Status	Drawn	Check'd	App'd
		Bap	SW	SW
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Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model	
Drawing Number	GIS-NV-AEE-080	Rev No. A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
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- 55
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Scale: 1:2,000	Original Size: A3	Contract No: PA4041	

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model		
Drawing Number	GIS-NV-AEE-081	Rev No.	A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
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Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model	
Drawing Number	GIS-NV-AEE-082	Rev No. A



Legend

- Building Footprint
- EWL Alignment as at 05/08/16

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
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Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Do Minimum Noise Model	
Drawing Number	GIS-NV-AEE-083	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No. PA4041	

Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-085	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB L_{Aeq}(24h)
Based on design lockdown (05/08/16)

- 40
- 45
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- 55
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Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-086	
Rev No.	A	



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

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Drawing Title	NOISE AND VIBRATION Preferred Option		
Drawing Number	GIS-NV-AEE-087		
Rev No.	A		



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
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Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-088	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB L_{Aeq}(24h)
Based on design lockdown (05/08/16)

- 40
- 45
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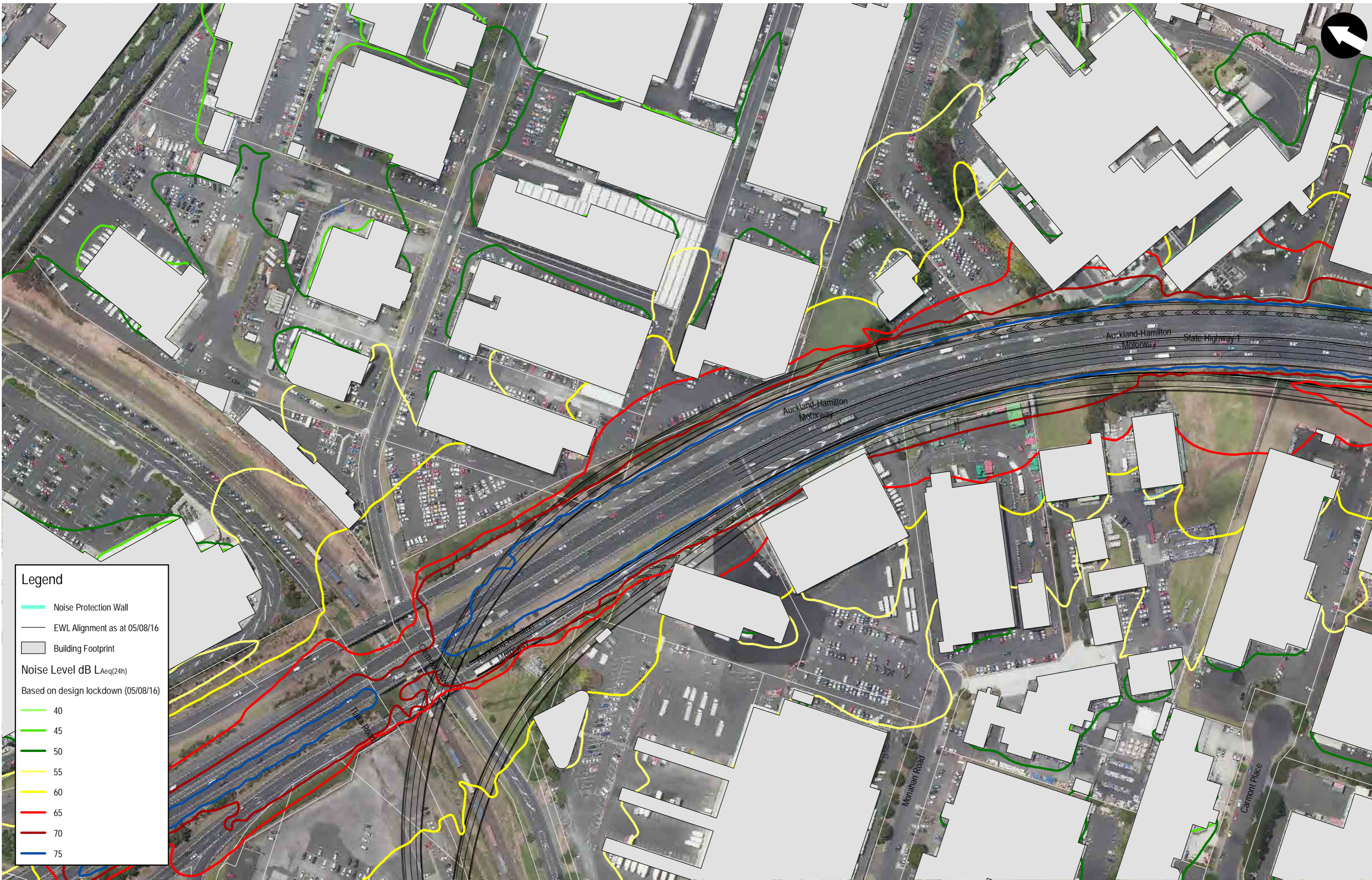
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Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-089	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
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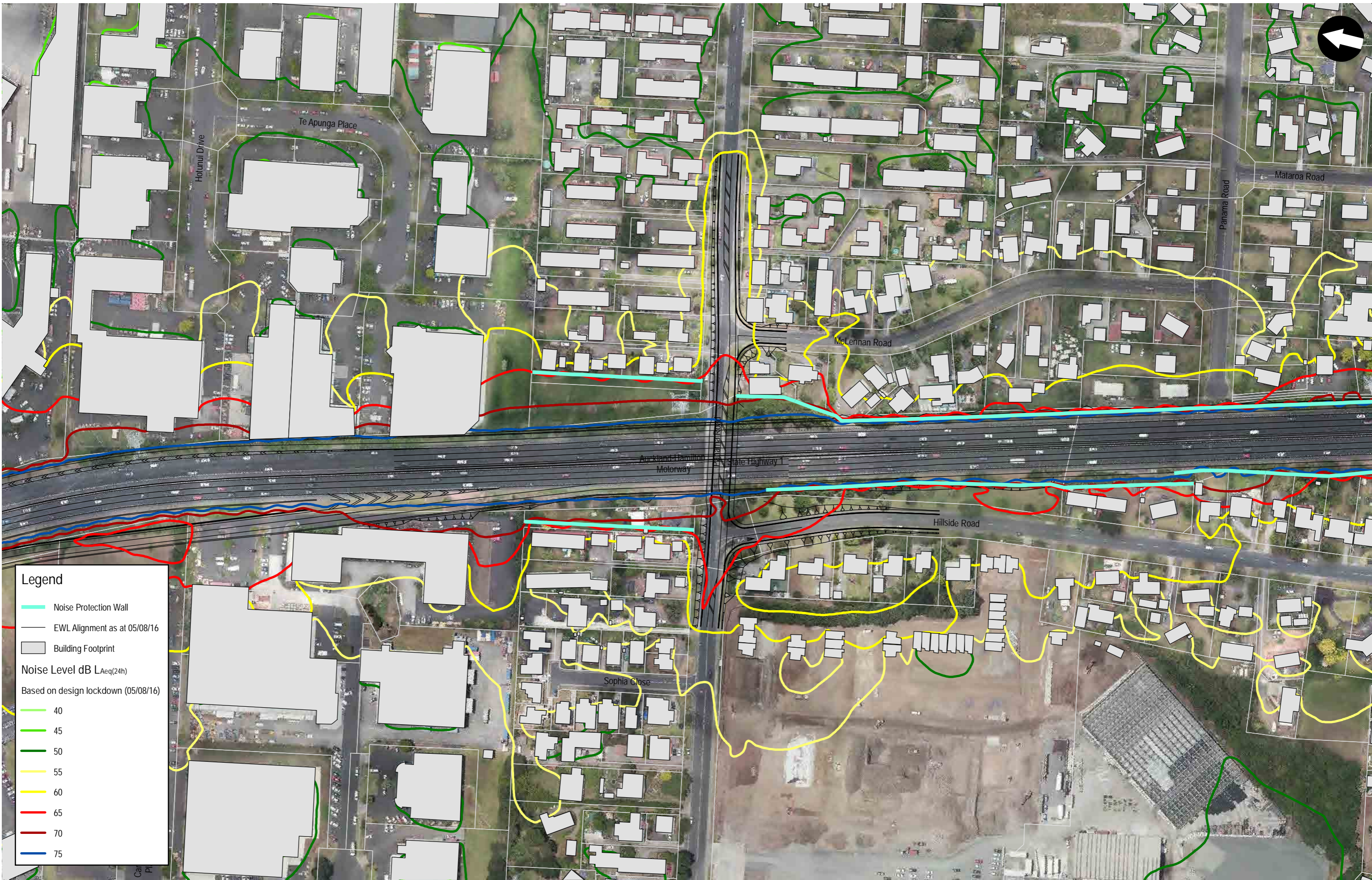
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Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-090	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
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Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-091	Rev No. A



Legend

- Noise Protection Wall
- EWL Alignment as at 05/08/16
- Building Footprint

Noise Level dB LAeq(24h)
Based on design lockdown (05/08/16)

- 40
- 45
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- 55
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- 75

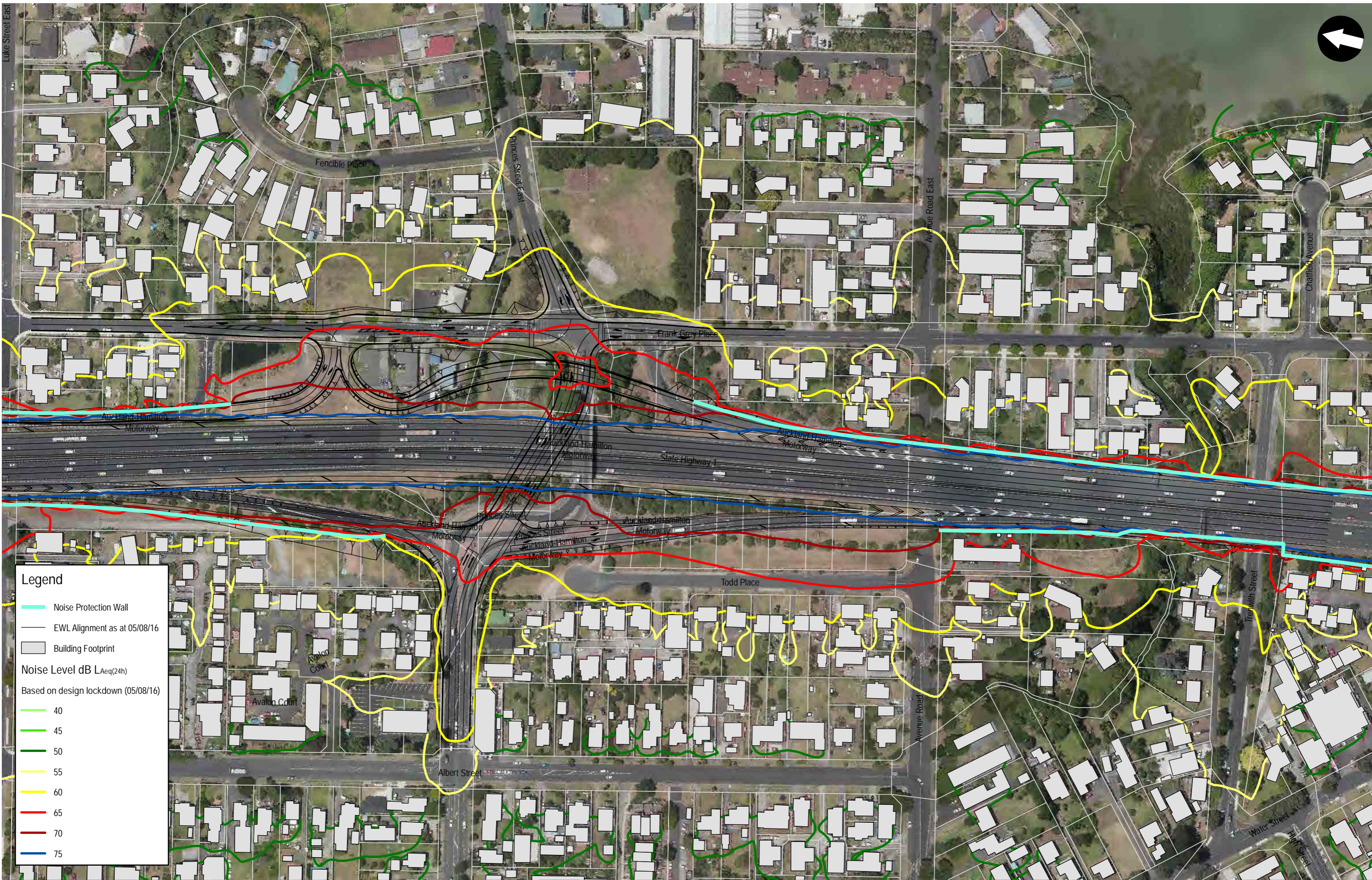
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Drawing Number	GIS-NV-AEE-092	Rev No. A



Legend

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Noise Level dB LAeq(24h)
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- 40
- 45
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Designed	Design Check		
Scale: 1:2,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Preferred Option	
Drawing Number	GIS-NV-AEE-093	
Rev No.	A	



Legend

Building Footprint

Noise Level dB LAeq(24h)

- 40
- 45
- 50
- 55
- 60
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- 70
- 75

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Drawn	Drafting Check	Reviewed Design Manager	Approved Alliance Manager
Designed	Design Check		
Scale: 1:20,000	Original Size: A3	Contract No	PA4041

Drawing Title	NOISE AND VIBRATION Existing Noise Model Overview	
Drawing Number	GIS-NV-AEE-054	Rev No. A

Appendix H

BPO Discussion Summary

East West Link Alliance Minutes of Meeting

BPO Workshop for Road Traffic Noise

Held 20 October 2016 at 1030am

at East West Link Alliance Office

Present:

- Lesley Hopkins, Planner
- Siiri Wilkening, Acoustics
- Gavin Lister, Landscape and Visual
- Tony Cain, Stormwater
- Julian Murahidy, Design

The purpose of the workshop was to assess the Best Practicable Option (BPO) for each traffic noise assessment area of the East West Link Project taking into consideration relevant inputs from each specialist discipline. The disciplines represented at the workshop were: planning and environmental, acoustics, landscape and visual, stormwater and design.

The criteria from Section 6.3 of NZS 6806 which are considered relevant for the Project are contained in Attachment A. These criteria were considered in the review of the noise mitigation options for the Project.

The assessment areas are:

Adjacent to	Direction	Area number	Area name
SH20	Northbound	1	Onehunga
SH1	Southbound	2	Mt Wellington
	Southbound	3	Ōtāhuhu North
	Southbound	4	Ōtāhuhu South
SH1	Northbound	5	Mt Wellington
	Northbound	6	Ōtāhuhu North
	Northbound	7	Ōtāhuhu South

The noise mitigation options for each assessment area that were considered in the workshop are contained in Attachment B. During the workshop, amended mitigation options were explored to address issues and risks. These resulted in additional options for some of the areas. These were assessed and are included in the assessments for each area.

The worksheets for each assessment area are contained on the pages that follow.

The outcomes of the BPO workshop have informed the revised preferred mitigation set out in Technical Report 7: Road and Traffic Noise.

Area 1: Onehunga Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2	Option 3
Constructability/technical feasibility. Compliance with relevant safety standards and guidelines. Public safety and security.	The acoustic barriers will need to be integrated into the SH20 structure. Consideration needs to be given to structural loads and how the structure is fixed during detailed design.	o	o	--
		1.5m barrier on Onehunga Mall side of SH20 should be located on edge of SH20.	2m barrier on Onehunga Mall side of SH20 should be located on edge of SH20.	5m high barrier for Onehunga Harbour Road is a significant structural element and construction will be complex.
Value for money, including maintenance costs and consideration of benefit cost analysis.	BCR calculated in accordance with NZ Transport Agency guideline.	o	+	---
		0.86	1.02	0.18
Compliance with NZS 6806 noise criteria. Achievement of the NZS 6806 structural mitigation performance standards. Requirement for building-modification measures. Effect of changes to the existing noise environment.	The newer buildings in this area have incorporated acoustic treatment and some have been retrofitted with double glazing. Limited opportunity to shield buildings. Adjacent buildings are multi storey and therefore several facades affected. The residential buildings to the east of the interchange are older. Therefore modification to these buildings would be extensive therefore look at reducing external noise for these PPFs. Building modification should be considered elsewhere.	-	o	-
		1.5m barrier close to Onehunga Mall PPFs. 3 PPFs remain in Category C.	2m barrier close to Onehunga Mall PPFs 2 PPFs on Onehunga Harbour Road remain in Category C.	2m barrier close to Onehunga Mall PPFs, 5m barrier for Onehunga Harbour Road PPFs. 2 PPFs remain in Category C. Only results in 1 additional PPF on Onehunga Harbour Road moving from Category B to A (marginal noise level improvements).
Consistency with NZ urban design protocol.	Bridging the Gap requires consideration of a transparent barrier depending on the context.	o	o	---
		Transparent barrier (atop the barrier) could be used to retain visibility of tuff ring through this section.	Transparent barrier (atop the barrier) could be used to retain visibility of tuff ring through this section.	Height and length of the barrier will make it a prominent element affecting legibility.

Assessment criteria	Issues / Risks	Option 1	Option 2	Option 3
<p>The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route.</p> <p>Road users' views to the surrounding landscape and key features/ locations in particular.</p> <p>Maintenance or enhancement of visual amenity for surrounding residents.</p>	<p>A key driver for the urban and landscape framework for the Project is acknowledgement of the cultural and landscape significance of the Te Hopua tuff ring. Current concept design proposals to improve legibility of this feature and any additional structure that potentially severs such legibility undermines this key intent.</p> <p>Barriers will reduce views to Te Hopua and legibility of the feature - cutting off view.</p> <p>Drivers have elevated views of Manukau Harbour along this section of SH20.</p>	-	-	---
		<p>Barrier located on eastern side of SH20 so less impact on tuff ring.</p>	<p>Barrier located on eastern side of SH20 so less impact on tuff ring.</p>	<p>One western side of SH20 the 5m high barrier would need to continue along an considerable length of SH20.</p> <p>Will result in shading and affect amenity of adjacent residential building and outdoor space.</p> <p>Will affect views of Te Hopua and the Manukau Harbour from SH20.</p>
<p>Potential effects on known heritage or cultural values</p>	<p>Impacts on Te Hopua need to be considered.</p>	0	0	--
		<p>Minor structural element. If transparent then effects on legibility and views can be mitigated.</p>	<p>Minor structural element. If transparent then effects on legibility and views can be mitigated.</p>	<p>Cannot be attached to SH20 so structural element within Te Hopua. Affects legibility and views.</p>

Area 2: Mt Wellington Southbound Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2	Option 3 (new)
Constructability/technical feasibility. Compliance with relevant safety standards and guidelines. Public safety and security.	At McLennan Road and Otahuhu Creek there are overland flow paths. High voltage transmission tower in this section. Design needs to consider conductivity for any structures near transmission towers.	o	o	o
		Overland flow path and non-conductive materials can be accommodated in design.	Same as for Option 1.	Same as for Option 1.
Value for money, including maintenance costs and consideration of benefit cost analysis	BCR calculated in accordance with NZ Transport Agency guideline.	++	+++	+++
		1.39	1.74	1.70
Compliance with NZS 6806 noise criteria. Achievement of the NZS 6806 structural mitigation performance standards Requirement for building-modification measures. Effect of changes to the existing noise environment.	North of Panama Road a 1.8m barrier (fence) proposed on boundary. Need to consider 50 year design life. There are some good examples around. The 2.4 barriers on the southern side are existing and these have been modelled. Aim is to get as many PPFs under 65dBA.	o	+	+
		2.4m barrier and 1.8m barrier at 103A, B and 132A to C Panama Road. 5 PPFs remain in Category C. Barriers result in extensive improvement for existing dwellings (up to 8dBA).	3m barrier and 1.8m barrier at 103A, B and 132A to C Panama Road. 3 PPFs remain in Category C and less PPFs in Category B (Compared to Option 1). Barriers over 3m would be necessary to achieve a greater improvement in noise. Barriers result in extensive improvement for existing dwellings (up to 9dBA).	3m barrier stepping down to 1.1m barrier at Otahuhu Creek. 1.8m high boundary fence adjacent to the driveways to 55 and 57 Mataroa Road and at 103A, B and 132A to C Panama Road. 3 PPFs remain in Category C and one less PPF is category A (compared to Option 2).
Consistency with NZ urban design protocol.	Desire to make new cycle/pedestrian connection at Mataroa as visible as possible. Keeping structures low assists with casual surveillance for path users.	o	o	+
		Barriers do not physically affect the pedestrian/cycle connection.	Barriers do not physically affect the pedestrian/cycle connection.	Barriers do not physically affect the pedestrian/cycle connection. Provides improved surveillance for pedestrian/cycle connection.
		o	o	+

<p>The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route.</p> <p>Road users' views to the surrounding landscape and key features/ locations in particular.</p> <p>Maintenance or enhancement of visual amenity for surrounding residents</p>	<p>Barrier to be located as close to road as possible.</p> <p>Could create an overlap in barriers. Look to step down the barrier as it reaches the Creek.</p>	<p>Barrier extend close to Creek partially blocking views along creek.</p>	<p>Barrier extend close to Creek partially blocking views along creek.</p>	<p>Transition to a lower barrier closer to the creek to signal change and keep sightlines to the bridge – starting at Cobbins Road with 3m then step down to 1.1m.</p>
<p>Potential effects on known heritage or cultural values.</p>	<p>Keeping the Otahuhu Creek and esplanade area open as this is an important portage.</p>	<p>-</p>	<p>-</p>	<p>+</p>
		<p>Partially blocks views of portage</p>	<p>Partially blocks views of portage.</p>	<p>Reduced barrier height on approach to creek keeps portage visible.</p>

Area 3: Ōtāhuhu North Southbound Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2 (new)
Constructability/technical feasibility. Compliance with relevant safety standards and guidelines Public safety and security.	Stormfilters located in this location so access required. Overland flow path needs to be accommodated in design.	o	o
		Overland flow path can be accommodated in design. Maintenance access can be provided from Deas Place.	Overland flow path can be accommodated in design. Maintenance access can be provided from Deas Place.
Value for money, including maintenance costs and consideration of benefit cost analysis.	BCR calculated in accordance with NZ Transport Agency guideline.	+	+
		1.16	1.04
Compliance with NZS 6806 noise criteria. Achievement of the NZS 6806 structural mitigation performance standards. Requirement for building-modification measures. Effect of changes to the existing noise environment.	Higher barriers (e.g. 3m) do not result in any additional benefit and therefore were not reported.	+	+
		2.4m barriers along length including ramp. Barriers result in significant improvement for existing dwellings. Moves all PPFs into Category A or B.	2.4m barriers reducing to 1.1m near Creek and shared path (to respond to visual issues). 1.8m barrier at 16 and 18 Deas Place. Barriers result in significant improvement for existing dwellings. Moves all PPFs into Category A or B.
Consistency with NZ urban design protocol.	Desire to make new cycle/pedestrian connection at Deas as visible as possible.	o	+
		Barrier reduces surveillance for path users.	Keeping structures low assists with casual surveillance for path users.
The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route. Road users' views to the surrounding landscape and key features/ locations in particular. Maintenance or enhancement of visual amenity for surrounding residents.	Transition to a lower barrier closer to the creek to signal change and keep sightlines to the bridge. Look at opportunities to undertake planting on the motorway side to soften the barrier.	+	
		Barrier extends close to Creek partially blocking views along creek and of cycle/pedestrian connection.	Transition to a lower barrier closer to the creek to signal change and keep sightlines to the bridge. Boundary fence provided between the pedestrian/cyclepath and adjacent dwellings (in addition to barrier on motorway side) to provide privacy.

Potential effects on known heritage or cultural values.	Keeping the Otahuhu Creek and esplanade area open as this is an important portage.	+	+
		Partially blocks views of portage.	Reduced barrier height on approach to creek keeps portage visible.

Area 4: Ōtāhuhu South Southbound Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2	Option 3 (new)
Constructability/technical feasibility Compliance with relevant safety standards and guidelines. Public safety and security.	Transmission towers in close proximity to noise barriers.	o	o	o
		Non-conductive structures required due to Transmission towers.	As for Option 1.	As for Option 1.
Value for money, including maintenance costs and consideration of benefit cost analysis.	BCR calculated in accordance with NZ Transport Agency guideline.	++	++	++
		1.31	1.39	1.47
Compliance with NZS 6806 noise criteria Achievement of the NZS 6806 structural mitigation performance standards. Requirement for building-modification measures Effect of changes to the existing noise environment.	Currently 9 PPF are Category C. Preference is to get as many houses out of Category C as possible.	o	o	o
		2.4m barrier along the length. All but 2 PPFs move into Category A and B. Barriers result in improvement for existing dwellings.	2.4m barrier and 3m barrier at 132 Avenue Road. All but 1 PPF moves into Category A and B. Barriers result in improvement for existing dwellings.	2.4m barrier stepping down to 1.1m barrier at Trenwith Street. All but 1 PPF moves into Category A and B. Barriers result in improvement for existing dwellings.
Consistency with NZ urban design protocol.	At Trenwith there is the motorway underpass. Amenity of the local road is a consideration. Solid noise barrier to a height of 2.4 m atop the bridge would exacerbate the sense of compressed, dark and not overlooked road (the amenity is already very poor and risk is that it is made worse).	o	o	+
		Solid noise barrier atop the bridge would exacerbate the sense of compressed, dark and not overlooked road (the amenity is already very poor and risk is that it is made worse).	Solid noise barrier atop the bridge would exacerbate the sense of compressed, dark and not overlooked road (the amenity is already very poor and risk is that it is made worse).	Modify the barrier at Trenwith Street to assist with amenity/visibility of local road. Step down from 2.4 to 1.1 adjacent to Trenwith Street.

<p>The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route.</p> <p>Road users' views to the surrounding landscape and key features/ locations in particular.</p> <p>Maintenance or enhancement of visual amenity for surrounding residents.</p>	<p>Look at opportunities to undertake planting on the motorway side to soften the barrier.</p> <p>Anticipate that in the future there may be a barrier continuing from this location along motorway.</p>	o	o	o
		Barrier to be off-set along property boundaries to allow planting wherever possible.	Barrier to be off-set along property boundaries to allow planting wherever possible.	Barrier to be off-set along property boundaries to allow planting wherever possible.
<p>Potential effects on known heritage or cultural values.</p>	<p>No specific issues or risks.</p>	o	o	o
		-	-	-

Area 5: Mt Wellington Northbound Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2	Option 3(new)
Constructability/technical feasibility Compliance with relevant safety standards and guidelines Public safety and security	Overland flow path on motorway at the creek and at Hillside Road. Access required from Hillside Road for stormwater maintenance. If planting along motorway then access to stormwater facilities needs to be considered.	o	o	o
		Overland flow path and access to stormwater facilities.	Overland flow path and access to stormwater facilities.	Overland flow path and access to stormwater facilities.
Value for money, including maintenance costs and consideration of benefit cost analysis	BCR calculated in accordance with NZ Transport Agency guideline.	+	+	+
		1.00	1.22	1.20
Compliance with NZS 6806 noise criteria Achievement of the NZS 6806 structural mitigation performance standards Requirement for building-modification measures Effect of changes to the existing noise environment	Currently 27 PPF are Category C. Preference is to get as many houses out of Category C as possible.	-	o	-
		2.4m barriers along the length and existing 1.8m barrier for 84 and 86 Panama Road. Barriers result in improvement for existing dwellings. 20 PPF remain in Category C.	Mix of 2.4 and 3m barriers. 1.8m barrier at 84 and 86 Panama Road replaced with 2.4m barrier. Barriers result in improvement for existing dwellings. 13 PPF remain in Category C.	3m barriers until at Kotahi Road then stepping down to 1.1m at Otahuhu Creek. Barriers result in improvement for existing dwellings. 13 PPF remain in Category C.
Consistency with NZ urban design protocol	No specific issues or risks.	o	o	o
		-	-	-

<p>The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route.</p> <p>Road users' views to the surrounding landscape and key features/ locations in particular.</p> <p>Maintenance or enhancement of visual amenity for surrounding residents</p>	<p>Two existing barriers at 84 and 86 Panama Road which will be shorter than new barriers.</p> <p>Barriers near Otahuhu Creek will affect views of Creek from the motorway and on the new bridge.</p> <p>Not necessary to keep the barriers symmetrical with barriers on the other side as this section is elevated so different.</p> <p>Room to plant along this side of the motorway</p>	o	o	+
		<p>Barriers obscure views of creek.</p> <p>Undertake planting on the motorway side to soften the barrier.</p>	<p>Barriers obscure views of creek.</p> <p>Undertake planting on the motorway side to soften the barrier.</p>	<p>Replace the two existing barriers in this location to obtain consistent heights.</p> <p>Transition to a lower barrier closer to the creek to signal change and keep sightlines to the bridge</p>
<p>Potential effects on known heritage or cultural values</p>	<p>No specific issues or risks identified.</p>	o	o	o
		-	-	-

Area 6: Ōtāhuhu North Northbound Assessment Matrix

Assessment criteria	Issues / Risks	Option 1	Option 2	
Constructability/technical feasibility. Compliance with relevant safety standards and guideline. Public safety and security	No specific issues or risks identified.	o	o	o
		-	-	-
Value for money, including maintenance costs and consideration of benefit cost analysis	BCR calculated in accordance with NZ Transport Agency guideline.	+++	+++	+++
		1.82	2.11	1.61
Compliance with NZS 6806 noise criteria Achievement of the NZS 6806 structural mitigation performance standards Requirement for building-modification measures Effect of changes to the existing noise environment	Preference is to get as many houses out of Category C as possible.	-	o	o
		1.8m barrier along ramp edge increasing to 2.4m from 85 Luke Street north. 1 PPF remains in Category C.	1.8m barrier along ramp edge and 3m barrier in the vicinity of 85 Luke Street. All PPFs move into Category A and B.	2.4m barrier throughout and pull barrier along ramp back to property boundary. All PPFs move into Category A and B and less highly annoyed PPFs.
Consistency with NZ urban design protocol	No specific issues or risks.	o	o	o
		-	-	-
The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route. Road users' views to the surrounding landscape and key features/ locations in particular. Maintenance or enhancement of visual amenity for surrounding residents	At Princes Street the land falls away so there is an opportunity to shift the barrier away from motorway edge to create space for planting.	o	o	+
		Undertake planting on the motorway side where possible to soften the barrier.	Undertake planting on the motorway side where possible to soften the barrier.	Provides a consistent height barrier along this section. Allows additional planting adjacent to ramp to soften barrier.
Potential effects on known heritage or cultural values	No specific issues or risks identified.	o	o	o
		-	-	-

Area 7: Ōtāhuhu South Northbound Assessment Matrix

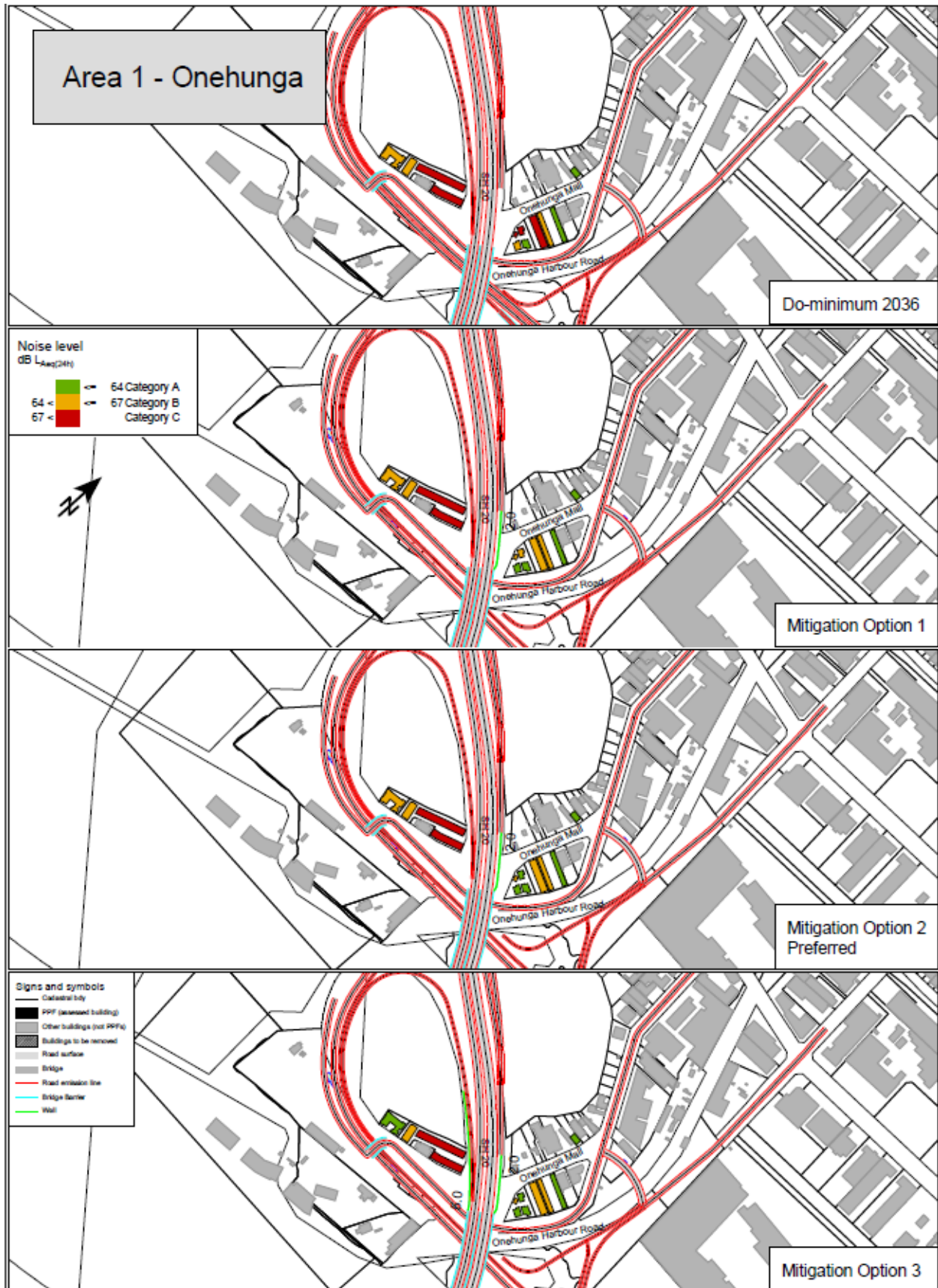
Assessment criteria	Issues / Risks	Option 1	Option 2 (new)
Constructability/technical feasibility Compliance with relevant safety standards and guidelines Public safety and security	No specific issues or risks identified. Existing barriers to be replaced.	o	o
		-	-
Value for money, including maintenance costs and consideration of benefit cost analysis	BCR calculated in accordance with NZ Transport Agency guideline.	+++	++
		1.56	1.41
Compliance with NZS 6806 noise criteria Achievement of the NZS 6806 structural mitigation performance standards Requirement for building-modification measures Effect of changes to the existing noise environment	Replace existing barriers at 113 Albert Street as these don't meet acoustic specifications. No barrier proposed at Albert Street as located far away enough from off-ramp and motorway to achieve compliance.	o	o
		1.8 to 3m barriers. Barriers result in significant improvement for existing dwellings. 2 PPFs remain as Category C	1.8 to 3m barriers. Step down from 2.4 to 1.1 adjacent to Trenwith Street. 2 PPFs remain as Category C. 7 PPFs move from Category A into B (compared to Option 1)
Consistency with NZ urban design protocol	At Trenwith there is the motorway underpass. Amenity of the local road is a consideration.	-	+
		Solid noise barrier to a height of 2.4 m atop the bridge would exacerbate the sense of compressed, dark and not overlooked road (the amenity is already very poor and risk is that it is made worse).	Modify the barrier at Trenwith Street to assist with amenity/visibility of local road. Step down from 2.4 to 1.1 adjacent to Trenwith Street.
The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route. Road users' views to the surrounding landscape and key features/ locations in particular. Maintenance or enhancement of visual amenity for surrounding residents	Look at opportunities to undertake planting on the motorway side to soften the barrier.	o	o
		Barrier to be off-set along property boundaries to allow planting wherever possible.	Barrier to be off-set along property boundaries to allow planting wherever possible.
Potential effects on known heritage or cultural values	No specific issues or risks identified.	o	o
		-	-

ATTACHMENT A: CRITERIA

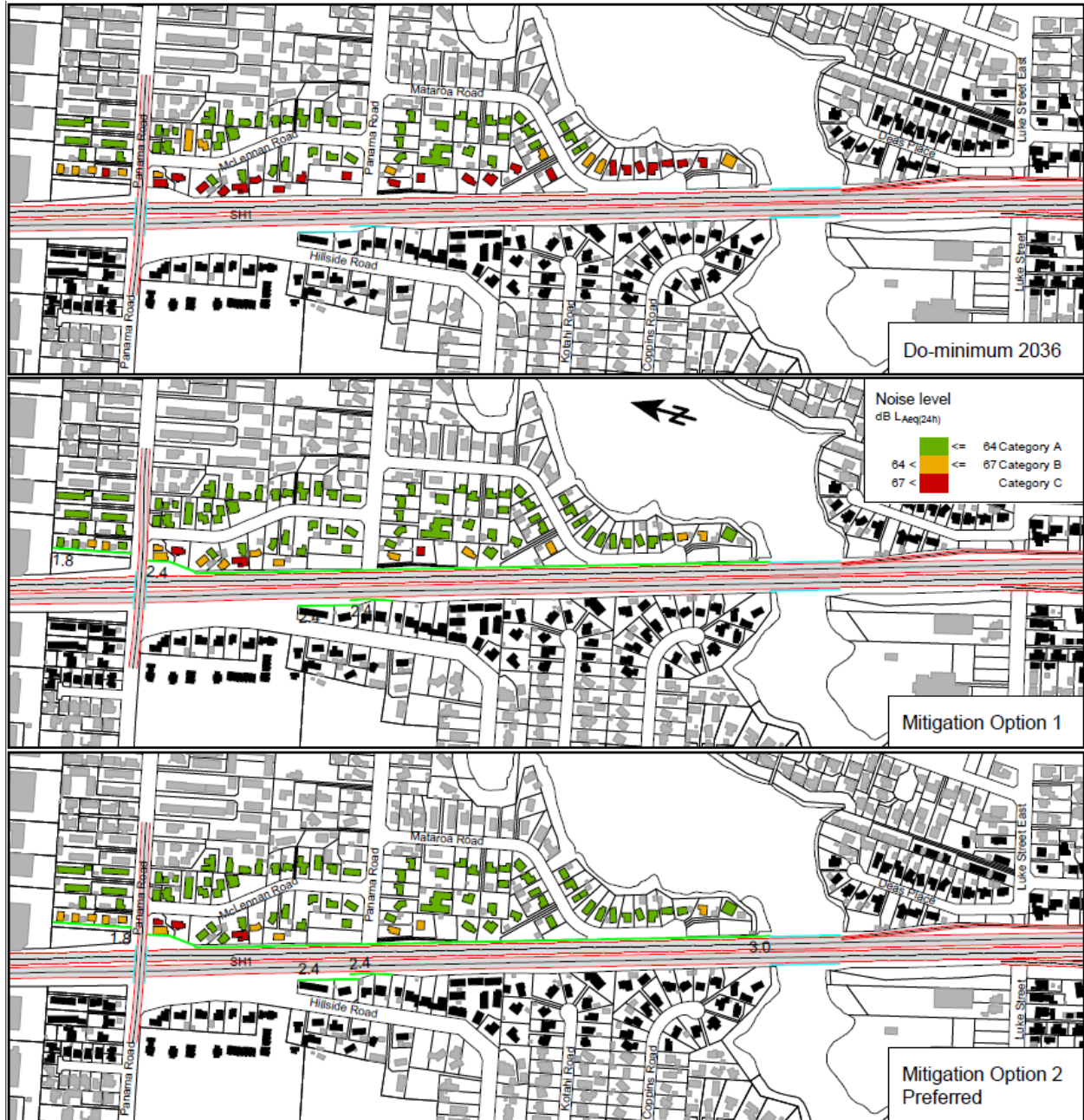
The following criteria from Section 6.3 of NZS 6806 are considered relevant for the Project:

Relevant criteria	Roading and structures	Property	Acoustics	Urban design	Visual and landscape	Social	Cultural	Stormwater	Heritage
Constructability/technical feasibility	Yes							Yes	
Compliance with relevant safety standards and guidelines	Yes								
Public safety and security	Yes								
Availability of sufficient land for construction and maintenance and the extent to which NZTA would need to acquire land, or interests in land		Yes							
Value for money, including maintenance costs and consideration of benefit cost analysis			Yes						
Compliance with NZS 6806 noise criteria			Yes						
Achievement of the NZS 6806 structural mitigation performance standards			Yes						
Requirement for building-modification measures			Yes						
Consistency with NZ urban design protocol				Yes					
Potential effects on known heritage or cultural values							Yes		Yes
Public access to the coastal marine area, rivers, or lakes									
Potential effects on coastal processes									
Effect of changes to the existing noise environment			Yes						
The extent to which the mitigation option promotes integration and establishes visual coherence and continuity in form, scale and appearance of structures and landscape proposals along the route					Yes				
Road users' views to the surrounding landscape and key features/ locations in particular					Yes				
Maintenance or enhancement of visual amenity for surrounding residents					Yes				
Natural character of the coastal environment, wetlands, lakes, rivers, and their margins					Yes				
Impacts (land take, amenity and usability) on community facilities (reserve, school, playground, playing field, etc)						Yes			

ATTACHMENT B: MITIGATION OPTIONS UNDER CONSIDERATION



Area 2: Mt Wellington Southbound



Area 3: Otahuhu North Southbound



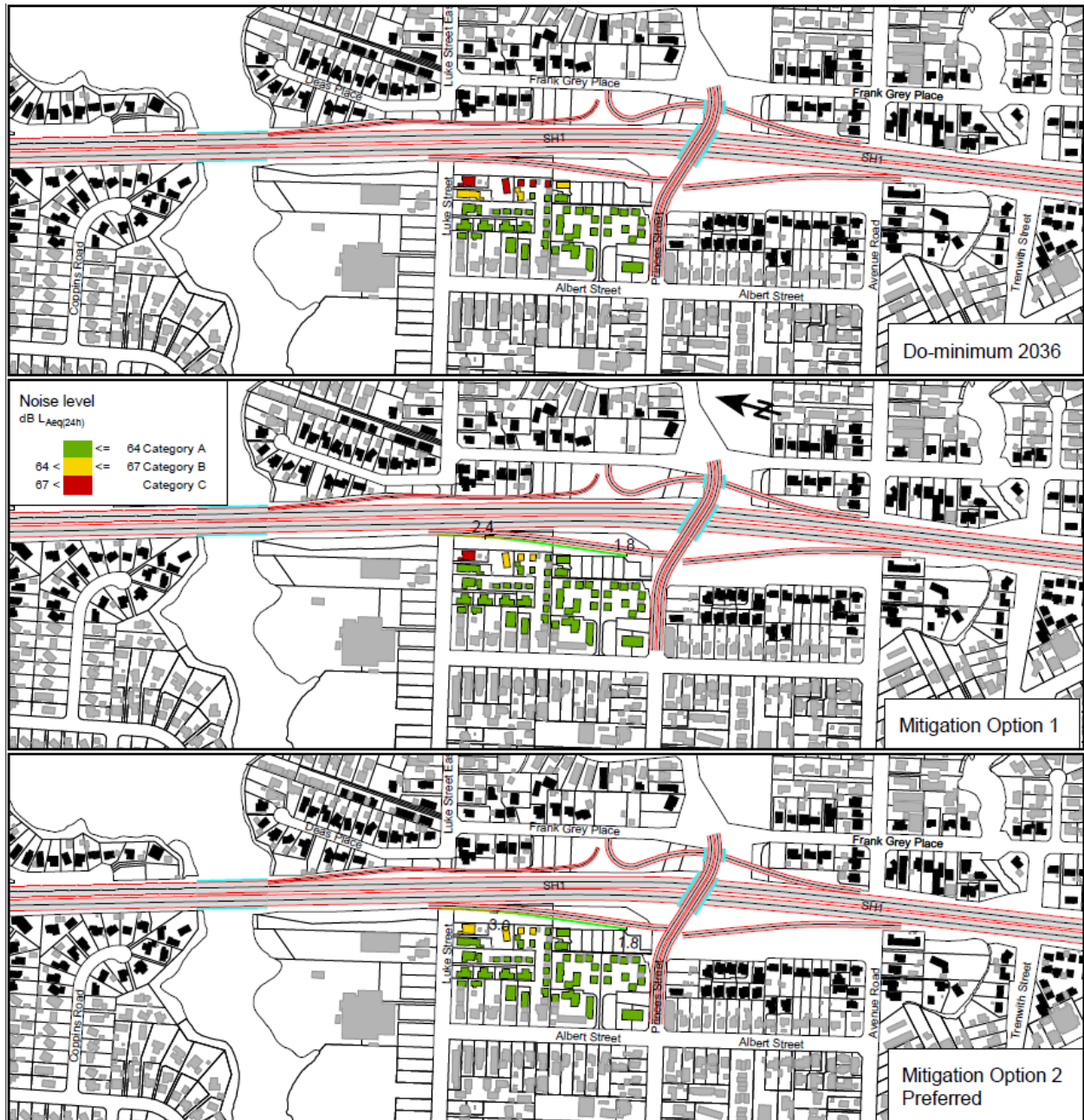
Area 4: Otahuhu South Southbound



Area 5: Mt Wellington Northbound



Area 6: Otahuhu North Northbound



Area 7: Otahuhu South Northbound

