APPENDIX K – COST ESTIMATES

Cost estimates have been developed for the nine route options (i.e. three northern options plus three southern options) to an Indicative Business Case Estimate (IBE) level and are presented below.

Confidence levels of estimate accuracy are suitable for an IBE level estimate; however, given the scale and complexity of the project, and limited investigation, testing and design completed to date, a level of inherent risk is inevitable.

Base estimates have been developed using initial and early state three-dimensional concept alignment design for each option to allow quantity generation for earthworks and pavement – but it must be noted that design alignments are not fixed and have not been optimised.

For example, cut and fill balancing has not been attempted and routes have not been refined to reduce earthworks or minimise bridge spans. In addition, only very limited bridge hydrology has been completed to date and which could have a significant bearing on cost during design development.

Only one interchange strategy has been used for all options to reduce the permutations of different cost estimates and to allow a 'like-for-like' comparison between options. All cost estimates assume four interchanges – a diamond near Manakau, a diamond east of Levin, a high-speed bifurcation between SH1/57 northeast of Levin, and a half diamond north of Levin.

Interchange costs were calculated during a previous phase of work and the costs have been applied to these cost estimates (for example a diamond interchange was previously calculated to cost around $30M (base) so this figure has been applied for all diamond interchanges).

Structure costs for all the Southern options are significant (particularly so for S7 and S7A) but only extremely high level structural design work has been completed - as this stage structural design has not been advanced to a concept level. Instead structure costs have been developed based on expected rates per square metre for each structure (rates set dependent on anticipated complexity of structure) – and using the judgement of an experienced structural engineer, using very limited hydrological data and terrain profile data. Structural costs will be refined once further hydrology and design development is completed.

Other cost aspects have been calculated using a variety of means including percentage costs of total works (for example for drainage, P&G and environmental compliance).

Local road costs have been calculated based on previous work when a concept local road network including overbridges was devised. This has not been updated for each current option but the costs are considered reasonably robust and the same local road costs have been applied to all options.

Property cost estimates have been supplied by a specialist property consultant.

Design and MSQA fees have been determined as a percentage of total construction and property cost.

To determine the expected estimate, the total cost for the mainline expressway works, interchanges, property, local roads and professional and client fees have been increased by 25%. More detailed assessment of contingency has not been undertaken.

The 95th percentile costs have been approximated by adding a further 15% to the expected estimate.

Table K-1: Summary of Shortlisted Option Costs

	S6 Options			S7 Options			S7A Options		
	S6/N4	**S6/N5**	**S6/N9**	**S7/N4**	**S7/N5**	**S7/N9**	**S7A/N4**	**S7A/N5**	**S7A/N9**
Base D&PD & MSQA	$31M	$31M	$31M	$42M	$42M	$42M	$38M	$38M	$38M
Base Property	$100M	$100M	$100M	$87M	$87M	$87M	$93M	$93M	$93M
Base Total	$549M	$552M	$552M	$733M	$736M	$736M	$664M	$667M	$667M
Expected (+25%)	**$687M**	**$691M**	**$691M**	**$916M**	**$920M**	**$920M**	**$830M**	**$834M**	**$834M**
95th%ile (+15%)	$790M	$794M	$794M	$1,054 M	$1,059 M	$1,058 M	$955M	$959M	$959M

It is apparent that the costings undertaken for the three options that include S7 are significantly greater than the S6 options (~$230M), and moderately greater than options that include S7A (~$90M). The main difference with the S7 options is the additional structural costs relative to S6 and S7A. On S7, the ground profile and hydrology requirements are expected to necessitate much more significant structures for the expressway. Longer and higher structures add to complexity and have significant cost increase implications, as does the location of the fault line location.

Other key differences between the highest and lowest cost southern options (S6 and S7 corridors) relate to earthworks and ground improvements, with costs on S7 estimated to be much greater than for S6, again due to the terrain profile through this corridor.

Costs for the northern segments, N4, N5 and N9 are all broadly similar, meaning the decision to proceed with S6, S7 or S7A has the largest bearing on overall cost. In general terms, any option that utilises the S7 corridor is expected to cost at least 30% more than the options that use S6.

Project Estimate - Form B

Project Name: S6

IBE

Indicative Business Case Estimate

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	**Nett Project Property Cost**	**$59,945,653**	**$14,986,413**	**$11,239,810**
	Project Development Phase			
	- Consultancy Fees	$6,256,883	$1,564,221	$1,173,166
	- NZTA Managed Costs			
B	**Total Project Development**	**$6,256,883**	**$1,564,221**	**$1,173,166**
	Pre-Implementation Phase			
	- Consultancy Fees	$9,385,325	$2,346,331	$1,759,748
	- NZTA Managed Costs			
C	**Total Pre-implementation**	**$9,385,325**	**$2,346,331**	**$1,759,748**
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees	$3,128,441	$782,110	$586,583
	- NZTA Managed Costs			
	- Consent Monitoring Fees			
	Sub Total Base Implementation Fees	**$3,128,441**	**$782,110**	**$586,583**
	Physical Works			
1	Environmental Compliance	$10,000,000	$2,500,000	$1,875,000
2	Earthworks	$25,494,130	$6,373,533	$4,780,149
3	Ground Improvements	$9,000,000	$2,250,000	$1,687,500
4	Drainage	$12,000,000	$3,000,000	$2,250,000
5	Pavement and Surfacing	$34,001,900	$8,500,475	$6,375,356
6	Bridges	$75,208,000	$18,802,000	$14,101,500
7	Retaining Walls	$0	$0	$0
8	Traffic Services	$5,345,800	$1,336,450	$1,002,338
9	Service Relocations	$5,054,250	$1,263,563	$947,672
10	Landscaping	$4,500,000	$1,125,000	$843,750
11	Traffic Management and Temporary Works	$2,500,000	$625,000	$468,750
12	Preliminary and General	$31,000,000	$7,750,000	$5,812,500
13	Extraordinary Construction Costs	$38,794,443	$9,698,611	$7,273,958
	Sub Total Base Physical Works	$252,898,523	$63,224,631	$47,418,473
D	**Total for Implementation Phase**			
E	**Project Base Estimate** (A+B+C+D)	331,614,825		

F	**Contingency** (Assessed/Analysed)	(A+B+C+D)	82,903,706
G	**Project Expected Estimate**	(E+F)	414,518,531
Nett Project Property Cost Expected Estimate			
Project Development Phase Expected Estimate			
Pre-implementation phase Expected Estimate			
Implementation Phase Expected Estimate			

H	**Funding Risk Contingency** (Assessed/Analysed)	(A+B+C+D)	62,177,780
I	**95th percentile Project Estimate**	(G+H)	476,696,311
Nett Project Property Cost 95th percentile Estimate			
Project Development Phase 95th percentile Estimate			
Pre-implementation Phase 95th percentile Estimate			
Implementation Phase 95th percentile Estimate			

Date of I	**15/11/2018**	**Cost Index (Qtr/Year)**	
Estimate	**Jamie Povall**	**Signed**	
Estimate internal peer review by		**Signed**	
Estimate external peer review by		**Signed**	
Estimate accepted by NZTA		**Signed**	

Project Estimate - Form B

Project Name: N4

IBE

Indicative Business Case Estimate

Item	Description	Base Estimate	Contingency	Funding Risk Contingency
A	**Nett Project Property Cost**	**$39,696,930**	**$9,924,233**	**$7,443,174**
	Project Development Phase			
	- Consultancy Fees	$4,106,608	$1,026,652	$769,989
	- NZTA Managed Costs			
B	**Total Project Development**	**$4,106,608**	**$1,026,652**	**$769,989**
	Pre-Implementation Phase			
	- Consultancy Fees	$6,159,913	$1,539,978	$1,154,984
	- NZTA Managed Costs			
C	**Total Pre-implementation**	**$6,159,913**	**$1,539,978**	**$1,154,984**
	Implementation Phase			
	Implementation Fees			
	- Consultancy Fees	$2,053,304	$513,326	$384,995
	- NZTA Managed Costs			
	- Consent Monitoring Fees			
	Sub Total Base Implementation Fees	**$2,053,304**	**$513,326**	**$384,995**
	Physical Works			
1	Environmental Compliance	$4,100,000	$1,025,000	$768,750
2	Earthworks	$18,121,600	$4,530,400	$3,397,800
3	Ground Improvements	$4,100,000	$1,025,000	$768,750
4	Drainage	$5,400,000	$1,350,000	$1,012,500
5	Pavement and Surfacing	$20,388,550	$5,097,138	$3,822,853
6	Bridges	$1,950,000	$487,500	$365,625
7	Retaining Walls	$0	$0	$0
8	Traffic Services	$3,651,520	$912,880	$684,660
9	Service Relocations	$6,527,400	$1,631,850	$1,223,888
10	Landscaping	$2,100,000	$525,000	$393,750
11	Traffic Management and Temporary Works	$3,000,000	$750,000	$562,500
12	Preliminary and General	$12,500,000	$3,125,000	$2,343,750
13	Extraordinary Construction Costs	$83,794,443	$20,948,611	$15,711,458
	Sub Total Base Physical Works	$165,633,513	$41,408,378	$31,056,284
D	**Total for Implementation Phase**			
E	**Project Base Estimate** (A+B+C+D)	217,650,268		

F	**Contingency** (Assessed/Analysed)	(A+B+C+D)	54,412,568	
G	**Project Expected Estimate**	(E+F)	272,062,836	
Nett Project Property Cost Expected Estimate				
Project Development Phase Expected Estimate				
Pre-implementation phase Expected Estimate				
Implementation Phase Expected Estimate				

H	**Funding Risk Contingency** (Assessed/Analysed)	(A+B+C+D)	40,809,425
I	**95th percentile Project Estimate**	(G+H)	312,872,261
Nett Project Property Cost 95th percentile Estimate			
Project Development Phase 95th percentile Estimate			
Pre-implementation Phase 95th percentile Estimate			
Implementation Phase 95th percentile Estimate			

Date of I	**15/11/2018**	**Cost Index (Qtr/Year)**	
Estimate	**Jamie Povall**	**Signed**	
Estimate internal peer review by		**Signed**	
Estimate external peer review by		**Signed**	
Estimate accepted by NZTA		**Signed**	