

Appendix 4 - SBCR Cost-Benefit Analysis: July 2018

Scenario (Base)	10Yr NPV	15Yr NPV
4 - Phase 1 and 2	101,447,474	166,576,711
3 - Phase 1 Only	61,878,291	89,652,996
2 - S4C Requirement Only	19,671,467	26,734,791
1 - Do Minimum	16,852,627	23,915,951

Project Name Yr Egin

Version 1.6

Date 06/07/2018

Sensitivity Analysis

10Yr NPV	15Yr NPV
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10Yr NPV	15Yr NPV
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20% reduction in Wider Benefit

4 - Phase 1 and 2	101,447,474	166,576,711
3 - Phase 1 Only	61,878,291	89,652,996
2 - S4C Requirement Only	19,671,467	26,734,791
1 - Do Minimum	16,852,627	23,915,951

40% reduction in Benefits

4 - Phase 1 and 2	58,771,633	97,849,175
3 - Phase 1 Only	35,851,612	52,516,435
2 - S4C Requirement Only	11,802,880	16,040,875
1 - Do Minimum	10,111,576	14,349,570

1Yr Delay in Benefits

4 - Phase 1 and 2	88,194,629	153,667,311
3 - Phase 1 Only	55,678,958	84,434,257
2 - S4C Requirement Only	18,107,073	25,417,613
1 - Do Minimum	15,288,232	22,598,772

Slow Mobilisation (6month delay)

4 - Phase 1 and 2	94,821,052	160,122,011
3 - Phase 1 Only	58,778,625	87,043,626
2 - S4C Requirement Only	18,889,270	26,076,202
1 - Do Minimum	16,070,429	23,257,362

20% increase in costs

4 - Phase 1 and 2	100,399,049	165,528,285
3 - Phase 1 Only	61,240,610	89,015,315
2 - S4C Requirement Only	19,671,467	26,734,791
1 - Do Minimum	16,852,627	23,915,951

1Yr Delay and -20% Wider Benefit

4 - Phase 1 and 2	88,194,629	153,667,311
3 - Phase 1 Only	55,678,958	84,434,257
2 - S4C Requirement Only	18,107,073	25,417,613
1 - Do Minimum	15,288,232	22,598,772

CBA (Simplified) Option 4 - Phase 1 and 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	Project Period				Post-Project											15 Yr	10Yr
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total	2026
Costs																	
City Deal Capital Investment	-	3,000,000	2,000,000	-	-	-	-	-	-	-	-	-	-	-	-	5,000,000	5,000,000
Investment (discounted/bias factored)	-	3,188,406	2,053,724	-	-	-	-	-	-	-	-	-	-	-	-	5,242,129	5,242,129
Cumulative Costs (discounted/bias)	-	3,188,406	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129	5,242,129
Benefits																	
Cash-releasing benefits	138,371	2,835,875	40,662	12,889	1,666,623	183,127	210,069	223,675	221,675	219,533	82,535	215,361	213,221	211,044	208,717	6,160,240	5,394,432
Non-Cash-releasing benefits																	
Construction Jobs Created	65	-	42	60												65	-
Construction Benefit	2,615,152		1,700,279	2,428,970												6,744,401	6,744,401
Technology Jobs Created																	
Theme Sector Benefit																	
Other Jobs Created	-	95	190	190	265	324	339	350	361	372	383	394	405	416	427	427	372
Other Jobs Benefit	-	4,177,359	8,354,719	8,354,719	12,245,250	15,357,675	16,135,781	16,704,766	17,273,751	17,842,735	18,411,720	18,980,704	19,549,689	20,118,674	20,687,658	214,195,200	116,446,755
Induced Wage Benefit (Multiplier)*																	
Total Benefits	2,476,781	7,013,234	10,014,336	10,796,578	13,911,873	15,540,802	16,345,850	16,928,441	17,495,425	18,062,268	18,329,184	19,196,065	19,762,910	20,329,718	20,896,375	227,099,841	128,585,588
Total Benefits (discounted)	2,476,781	6,776,071	9,348,490	9,737,895	12,123,394	13,084,938	13,297,359	13,305,601	13,286,228	13,252,846	12,993,904	13,148,263	13,078,764	12,998,906	12,909,400	171,818,840	106,689,604
Cumulative Benefits (discounted)	2,476,781	9,252,852	18,601,342	28,339,237	40,462,631	53,547,569	66,844,929	80,150,530	93,436,758	106,689,604	119,683,507	132,831,770	145,910,534	158,909,440	171,818,840	171,818,840	106,689,604
NPV	2,476,781	6,064,446	13,359,213	23,097,108	35,220,502	48,305,440	61,602,799	74,908,401	88,194,629	101,447,474	114,441,378	127,589,641	140,668,404	153,667,311	166,576,711	166,576,711	101,447,474

Base Analysis

Scenario Summary	
10Yr NPV	101,447,474
15Yr NPV	166,576,711

Sensitivity Analysis

20% reduction in Wider Benefit	
10Yr NPV	101,447,474
15Yr NPV	166,576,711

40% reduction in Benefits	
10Yr NPV	58,771,633
15Yr NPV	97,849,175

1Yr Delay in Benefits	
10Yr NPV	88,194,629
15Yr NPV	153,667,311

Slow Mobilisation (6month delay)	
10Yr NPV	94,821,052
15Yr NPV	160,122,011

20% increase in costs	
10Yr NPV	100,399,049
15Yr NPV	165,528,285

1Yr Delay and -20% Wider Benefit	
10Yr NPV	88,194,629
15Yr NPV	153,667,311

Optimism Bias

0.10

*The job estimates identified above are based on an assessment of the net additional impact at the City Region level. Therefore, they include allowance for displacement and multiplier effects

CBA (Simplified) Option 3 - Phase 1 Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
	Project Period				Post-Project											15 Yr	10Yr	
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total	2026	
Costs																		
City Deal Capital Investment		3,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000	
Investment (discounted/bias factored)	-	3,188,406	-	-	-	-	-	-	-	-	-	-	-	-	-	3,188,406	3,188,406	
Cumulative Costs (discounted/bias)	-	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	3,188,406	
Benefits																		
Cash-releasing benefits	-	138,371	2,835,875	40,662	12,889	32,991	51,095	79,669	94,939	94,637	94,335	205,966	93,732	93,430	93,128	92,826	3,284,547	3,117,398
Non-Cash-releasing benefits																		
Construction Jobs Created		65															65	-
Construction Benefit		2,615,152															2,615,152	2,615,152
Technology Jobs Created																		
Theme Sector Benefit																		
Other Jobs Created		95	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190
Other Jobs Benefit		4,177,359	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	8,354,719	112,788,703	71,015,109
Induced Wage Benefit (Multiplier)*																		
Total Benefits	2,476,781	7,013,234	8,314,057	8,367,608	8,387,710	8,405,814	8,434,387	8,449,658	8,449,356	8,449,054	8,148,752	8,448,450	8,448,148	8,447,847	8,447,545	118,688,402	76,747,660	
Total Benefits (discounted)	2,476,781	6,776,071	7,761,261	7,547,103	7,309,405	7,077,470	6,861,380	6,641,355	6,416,539	6,199,333	5,776,804	5,786,730	5,590,844	5,401,588	5,218,739	92,841,402	65,066,697	
Cumulative Benefits (discounted)	2,476,781	9,252,852	17,014,114	24,561,217	31,870,621	38,948,091	45,809,471	52,450,825	58,867,364	65,066,697	70,843,501	76,630,231	82,221,074	87,622,662	92,841,402	92,841,402	65,066,697	65,066,697
NPV	2,476,781	6,064,446	13,825,708	21,372,811	28,682,215	35,759,685	42,621,065	49,262,420	55,678,958	61,878,291	67,655,095	73,441,825	79,032,668	84,434,257	89,652,996	89,652,996	61,878,291	61,878,291

Base Analysis

Scenario Summary	
10Yr NPV	61,878,291
15Yr NPV	89,652,996

Sensitivity Analysis

20% reduction in Wider Benefit	
10Yr NPV	61,878,291
15Yr NPV	89,652,996

40% reduction in Benefits	
10Yr NPV	35,851,612
15Yr NPV	52,516,435

1Yr Delay in Benefits	
10Yr NPV	55,678,958
15Yr NPV	84,434,257

Slow Mobilisation (6month delay)	
10Yr NPV	58,778,625
15Yr NPV	87,043,626

20% increase in costs	
10Yr NPV	61,240,610
15Yr NPV	89,015,315

1Yr Delay and -20% Wider Benefit	
10Yr NPV	55,678,958
15Yr NPV	84,434,257

Optimism Bias

0.10

*The job estimates identified above are based on an assessment of the net additional impact at the City Region level. Therefore, they include allowance for displacement and multiplier effects

CBA (Simplified) Option 2 - S4C Requirement Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	Project Period				Post-Project											15 Yr	10Yr
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total	2026
Costs																	
City Deal Capital Investment					-	-	-	-	-	-	-	-	-	-	-	-	-
Investment (discounted/bias factored)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cumulative Costs (discounted/bias)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benefits																	
Cash-releasing benefits		3,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	3,000,000	3,000,000
Non-Cash-releasing benefits																	
Construction Jobs Created	14															14	14
Construction Benefit	552,497															552,497	552,497
Technology Jobs Created																	
Theme Sector Benefit																	
Other Jobs Created		52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Other Jobs Benefit		2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	29,849,531	19,188,984
Induced Wage Benefit (Multiplier)*																-	-
Total Benefits	552,497	5,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	33,402,028	22,741,481
Total Benefits (discounted)	552,497	4,958,560	1,990,347	1,923,040	1,858,010	1,795,179	1,734,472	1,675,819	1,619,148	1,564,395	1,511,492	1,460,379	1,410,994	1,363,280	1,317,178	26,734,791	19,671,467
Cumulative Benefits (discounted)	552,497	5,511,057	7,501,404	9,424,444	11,282,454	13,077,633	14,812,105	16,487,924	18,107,073	19,671,467	21,182,960	22,643,339	24,054,333	25,417,613	26,734,791	26,734,791	19,671,467
NPV	552,497	5,511,057	7,501,404	9,424,444	11,282,454	13,077,633	14,812,105	16,487,924	18,107,073	19,671,467	21,182,960	22,643,339	24,054,333	25,417,613	26,734,791	26,734,791	19,671,467

Base Analysis

Scenario Summary
10Yr NPV 19,671,467
15Yr NPV 26,734,791

Sensitivity Analysis

20% reduction in Wider Benefit
10Yr NPV 19,671,467
15Yr NPV 26,734,791

40% reduction in Benefits
10Yr NPV 11,802,880
15Yr NPV 16,040,875

1Yr Delay in Benefits
10Yr NPV 18,107,073
15Yr NPV 25,417,613

Slow Mobilisation (6month delay)
10Yr NPV 18,889,270
15Yr NPV 26,076,202

20% increase in costs
10Yr NPV 19,671,467
15Yr NPV 26,734,791

1Yr Delay and -20% Wider Benefit
10Yr NPV 18,107,073
15Yr NPV 25,417,613

Optimism Bias

0.10

*The job estimates identified above are based on an assessment of the net additional impact at the City Region level. Therefore, they include allowance for displacement and multiplier effects

CBA (Simplified) Option 1 - Do Minimum

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
	Project Period				Post-Project											15 Yr	10Yr
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total	2026
Costs																	
City Deal Capital Investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investment (discounted/bias factored)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cumulative Costs (discounted/bias)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benefits																	
Cash-releasing benefits	-	82,500	-	-	-	-	-	-	-	-	-	-	-	-	-	82,500	82,500
Non-Cash-releasing benefits	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Jobs Created	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-
Construction Benefit	552,497	-	-	-	-	-	-	-	-	-	-	-	-	-	-	552,497	552,497
Technology Jobs Created	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Theme Sector Benefit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Jobs Created	-	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Other Jobs Benefit	-	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	29,849,531	19,188,984
Induced Wage Benefit (Multiplier)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Benefits	552,497	2,214,609	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	2,132,109	30,484,528	19,823,981
Total Benefits (discounted)	552,497	2,139,719	1,990,347	1,923,040	1,858,010	1,795,179	1,734,472	1,675,819	1,619,148	1,564,395	1,511,492	1,460,379	1,410,994	1,363,280	1,317,178	23,915,951	16,852,627
Cumulative Benefits (discounted)	552,497	2,692,216	4,682,563	6,605,604	8,463,614	10,258,793	11,993,265	13,669,084	15,288,232	16,852,627	18,364,119	19,824,498	21,235,493	22,598,772	23,915,951	23,915,951	16,852,627
NPV	552,497	2,692,216	4,682,563	6,605,604	8,463,614	10,258,793	11,993,265	13,669,084	15,288,232	16,852,627	18,364,119	19,824,498	21,235,493	22,598,772	23,915,951	23,915,951	16,852,627

Base Analysis

Scenario Summary
10Yr NPV 16,852,627
15Yr NPV 23,915,951

Sensitivity Analysis

20% reduction in Wider Benefit
10Yr NPV 16,852,627
15Yr NPV 23,915,951

40% reduction in Benefits
10Yr NPV 10,111,576
15Yr NPV 14,349,570

1Yr Delay in Benefits
10Yr NPV 15,288,232
15Yr NPV 22,598,772

Slow Mobilisation (6month delay)
10Yr NPV 16,070,429
15Yr NPV 23,257,362

20% increase in costs
10Yr NPV 16,852,627
15Yr NPV 23,915,951

1Yr Delay and -20% Wider Benefit
10Yr NPV 15,288,232
15Yr NPV 22,598,772

Optimism Bias

0.10

*The job estimates identified above are based on an assessment of the net additional impact at the City Region level. Therefore, they include allowance for displacement and multiplier effects

STPR Factors

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	STPR (%)	Factor	
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		3.5	96.5%
Factor	1	0.9662	0.9335	0.9019	0.8714	0.8420	0.8135	0.7860	0.7594	0.7337	0.7089	0.6849	0.6618	0.6394	0.6178	0.5969			

Depreciation (Not Impact)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	30 Year Lifetime - linear		
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annualise	0.033333
Factor	1	0.966667	0.933333	0.9	0.866667	0.833333	0.8	0.766667	0.733333	0.7	0.666667	0.633333	0.6	0.566667	0.533333		(1-)	0.966667
1yr later		1	0.966667	0.933333	0.9	0.866667	0.833333	0.8	0.766667	0.733333	0.7	0.666667	0.633333	0.6	0.566667	0.533333		
2yr later			1	0.966667	0.933333	0.9	0.866667	0.833333	0.8	0.766667	0.733333	0.7	0.666667	0.633333	0.6	0.566667	0.533333	
3yr later				1	0.966667	0.933333	0.9	0.866667	0.833333	0.8	0.766667	0.733333	0.7	0.666667	0.633333	0.6	0.566667	0.533333333

