

Appendix B

Photos



1. General Overview



Photo B- 1.1 – View of Scrivener Dam from downstream



Photo B- 1.2 – Scrivener Dam looking towards left abutment



Photo B- 1.3 – View of area downstream



Photo B- 1.4 – View of area downstream from right abutment

2. Stilling Basing, Training Walls and Overflow section



Photo B- 2.1 – Photo of Overflow Section



Photo B- 2.2 – -Photo of Overflow Section



Photo B- 2.3 – -View of Chute blocks, apron and baffle piers



Photo B- 2.4 – View of Stilling Basin looking downstream (minor erosion downstream)



Photo B- 2.5 – Stilling Basin looking towards River



Photo B- 2.6 – Stilling Basin looking downstream and left



Photo B- 2.7 – Stilling Basin looking towards left side



Photo B- 2.8 – Stilling Basin looking downstream to Bay 1



Photo B- 2.9 – Stilling Basin looking towards chute blocks and baffles



Photo B- 2.10 – Internal Splitter Wall in Stilling Basin



Photo B- 2.11 – Stilling Basin divider/ splitter wall



Photo B- 2.12 – Internal Splitter Wall in Stilling Basin



Photo B- 2.13 – Left downstream spillway training wall



Photo B- 2.14 – Left Spillway Training Wall



Photo B- 2.15 – Right downstream spillway training wall



Photo B- 2.16 – Right Spillway Training Wall



Photo B- 2.17 – Right downstream spillway training wall



Photo B- 2.18 – Downstream view of top of right training wall looking towards stilling basin



Photo B- 2.19 – Right downstream spillway training wall from Top



Photo B- 2.20 – Downstream end of Bay 1



Photo B- 2.21 – Looking along End Sill



Photo B- 2.22 – Looking left along end sill



Photo B- 2.23 – Typical cracking Bay 4



Photo B- 2.24 – Typical Cracking Bay 1



Photo B- 2.25 – Typical Crack Bay 4 and 5



Photo B- 2.26 – End sill Cracking



Photo B- 2.27 – View of Chute blocks, apron and baffle piers and Spillway Gate

3. Outlet Works



Photo B- 3.1 – Sluice Outlet Chute Block



Photo B- 3.2 – Sluice Outlet



Photo B- 3.3 – Sluice in Operation



Photo B- 3.4 – Sluice Outlet

Appendix C

Comments-response register

Appendix D

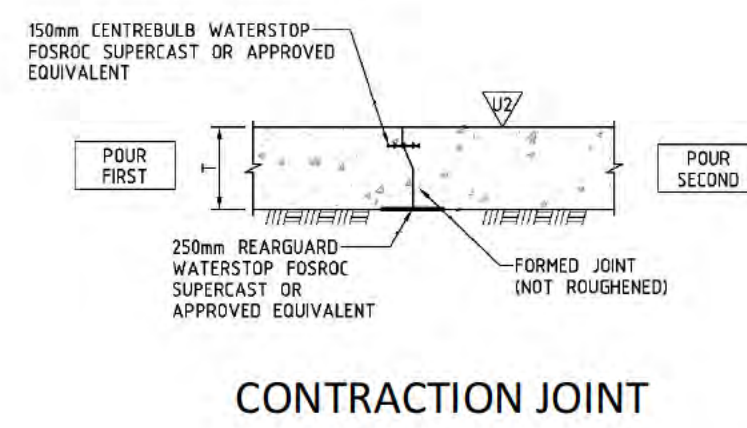
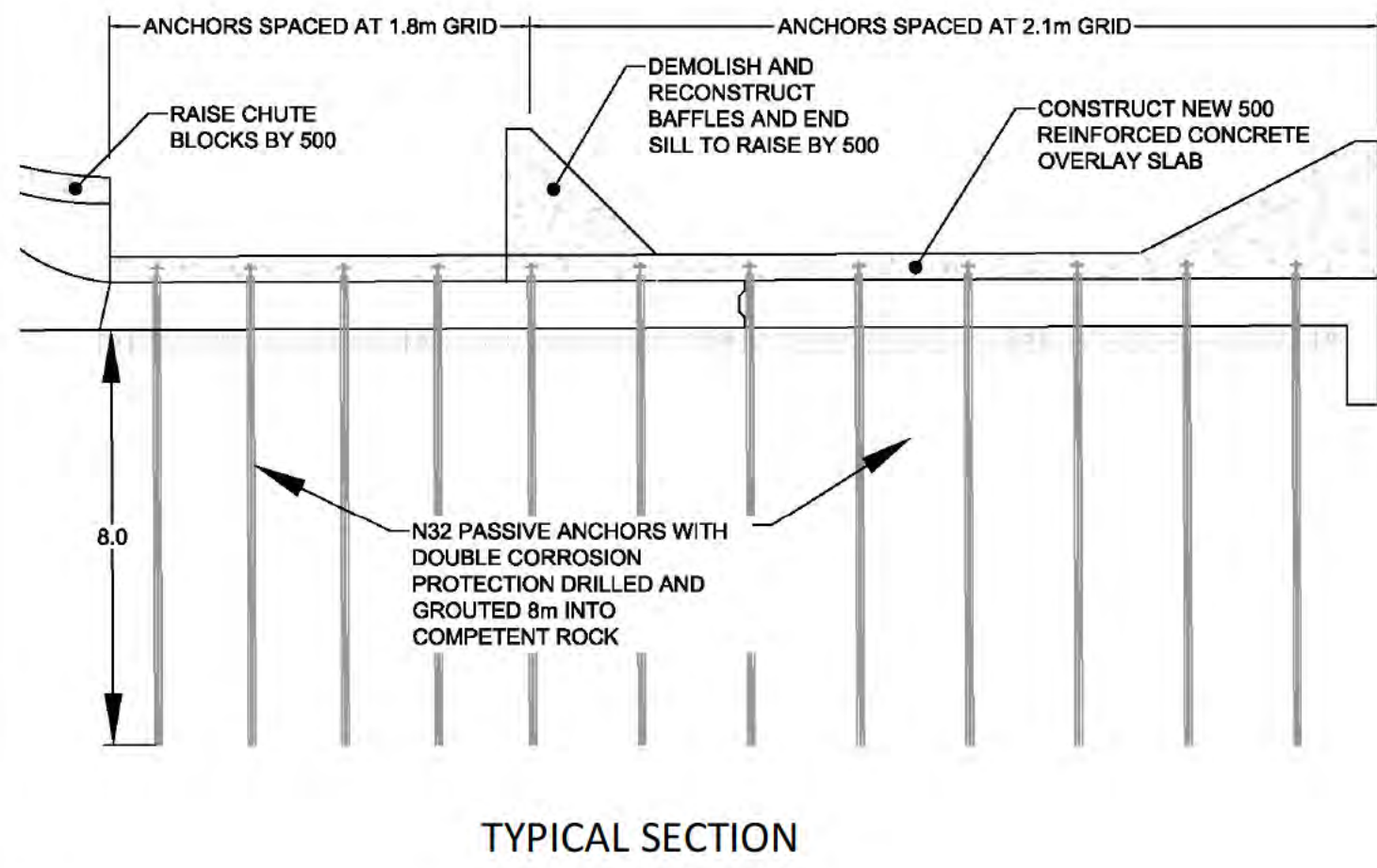
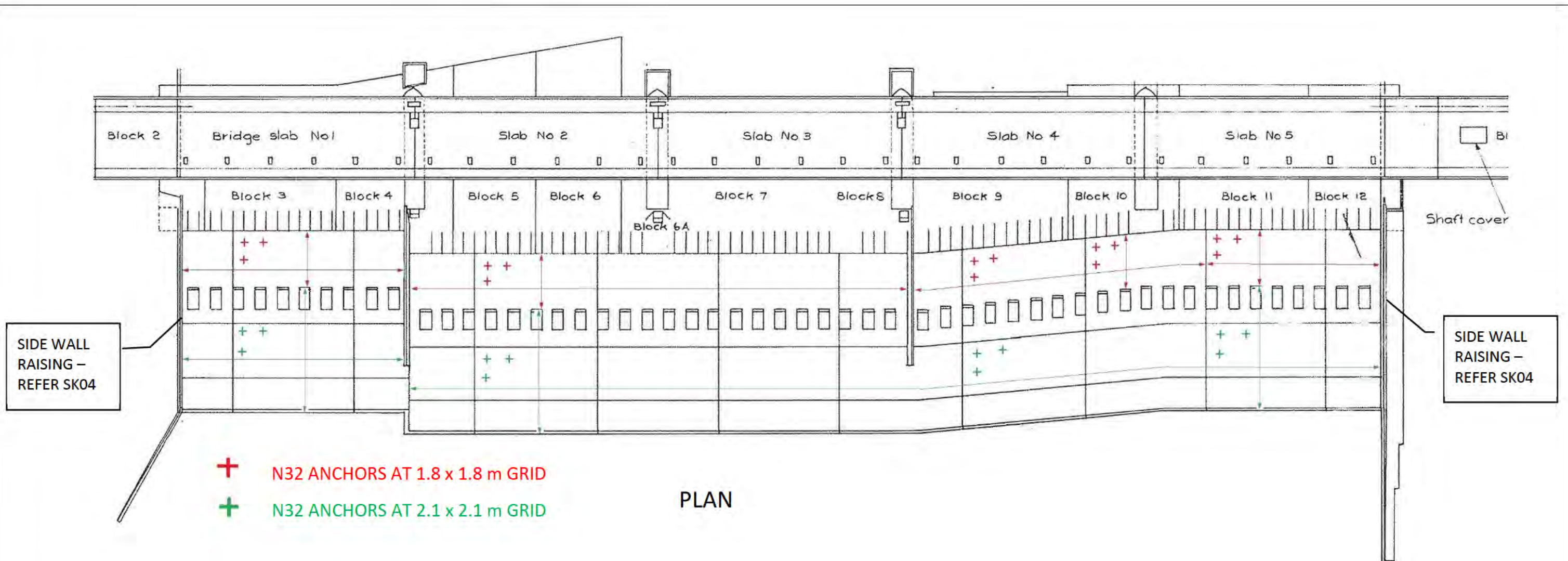
Option Identification Workshop Minutes


Appendix B

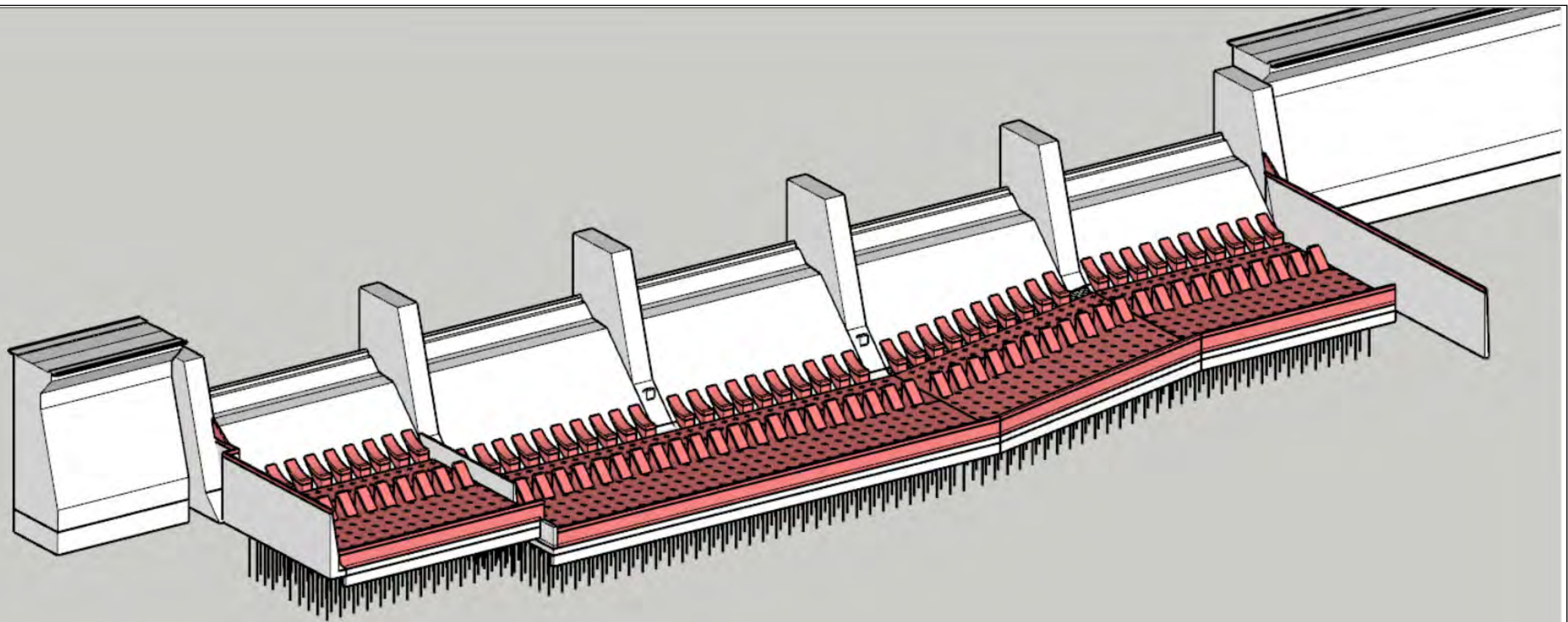
Meeting Presentation


Appendix E

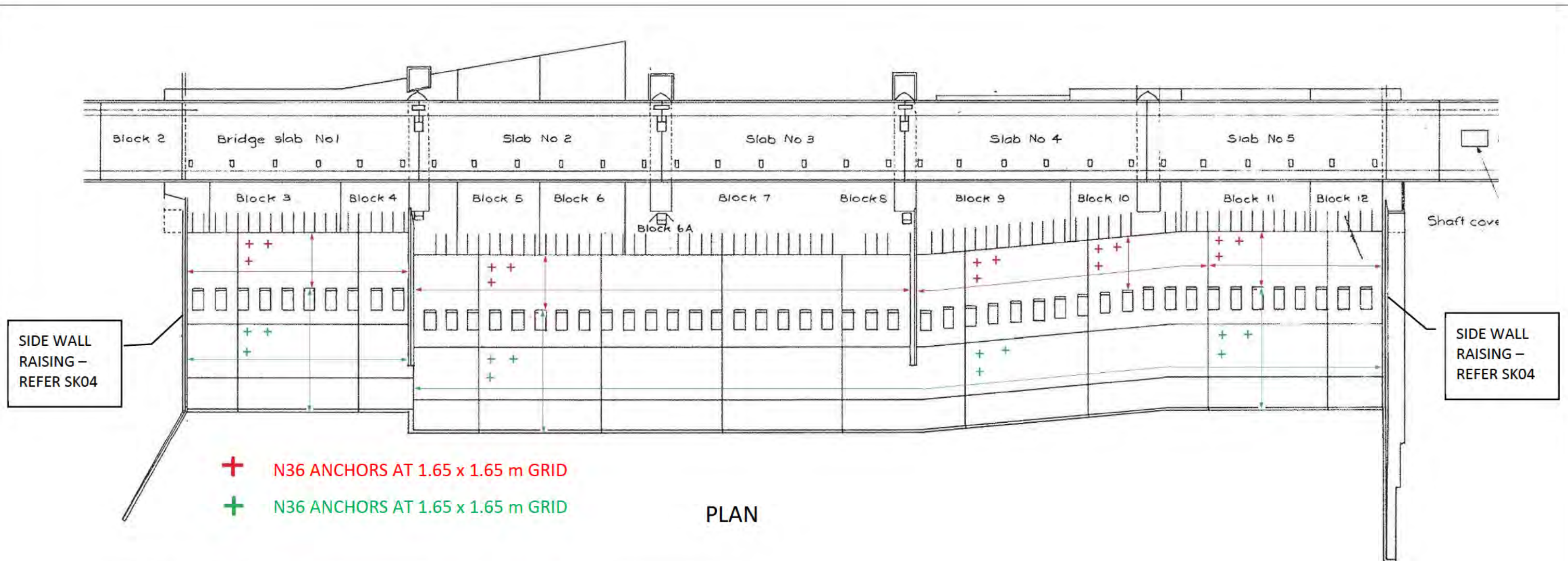
Option Sketches



	SCRIVENER DAM STILLING BASIN UPGRADE PROJECT	SK01-1
	OPTION 3 – OVERLAY SLAB WITH ANCHORS	FOR DISCUSSION
		REVISION 1
		DATE 160921

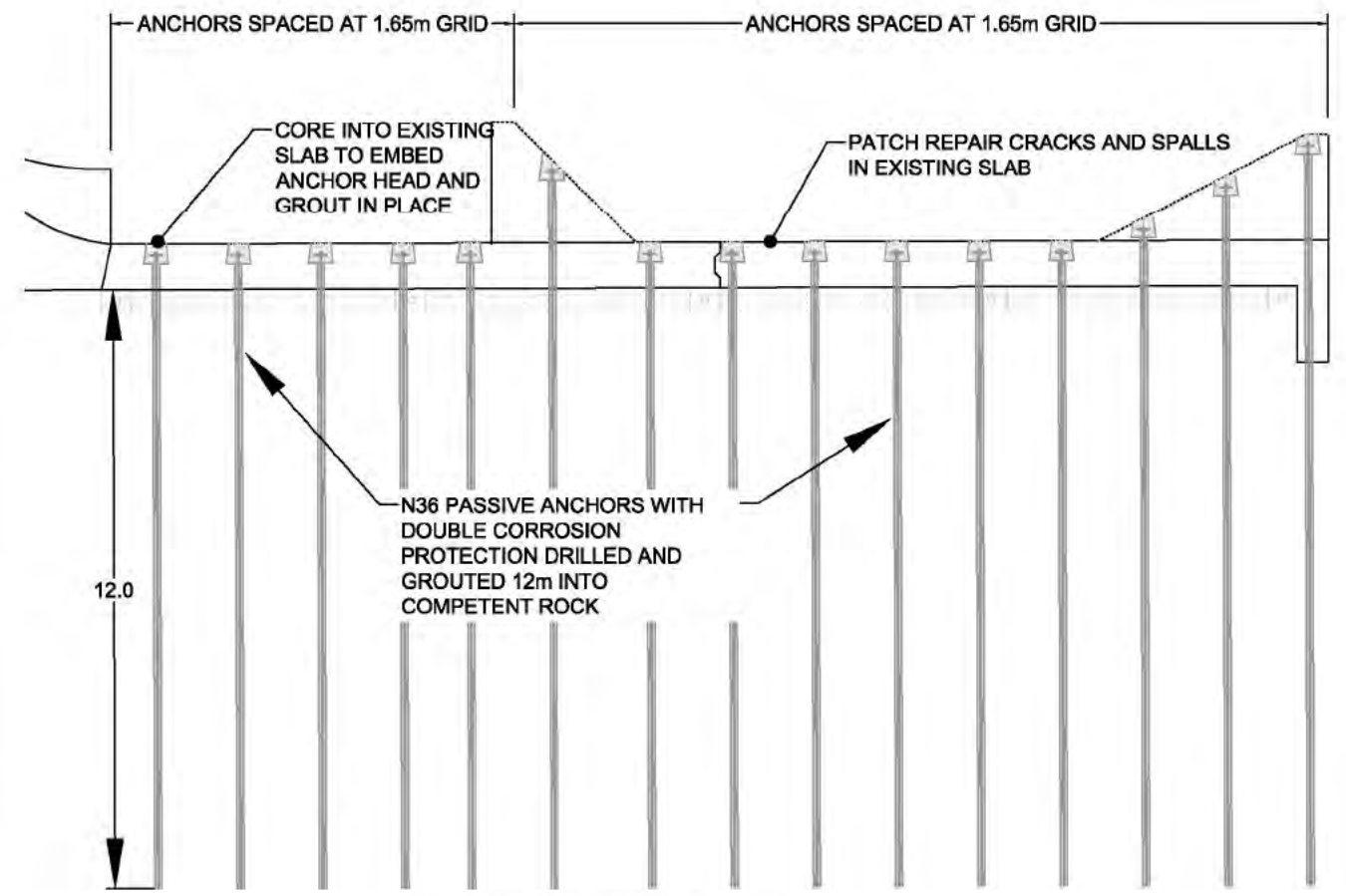


	SCRIVENER DAM STILLING BASIN UPGRADE PROJECT	SK01-2
	OPTION 3 – OVERLAY SLAB WITH ANCHORS	FOR DISCUSSION
		REVISION 1
		DATE 160921



- + N36 ANCHORS AT 1.65 x 1.65 m GRID
- + N36 ANCHORS AT 1.65 x 1.65 m GRID

PLAN

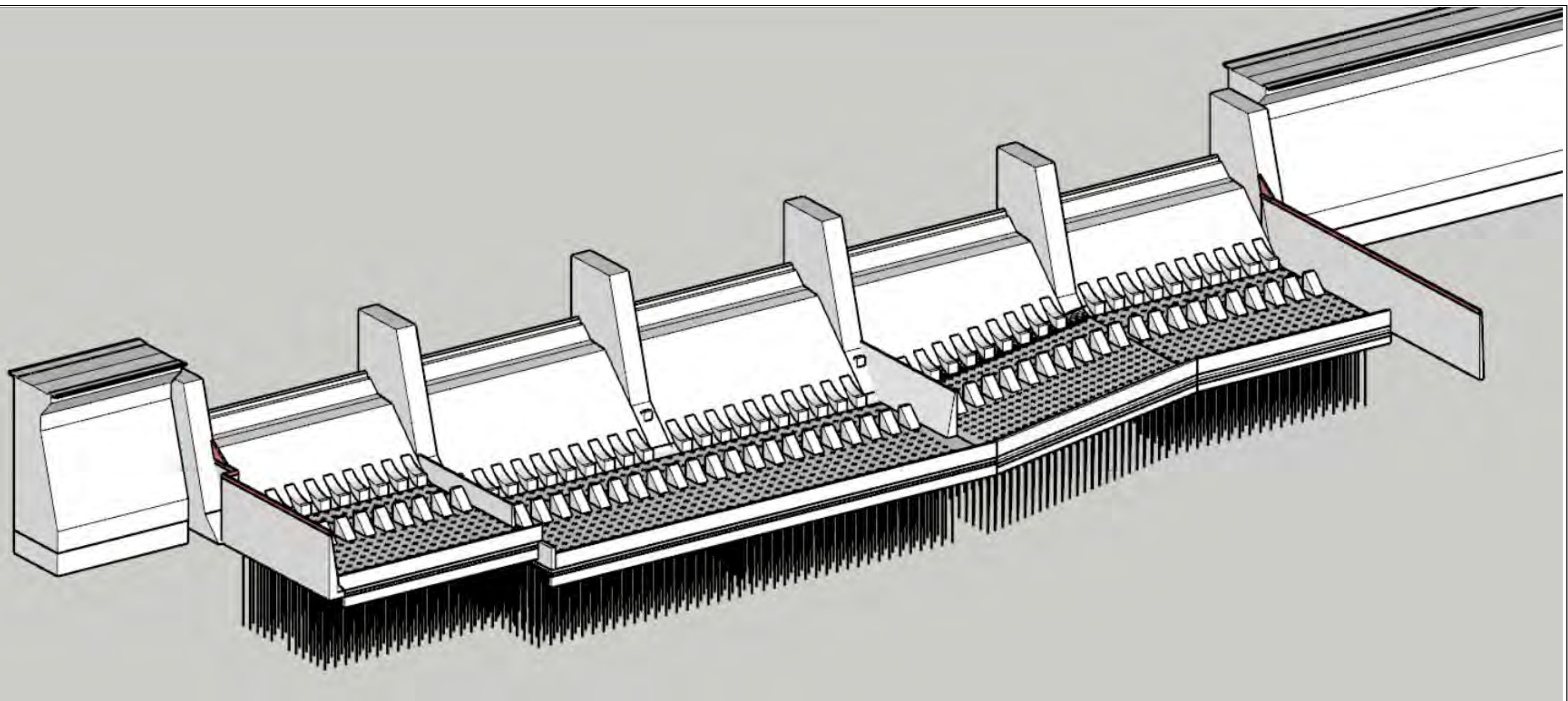



TYPICAL SECTION

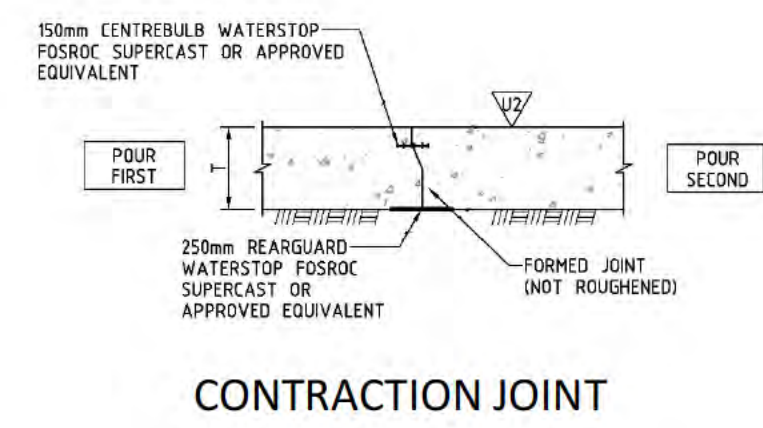
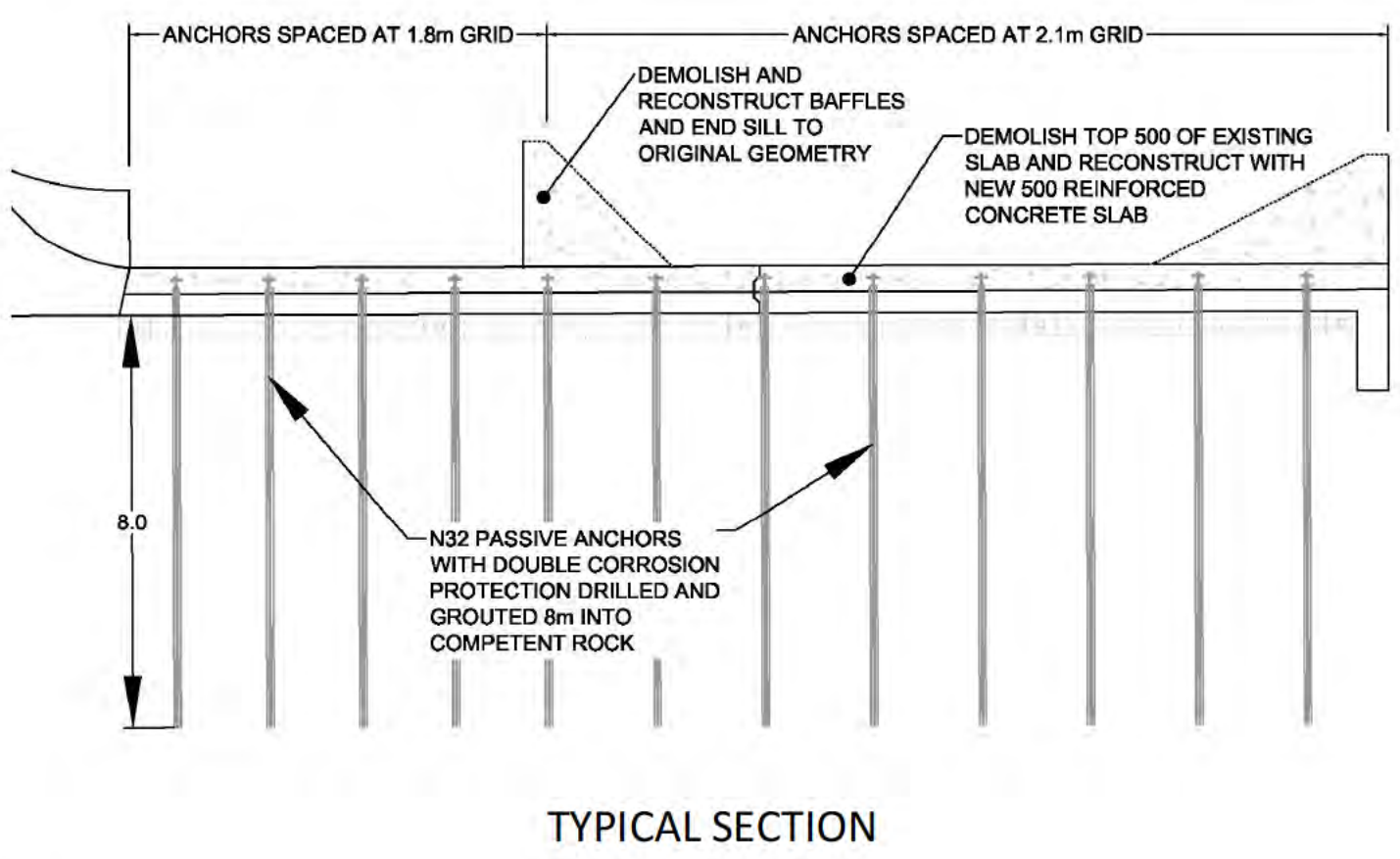
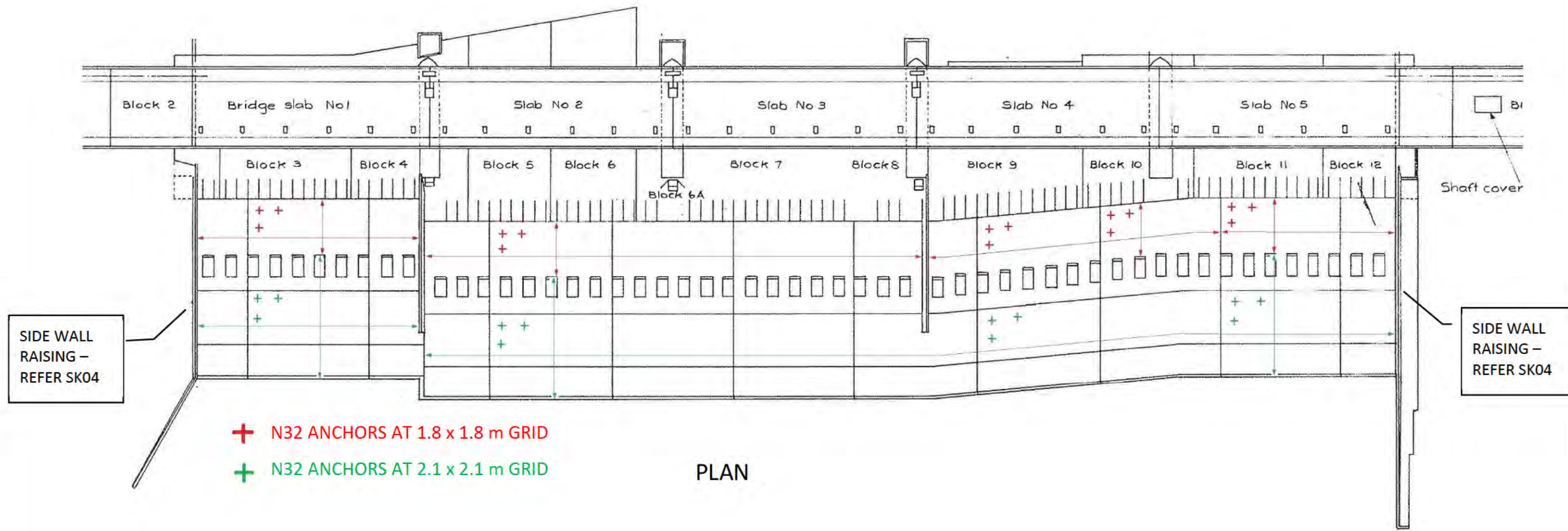



**SCRIVENER DAM STILLING BASIN
UPGRADE PROJECT
OPTION 4 – RETROFIT
ANCHORS**

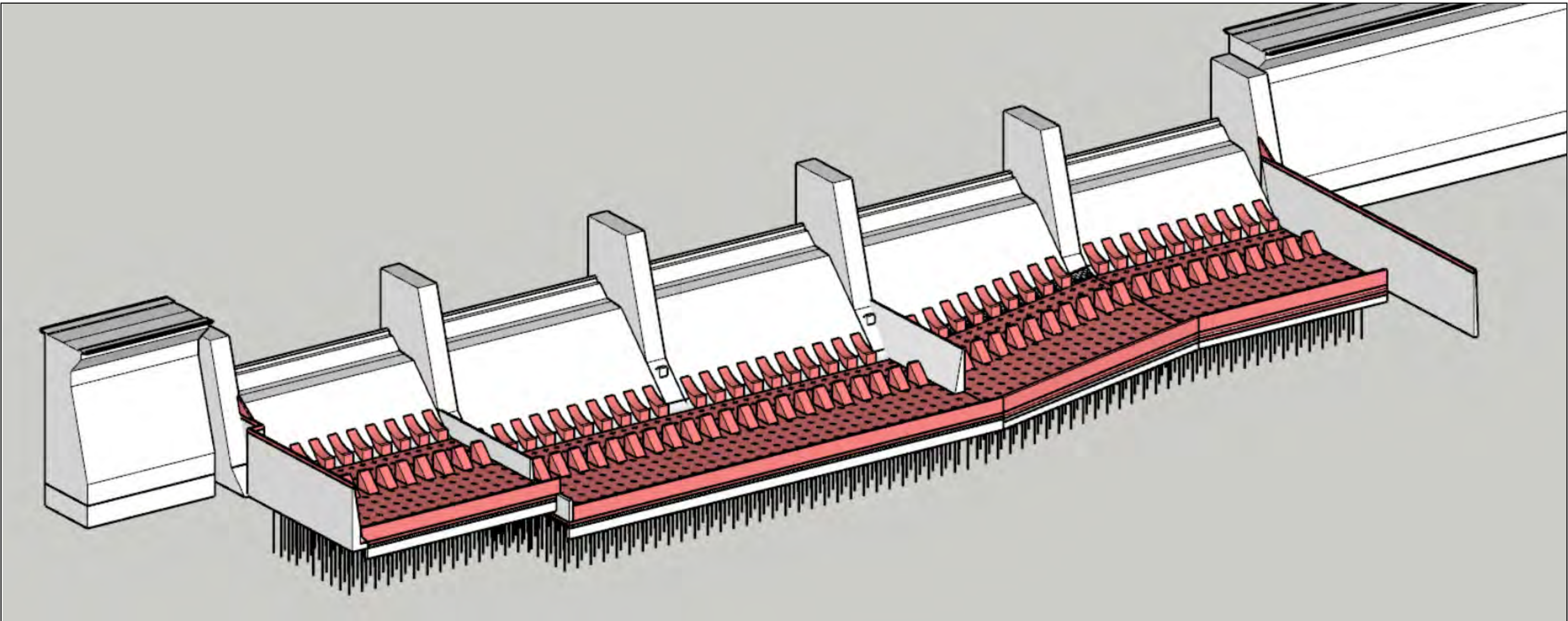
SK02-1
FOR DISCUSSION
REVISION 1
DATE 160921




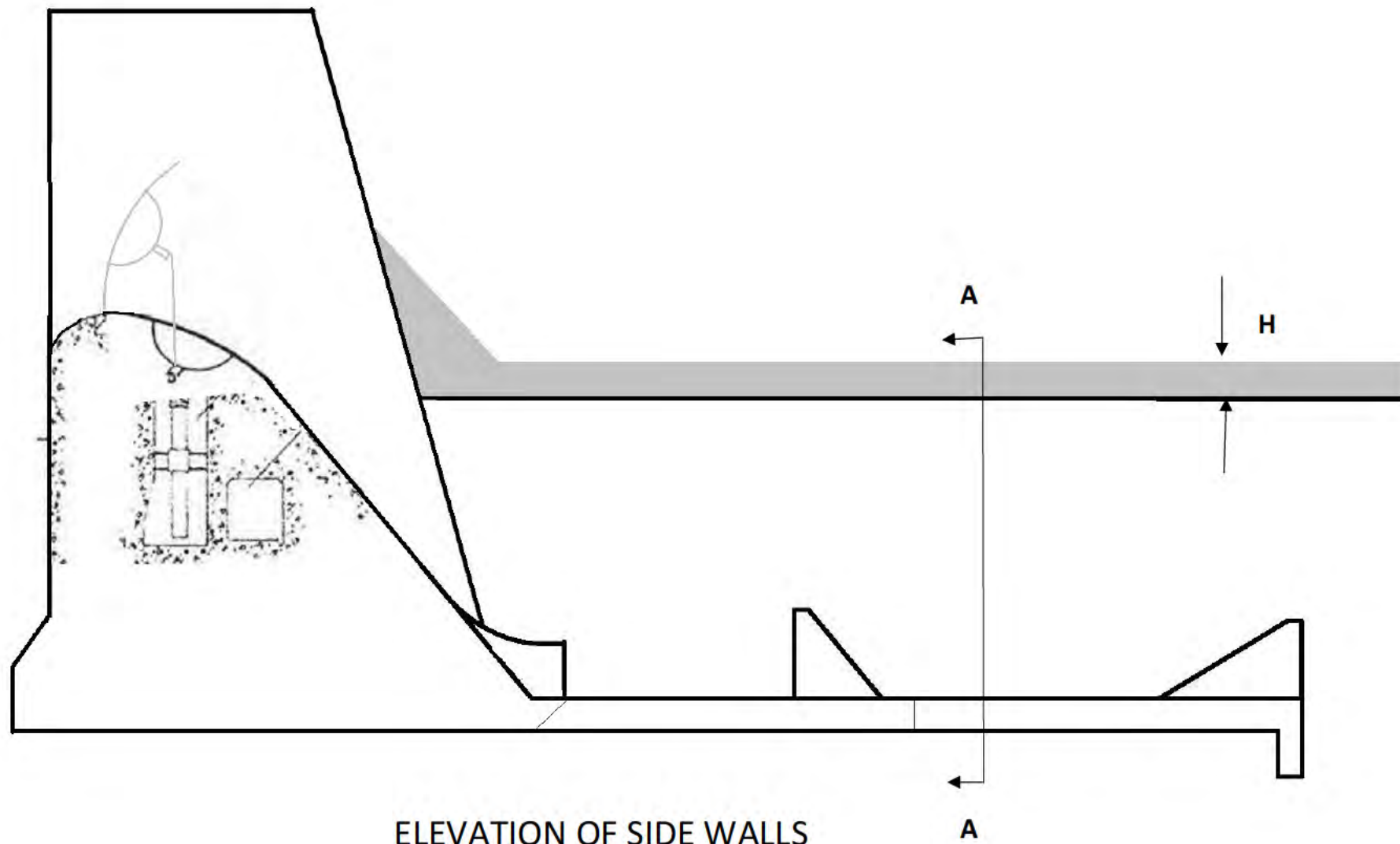
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	OPTION 4 – RETROFIT ANCHORS	FOR DISCUSSION
		REVISION 1
		DATE 160921



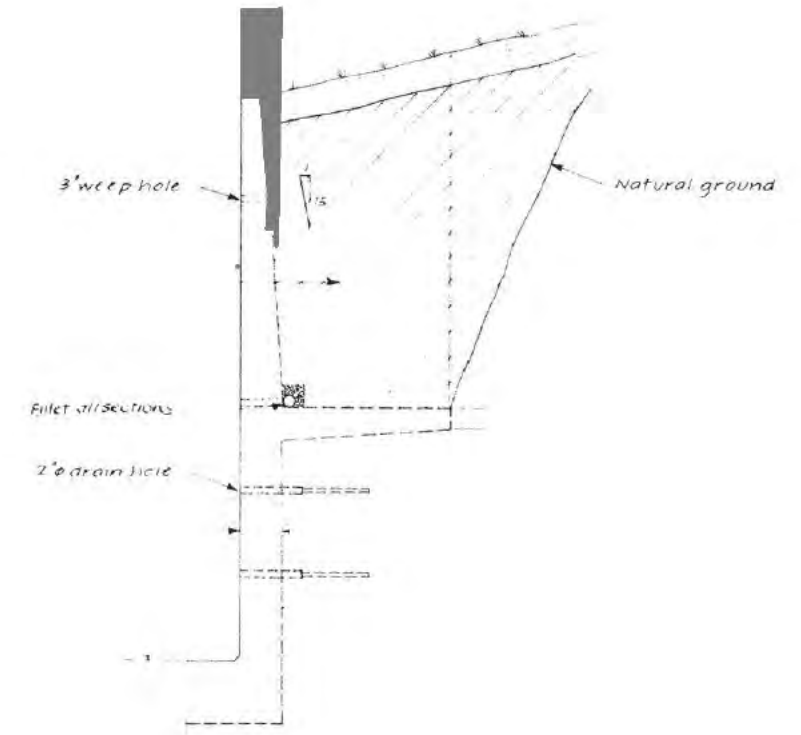
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	OPTION 9 – DEMOLISH AND REBUILD ANCHORED SLAB	FOR DISCUSSION
		REVISION 1
		DATE 160921



	SCRIVENER DAM STILLING BASIN UPGRADE PROJECT	SK03-2
	OPTION 9 – DEMOLISH AND REBUILD ANCHORED SLAB	FOR DISCUSSION
		REVISION 1
		DATE 160921



ELEVATION OF SIDE WALLS




SECTION A-A

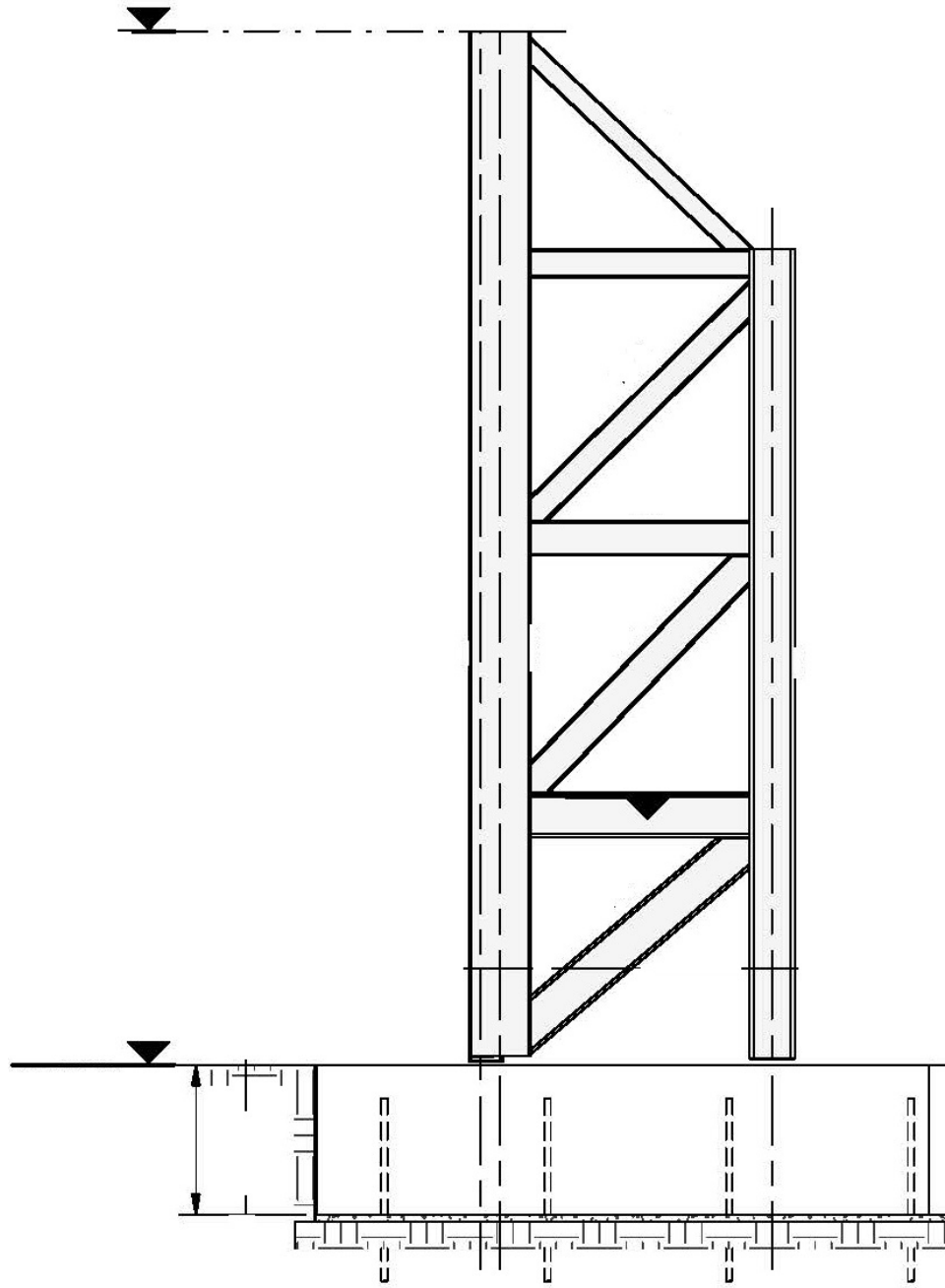


APPROXIMATE EXTENTS OF WALL RAISING

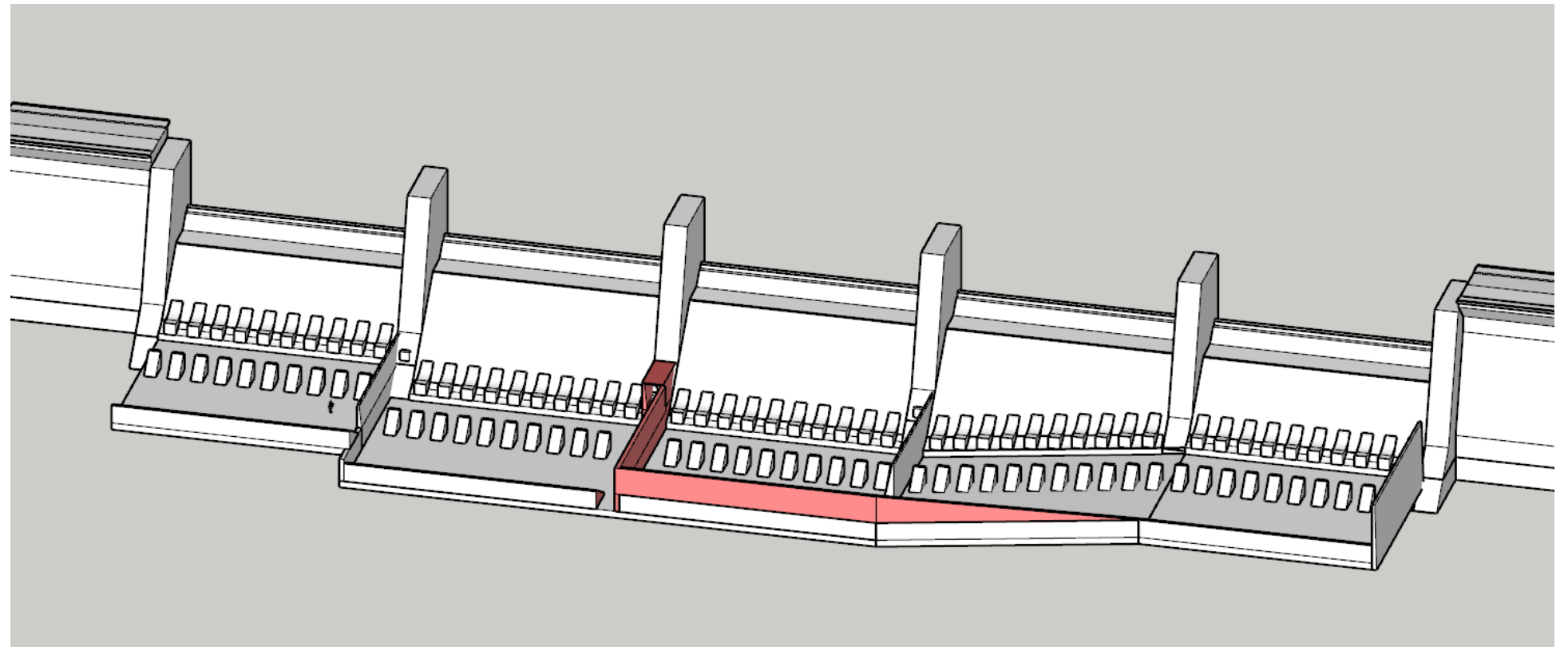
Option	Height of Wall Raising (H) - m	Comments
Option 3	2.2	Allows for 0.5m raising of invert of stilling basin plus containment of 1 in 1,000 AEP flood
Option 4	1.7	To contain 1 in 1000 AEP flood
Option 9	1.7	To contain 1 in 1000 AEP flood

	SCRIVENER DAM STILLING BASIN UPGRADE PROJECT SIDE WALL RAISING	SK04-1
		FOR DISCUSSION
		REVISION 1
		DATE 160921

c



TYPICAL SECTION – STEEL COFFERDAM



ISOMETRIC VIEW OF COFFERDAM



**SCRIVENER DAM STILLING BASIN
UPGRADE PROJECT
COFFERDAM**

SK05
FOR DISCUSSION
REVISION 1
DATE 160921

Appendix F

Preliminary Construction Program

Appendix G

Concept Screening Cost Estimates

Appendix H

Multi-Criteria Assessment

National Capital Authority—Scrivener Dam Dissipator Strengthening project
Submission 1 - Attachment 4

	Criteria	Weighting	Rank	1 Project Costs	2 OPEX	3 Robust & Durable Solution (beyond design criteria)	4 Benefits on Dam Safety	5 Construction simplicity/complexity	6 Flood Management during Construction	7 Maintenance Requirements	8 Surveillance and Operation	9 Social and Environmental Impacts	10 OH&S Safety
1	Project Costs	7.3%	6	Project Costs	Project Costs	Robust & Durable Solution (beyond design criteria)	Benefits on Dam Safety	Construction simplicity/complexity	Flood Management during Construction	Project Costs	Project Costs	Social and Environmental Impacts	OH&S Safety
2	OPEX	7.3%	6		OPEX	OPEX	Benefits on Dam Safety	Construction simplicity/complexity	Flood Management during Construction	OPEX	OPEX	Social and Environmental Impacts	OH&S Safety
3	Robust & Durable Solution (beyond design criteria)	9%	5			Robust & Durable Solution (beyond design criteria)	Benefits on Dam Safety	Robust & Durable Solution (beyond design criteria)	Robust & Durable Solution (beyond design criteria)	Maintenance Requirements	Robust & Durable Solution (beyond design criteria)	Social and Environmental Impacts	OH&S Safety
4	Benefits on Dam Safety	18%	1				Benefits on Dam Safety	Benefits on Dam Safety	Benefits on Dam Safety	Benefits on Dam Safety	Benefits on Dam Safety	Benefits on Dam Safety	Benefits on Dam Safety
5	Construction simplicity/complexity	2%	9					Construction simplicity/complexity	Flood Management during Construction	Maintenance Requirements	Construction simplicity/complexity	Construction simplicity/complexity	OH&S Safety
6	Flood Management during Construction	13%	3						Flood Management during Construction	Flood Management during Construction	Flood Management during Construction	Flood Management during Construction	OH&S Safety
7	Maintenance Requirements	7%	6							Maintenance Requirements	Maintenance Requirements	Social and Environmental Impacts	OH&S Safety
8	Surveillance and Operation	2%	9								Surveillance and Operation	Social and Environmental Impacts	OH&S Safety
9	Social and Environmental Impacts	11%	4									Social and Environmental Impacts	OH&S Safety
10	OH&S Safety	16%	2										OH&S Safety
Count				4	4	5	10	1	7	4	1	6	9
Weighting				7.3%	7.3%	9.1%	18.2%	1.8%	12.7%	7.3%	1.8%	10.9%	16.4%
Ranking				6	6	5	1	9	3	6	9	4	2

Block	Item	Criteria	Option 3 Overlay slab with anchors and waterstops			Option 4 Retrofitting Anchors in existing slab, and retrofitting waterstops			Option 9 Partial demolition of existing slab, new anchors and rebuilding to original geometry			Comments
			Score	Score (visual)	Weighted score	Score	Score (visual)	Weighted score	Score	Score (visual)	Weighted score	
A - Cost	1	Project Costs	5	■■■■■	3.64	7	■■■■■■■	5.09	3	■■■	2.18	<p>Option 3 is the average price. Option 4 is about 50% cheaper. Option 9 is about 40% more expensive</p> <p>Option 3 and 9 likely to have similar operating costs. Concern that Option 4 is not as robust and will therefore require more frequent inspection.</p> <p>Option 3 and 9 considered similar. Option 3 has greater total slab thickness creating greater redundancy against erosion/scour, but Option 9 retains original geoemetry so potentially improves dissipation performance. Option 4 has concerns regarding detail around anchor embedment (corrosion potential?) and does not address existing cracks in slab.</p> <p>All options considered similar. None improve safety of the dam (beyond the inherent stilling basin upgrade) and none reduce the dam safety.</p> <p>Complex details are likely to be required to construction the anchor head in Option 4, so this option is marked slightly less than Option 3. Option 9 requires extensive demolition which will be slow and will require specialised contractors to demolish and deal with environmental impacts.</p> <p>Option 4 will be fast to construct and has less components which could be damaged during a flood. Option 3 is similar to Option 4 but will require concrete surface prep and reo cages which could get damaged in an overtopping event. Option 9 requires partial demolition of slab - there is concern that the remaining slab will not be sufficiently robust to withstand uplift pressures and damage due to an overtopping event.</p> <p>Option 3 and 9 likely to have similar maintenance costs (both have 100 year design life). Option 4 uses existing slab which is already 60 years into its design life - it is likely to require more ongoing maintenance as a result.</p> <p>All options will require ongoing inspections. All considered to have similar requirements.</p> <p>Option 4 considered to have less impacts than Option 3 as it is likely to be faster and requires less bulk materials. Option 9 is significantly worse than others as it requires extensive demolition which has potential environmental impacts (noise, vibration, dust, construction duration longer etc).</p> <p>Option 3 involves standard process with standard OH&S issues managed through normal processes. Option 4 considered to have slightly improved OH&S risks as there are less construction activities. Option 9 considered to have greater OH&S risks due to additional work activities (demolition, more moving vehicles, longer duration).</p>
	2	OPEX	5	■■■■■	3.64	2	■■	1.45	5	■■■■■	3.64	
B - Technical Merits	3	Robust & Durable Solution (beyond design criteria)	6	■■■■■■	5.45	3	■■■	2.73	6	■■■■■■	5.45	
	4	Benefits on Dam Safety	5	■■■■■	9.09	5	■■■■■	9.09	5	■■■■■	9.09	
C - Construction	5	Construction simplicity/complexity	7	■■■■■■■	1.27	5	■■■■■	0.91	3	■■■	0.55	
	6	Flood Management during Construction	5	■■■■■	6.36	6	■■■■■■	7.64	4	■■■■	5.09	
D - Operation and Maintenance	7	Maintenance Requirements	5	■■■■■	3.64	3	■■■	2.18	5	■■■■■	3.64	
	8	Surveillance and Operation	5	■■■■■	0.91	4	■■■■	0.73	5	■■■■■	0.91	
E - Other Aspects	9	Social and Environmental Impacts	5	■■■■■	5.45	6	■■■■■■	6.55	3	■■■	3.27	
	10	OH&S Safety	5	■■■■■	8.18	6	■■■■■■	9.82	4	■■■■	6.55	

Weighted Total	Total Score ■■■■	48	Total Score ■■■■	46	Total Score ■■■■	40
A - Cost	A - Cost	7	A - Cost	7	A - Cost	6
B - Technical Merits	B - Technical Merits	15	B - Technical Merits	12	B - Technical Merits	15
C - Construction	C - Construction	8	C - Construction	9	C - Construction	6
D - Operation and Maintenance	D - Operation and Maintenance	5	D - Operation and Maintenance	3	D - Operation and Maintenance	5
E - Other Aspects	E - Other Aspects	14	E - Other Aspects	16	E - Other Aspects	10

Appendix I

Preferred Option Workshop Minutes

