

LIQUID WASTE MANAGEMENT PLAN (LWMP) for the COMOX VALLEY SEWERAGE SYSTEM (CVSS)

Joint Technical Advisory Committee and Public Advisory Committee
(TACPAC)

Meeting #6

March 22, 2019

- Reviewing and Evaluating the Long List of Conveyance Options

Today's Agenda

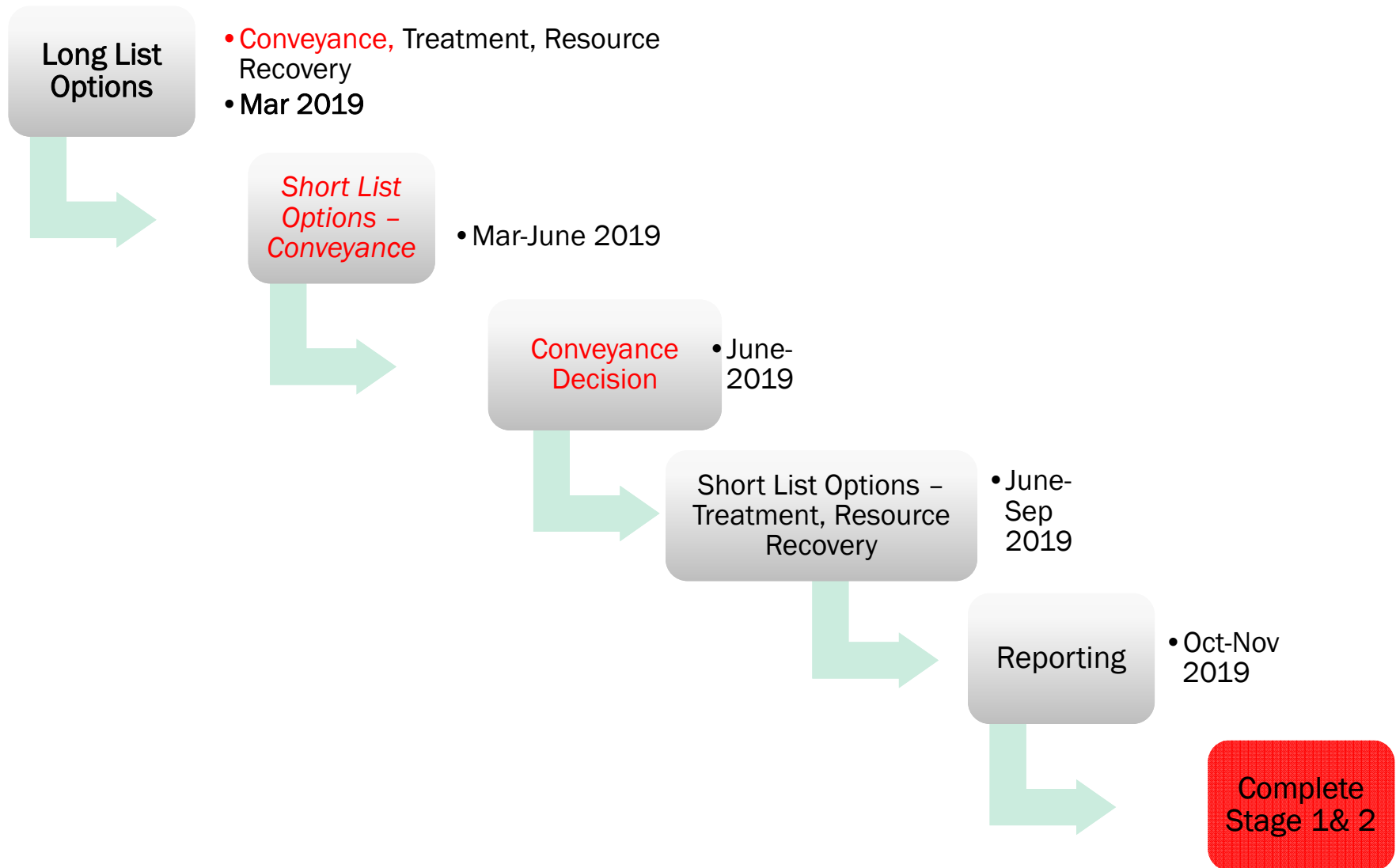
- Discussion of process change – deal with Conveyance first
- Resulting LWMP schedule change
- Review Long List of conveyance Options
- Review TAC technical evaluation
- Run Options through the evaluation system
- Select the best three options to be the Short List and recommend to CVSC for Detailed Study

Update

- CVSC feedback on Long List
- Process change – dealing with Conveyance first
- Komoks First Nation consultation

[Kris]

LWMP Road Map – CVSS Stage 1 & 2



Important Dates

Date	Activity
March 27	CVRD to Consult with the KFN Chief & Council
April 16	CVSC to approve conveyance short listed options
May 29	TAC Meeting 7A (BW Westerly Hotel) Conveyance Short List Studies
May 30	TACPAC Meeting 7 (BW Westerly Hotel) Short List Studies, <i>identify</i> Preferred Conveyance Option
June 5&6	Public Workshops #4 – Conveyance Short List studies, <i>discuss</i> preferred option
June 13	TACPAC 8 – finalize evaluation to <i>recommend</i> Preferred Conveyance Option to CVSC Review Long List studies TMT & RR
July	CVSC to decide on Preferred Conveyance Option
Sep 9	TACPAC 9 reviewing TMT & RR short List studies
Sep 26	TACPAC 10 recommend preferred TMT and RR options to CVSC

Conceptual Studies, Long List Conveyance Options

[WSP]

Options and Review



Methodology

- Key components for each option were developed in the a “shopping list”
- For each item major components were defined at a relative level, notably:
 - Diameter and Length for linear assets
 - Flow and Pressure for pumping assets
- Capital costs were estimated using a Class ‘D’ framework
- Operating costs were estimated using
 - power (BC Hydro rates)
 - labour
 - asset replacement



Project “Shopping List”

Description	Alignments and Conveyance Concepts										
	1A	1B	1C	2A	2B	3A	3B	3C	4A	4B	5
Upgrade Courtenay (Capacity and AM driven)			•								
New Courtenay - Moderate Pressure Increase	•	•		•	•	•	•	•			
New Courtenay - High Pressure Increase									•	•	•
Upgrade Jane (Capacity and AM driven)			•		•			•			
New Jane - Moderate Pressure Increase	•	•		•		•	•		•	•	•
Downgrade Jane	•	•		•		•	•		•	•	•
New In-line Pump Station			•		•						
Forcemain Tunnel through Lazo hill	•					•	•				
Forcemain Tunnel through Comox hill						•					
Gravity Tunnel through Lazo hill								•			
Overland from Comox hill to Lazo hill						•					
Overland Courtenay to Lazo Hill					•		•				
Overland Courtenay to Jane (New or Existing)				•				•			
Overland Jane to Lazo Hill				•				•			
Overland Jane to connect to FM (Long Distance to North)									•	•	•
Overland Lazo Hill to CVWPCC		•	•	•	•						
Overland Forcemain North from Courtenay to CVWPCC									•		•
Overland Gravity North from Courtenay to CVWPCC										•	
Estuary Courtenay to Jane		•									
Estuary Courtenay to Lazo Hill	•		•								
New Courtenay WWTP											•
Jane to forcemain	•	•	•	•		•		•			
Old Jane to New Jane		•					•		•	•	•
Overland Courtenay to CVWPCC (Excl. Tunnel Sections)						•					
Overland Lazo Tunnel to CVWPCC							•	•			
KFN Pump Station and FM to Courtenay									•	•	•
New CFB Pump Station										•	



Economic Benefit

- Benefits to local economy
 - Where will Contractors and Service Providers come from?

Local	Sub-contract work for all projects Smaller projects (Jane PS piping, KFN modifications)
Regional	Jane PS upgrades to medium pressure Courtenay PS asset related upgrades
Provincial	Courtenay PS upgrade to medium pressure
National	Courtenay PS high pressure upgrades Overland forcemains Estuary forcemains
International	Tunnels





Economic Benefit

Description	Local Value	Alignments and Conveyance Concepts										
		1A	1B	1C	2A	2B	3A	3B	3C	4A	4B	5
Upgrade Courtenay (Capacity and AM driven)	4			•								
New Courtenay - Moderate Pressure Increase	3	•	•		•	•	•	•	•			
New Courtenay - High Pressure Increase	2									•	•	•
Upgrade Jane (Capacity and AM driven)	4			•		•			•			
New Jane - Moderate Pressure Increase	4	•	•		•		•	•		•	•	•
Downgrade Jane	4	•	•		•		•	•		•	•	•
New In-line Pump Station	2			•		•						
Forcemain Tunnel through Lazo hill	1	•					•	•				
Forcemain Tunnel through Comox hill	1						•					
Gravity Tunnel through Lazo hill	1								•			
Overland from Comox hill to Lazo hill	4						•					
Overland Courtenay to Lazo Hill	4					•						
Overland Courtenay to Jane (New or Existing)	4				•				•			
Overland Jane to Lazo Hill	5				•				•			
Overland Jane to connect to FM (Long Distance to North)	5									•	•	•
Overland Lazo Hill to CVWPCC	4		•	•	•	•						
Overland Forcemain North from Courtenay to CVWPCC	4									•		•
Overland Gravity North from Courtenay to CVWPCC	4										•	
Estuary Courtenay to Jane	2		•									
Estuary Courtenay to Lazo Hill	2	•		•								
New Courtenay WWTP	2											•
Jane to forcemain	5	•	•	•	•		•		•			
Old Jane to New Jane	5		•					•		•	•	•
Overland Courtenay to CVWPCC (Excl. Tunnel Sections)	4						•					
Overland Lazo Tunnel to CVWPCC	4							•	•			
KFN Pump Station and FM to Courtenay	5									•	•	•
New CFB Pump Station	3										•	

5	Local
4	Regional
3	Provincial
2	National
1	Specialty (International)



Environment

- Estuary requires dredging and excavation of an approximately 2.3 km long and 10 m wide trench plus access points
 - Impact ~23,000 m² or 23 ha (60 acres) of foreshore, plus access routes
 - Likely require a soil disposal at sea permit from Environment Canada
 - Likely require an Environmental Assessment submission
 - Likely restoration and compensation
 - Retains failure risks and damage
- Tunnelling will require water control, treatment and disposal (groundwater)
- Overland will require silt control and restoration



Environment

- Energy
 - BC Hydro rate 10.67 tCO_{2e}/ GW-hr
- Pipeline Construction
 - Open Excavation ~500 kgCO_{2e}/m
 - Tunnelling ~250 kgCO_{2e}/m
 - Estuary Excavation ~550 kg/CO_{2e}/m

Local Value	Alignments and Conveyance Concepts										
	1A	1B	1C	2A	2B	3A	3B	3C	4A	4B	5
Power (tCO _{2e} /yr)	28	49	50	47	66	26	28	32	53	60	104
Construction (tCO _{2e})	3 353	3 943	3 878	4 400	4 100	3 975	3 885	4 125	6 610	7 860	6 610
50-Year	4 755	6 397	6 370	6 737	7 410	5 299	5 287	5 722	9 258	10 859	11 829

- Does not include pump station or WWTP construction

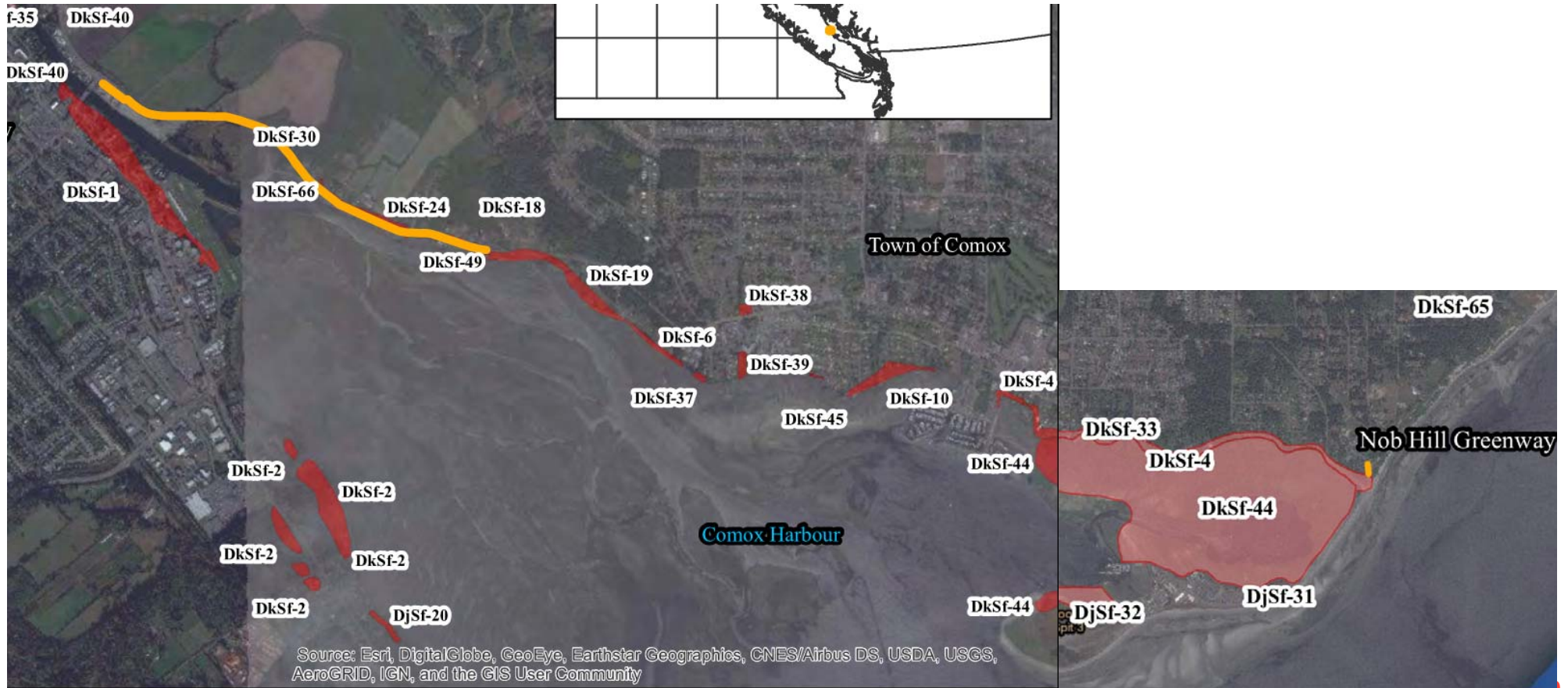


Social

- Noise
 - Construction of linear work would be around 10 to 20 meters production per day
 - Would require multiple work crews
 - Allow 6 to 12 months construction
 - Terrestrial work can be limited to day-time hours
 - Marine work would need consideration for working with tides
 - Terrestrial work would require importing of material for pipe bedding
 - Pump station noise would be generators (testing and power failure) and utility vehicles



Archaeological





Capital Costs

Description	Class 'D' Cost 2019\$ 40% Contingency	Alignments and Conveyance Concepts										
		1A	1B	1C	2A	2B	3A	3B	3C	4A	4B	5
Upgrade Courtenay (Capacity and AM driven)	\$ 4 200 000			•								
New Courtenay - Moderate Pressure Increase	\$ 10 500 000	•	•		•	•	•	•	•			
New Courtenay - High Pressure Increase	\$ 29 400 000									•	•	•
Upgrade Jane (Capacity and AM driven)	\$ 3 150 000			•		•			•			
New Jane - Moderate Pressure Increase	\$ 3 850 000	•	•		•		•	•		•	•	•
Downgrade Jane	\$ 2 363 000	•	•		•		•	•		•	•	•
New In-line Pump Station	\$ 12 040 000			•		•						
Forcemain Tunnel through Lazo hill	\$ 23 587 000	•					•	•				
Forcemain Tunnel through Comox hill	\$ 11 735 000						•					
Gravity Tunnel through Lazo hill	\$ 27 801 000								•			
Overland from Comox hill to Lazo hill	\$ 10 977 000						•					
Overland Courtenay to Lazo Hill	\$ 26 999 000					•		•				
Overland Courtenay to Jane (New or Existing)	\$ 16 493 000				•				•			
Overland Jane to Lazo Hill	\$ 4 851 000				•				•			
Overland Jane to connect to FM (Long Distance to North)	\$ 4 805 000									•	•	•
Overland Lazo Hill to CVWPCC	\$ 5 914 000		•	•	•	•						
Overland Forcemain North from Courtenay to CVWPCC	\$ 27 489 000									•		•
Overland Gravity North from Courtenay to CVWPCC	\$ 38 962 000										•	
Estuary Courtenay to Jane	\$ 32 728 000		•									
Estuary Courtenay to Lazo Hill	\$ 38 133 000	•		•								
New Courtenay WWTP	\$ 105 000 000											•
Jane to forcemain	\$ 1 109 000	•	•	•	•		•		•			
Old Jane to New Jane	\$ 52 000		•					•		•	•	•
Overland Courtenay to CVWPCC (Excl. Tunnel Sections)	\$ 15 847 000						•					
Overland Lazo Tunnel to CVWPCC	\$ 1 617 000							•	•			
KFN Pump Station and FM to Courtenay	\$ 616 000									•	•	•
New CFB Pump Station	\$ 3 920 000										•	



Operating Costs

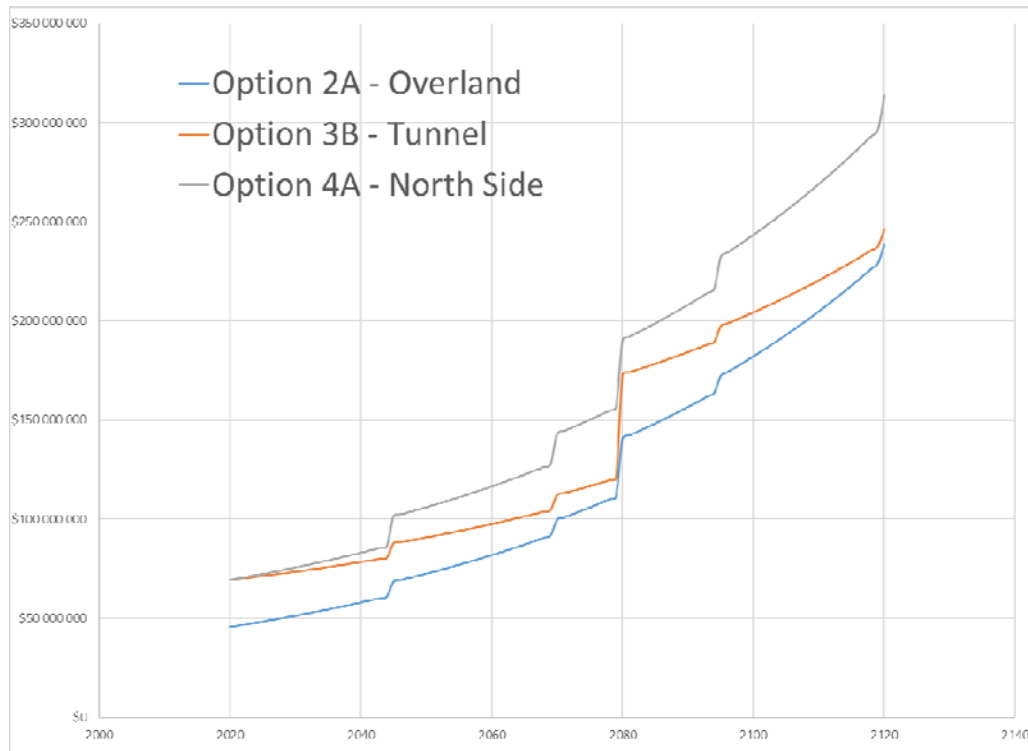
15-yr MFA Rate			3.05%	
15-yr ENR Construction Index			3.02%	
Starting Power Cost		\$	11.21	\$/kW
Power Rate Increase			5%	
Operating hrs/day			10	hr
Variable Rate		\$	0.055	\$/kW-hr
Labour Rate		\$	100 000	
Labour Infl.			3%	

Capital Investments						Manual Input from "Power Anal	
Project ID	Description	Capital Cost	Investment Year	Renewal Frequency	Renewal %	Total Power (kW)	Labour hrs/day
1.B	New Courtenay - Moderate Pressure Increase	\$10 500 000	2020	25	40%	1125	3
2.D	Downgrade Jane	\$2 362 500	2020	25	40%	25	0
2.C	New Jane - Moderate Pressure Increase	\$3 850 000	2020	25	40%	425	3
5.F	Overland Lazo Hill to CVWPCC	\$5 913 600	2020	60	100%	0	0
6.A	Estuary Courtenay to Jane	\$32 728 080	2020	60	100%	0	0
8.A	Jane to forcemain	\$1 108 800	2020	60	100%	0	0
8.B	Old Jane to New Jane	\$51 744	2020	60	100%	0	0
Total Capital Cost		\$56 514 724					

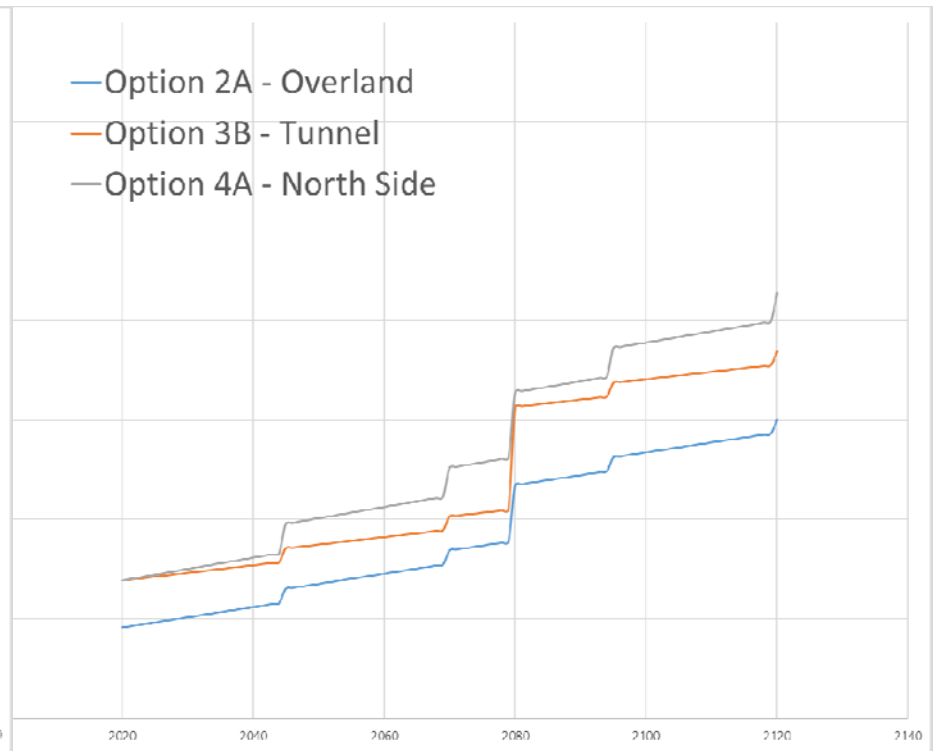


Operating Costs

5% BC Hydro Rate Increase



3% BC Hydro Rate Increase





Relative Net Present Worth (life cycle)

Total LCC for all Options (\$Million NPV)											
Option ID	Options Description	Initial	30-Year			50-Year			100-Year		
		Capital Cost	Capital	O&M	Total	Capital	O&M	Total	Capital	O&M	Total
1A	Estuary With Lazo Hill Tunnel	\$ 79.5	\$ 86.1	\$ 14.9	\$ 100.9	\$ 92.7	\$ 29.4	\$ 122.1	\$ 167.4	\$ 97.4	\$ 264.8
1B	Estuary with Lazo Hill Overland Route	\$ 56.5	\$ 63.2	\$ 24.3	\$ 87.5	\$ 69.8	\$ 48.5	\$ 118.3	\$ 121.9	\$ 164.9	\$ 286.8
1C	Estuary with a New In-Line Pump Station	\$ 64.5	\$ 72.1	\$ 25.8	\$ 97.9	\$ 79.8	\$ 51.1	\$ 130.9	\$ 139.2	\$ 171.1	\$ 310.3
2A	Overland Forcemain	\$ 45.1	\$ 51.7	\$ 23.3	\$ 75.0	\$ 58.4	\$ 46.4	\$ 104.8	\$ 99.3	\$ 157.4	\$ 256.7
2B	Overland Forcemain with In-Line Pump Station	\$ 58.6	\$ 68.7	\$ 33.1	\$ 101.8	\$ 74.7	\$ 66.0	\$ 140.7	\$ 127.1	\$ 223.5	\$ 350.6
3A	Tunnel Through Comox Hill and Lazo Hill	\$ 80.0	\$ 86.6	\$ 14.9	\$ 101.5	\$ 93.2	\$ 29.4	\$ 122.6	\$ 168.4	\$ 97.4	\$ 265.8
3B	Tunnel Through Lazo Hill	\$ 69.0	\$ 75.6	\$ 17.0	\$ 92.6	\$ 82.2	\$ 33.6	\$ 115.8	\$ 146.6	\$ 112.4	\$ 259.0
3C	Gravity Tunnel From Comox to the CVWPCC	\$ 65.5	\$ 70.9	\$ 16.6	\$ 87.6	\$ 76.4	\$ 32.9	\$ 109.3	\$ 138.0	\$ 109.9	\$ 247.9
4A	North Side Forcemain Concept	\$ 68.6	\$ 82.7	\$ 26.0	\$ 108.8	\$ 96.8	\$ 52.1	\$ 148.9	\$ 157.0	\$ 177.4	\$ 334.4
4B	North Side Gravity Concept	\$ 84.0	\$ 99.9	\$ 30.3	\$ 130.2	\$ 115.8	\$ 60.4	\$ 176.2	\$ 190.2	\$ 204.8	\$ 395.0
5	Decentralized Treatment Concept	\$ 173.6	\$ 187.7	\$ 58.3	\$ 246.0	\$ 201.8	\$ 114.0	\$ 315.8	\$ 364.0	\$ 371.9	\$ 735.9

Evaluating the Long List Options

- Review the TAC evaluation of technical categories
- Review the evaluation of the financial categories
- TACPAC evaluation of the economic, environmental and social categories
- Discussion
- Settle on the Short List for detailed study

For meeting # 7...

Thursday May 30, 9-3, BW Westerly Hotel

- Review detailed studies of Short List options
- Evaluate
- Take to public

Round Table

[Allison]

Thank You!