

WINNIPEG SEWAGE TREATMENT PROGRAM

SEWPCC

**Process Selection Report presentation
Follow up of meeting actions from Jan
24th & 27th 2011**



April 29, 2011 - Winnipeg

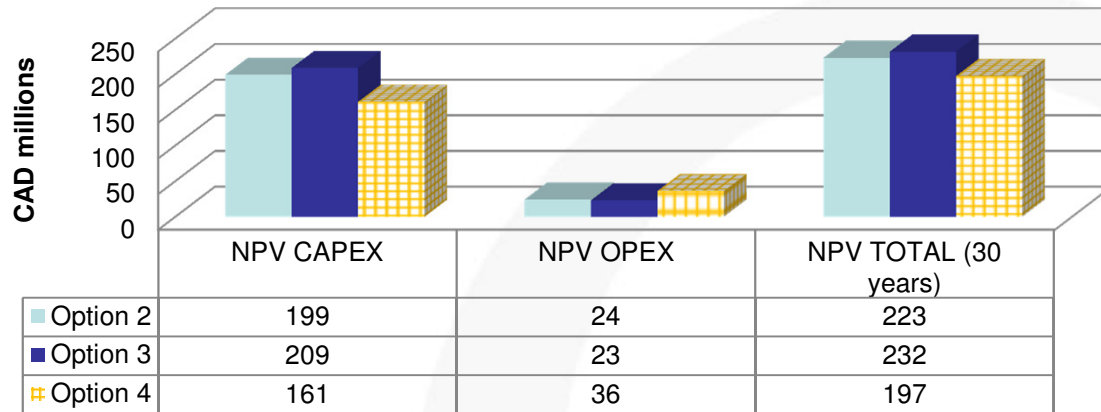


AGENDA

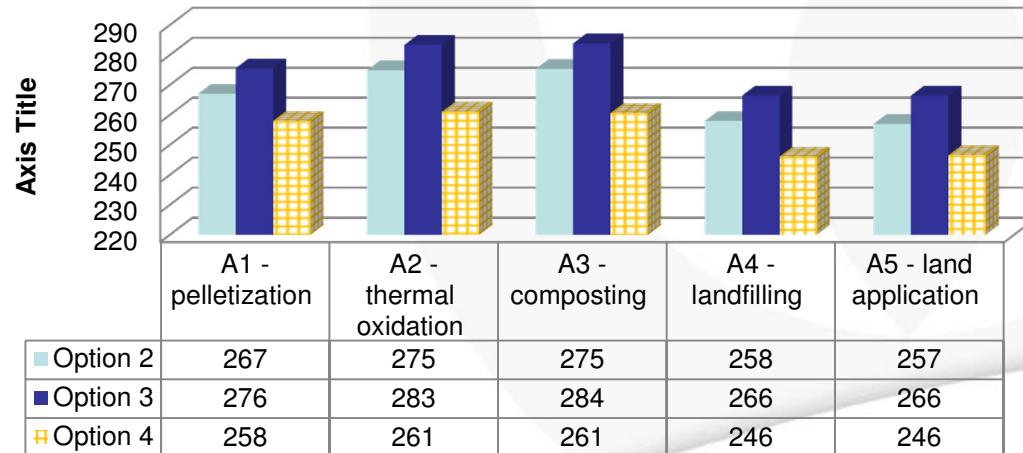
- ❶ Assess the financial sensitivity of options 2 & 4 to different delivery options :
 - ➔ Assessment of construction phasing scenario for both options
 - ➔ Assessment of the modularity of option 4 (option 4 -> option 3)
 - ➔ Assessment of the flexibility of option 4 :
 - ✓ De-nitrification as a future option
 - ✓ Use of DAF to equalise sludge volume
- ❷ Carbon footprint – assessment including emissions from secondary treatment
- ❸ Design risk if necessary to comply with tighter limits on Ammonia
- ❹ Impact of Government subsidies on the financial analysis

Summary of previous results

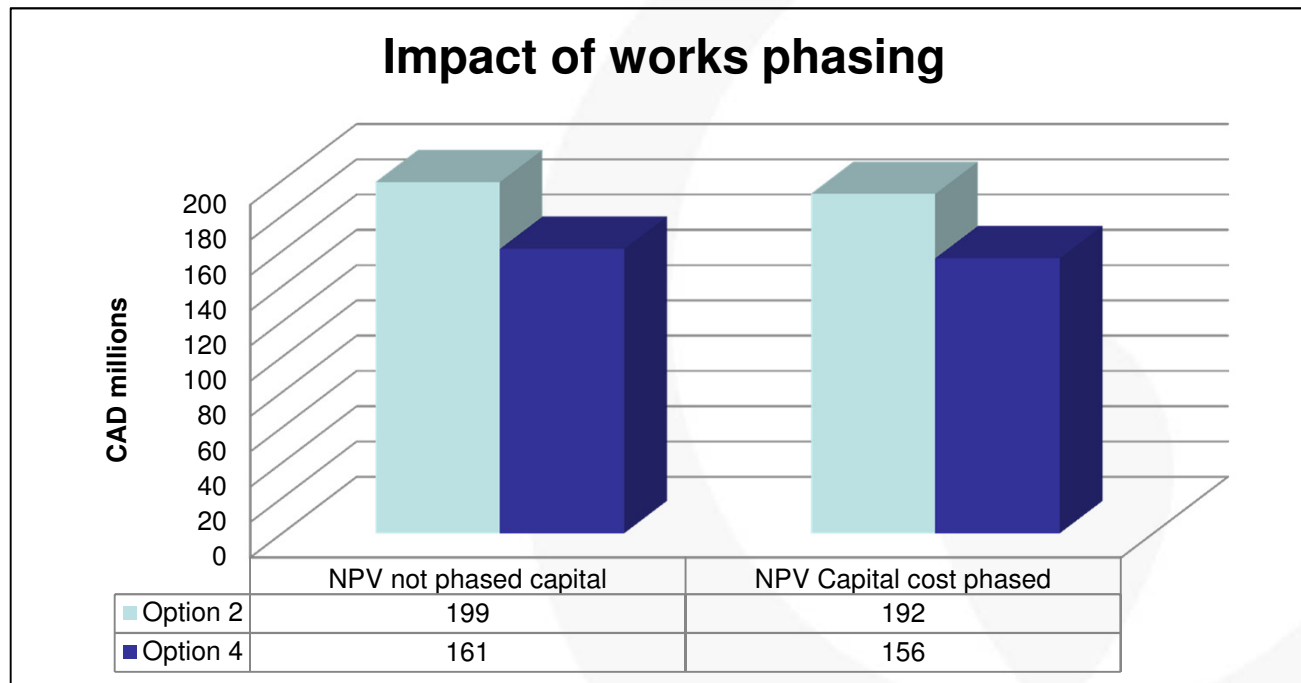
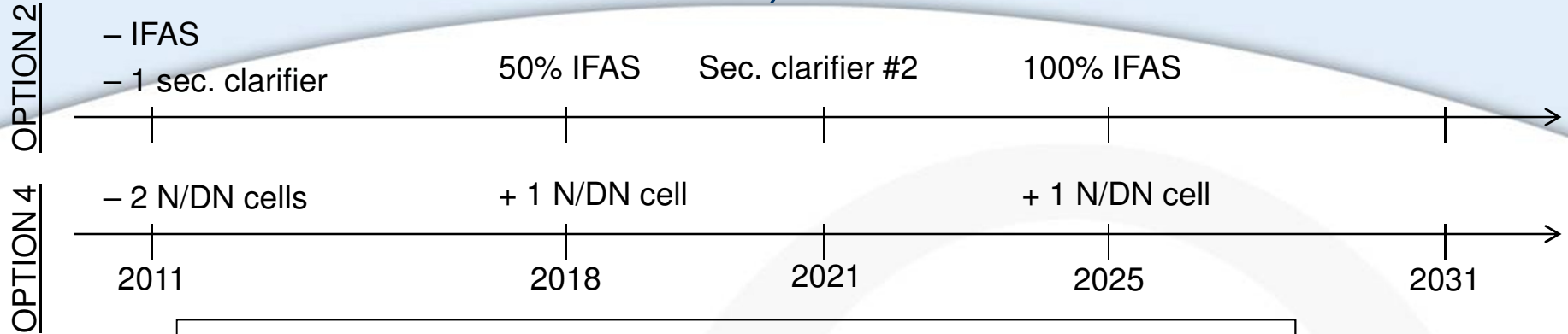
Previous NPV results



Previous Water + Sludge NPV results

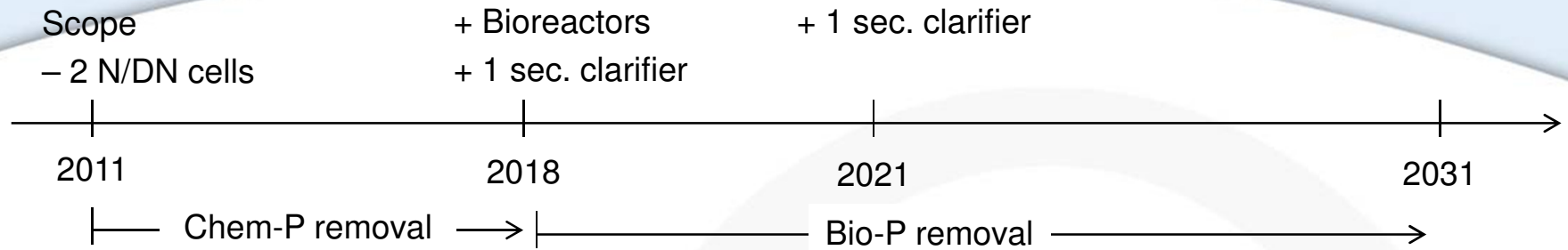


① Assessment of constr. phasing scenario - Options 2 & 4 (Excludes Bio-solids treatment)

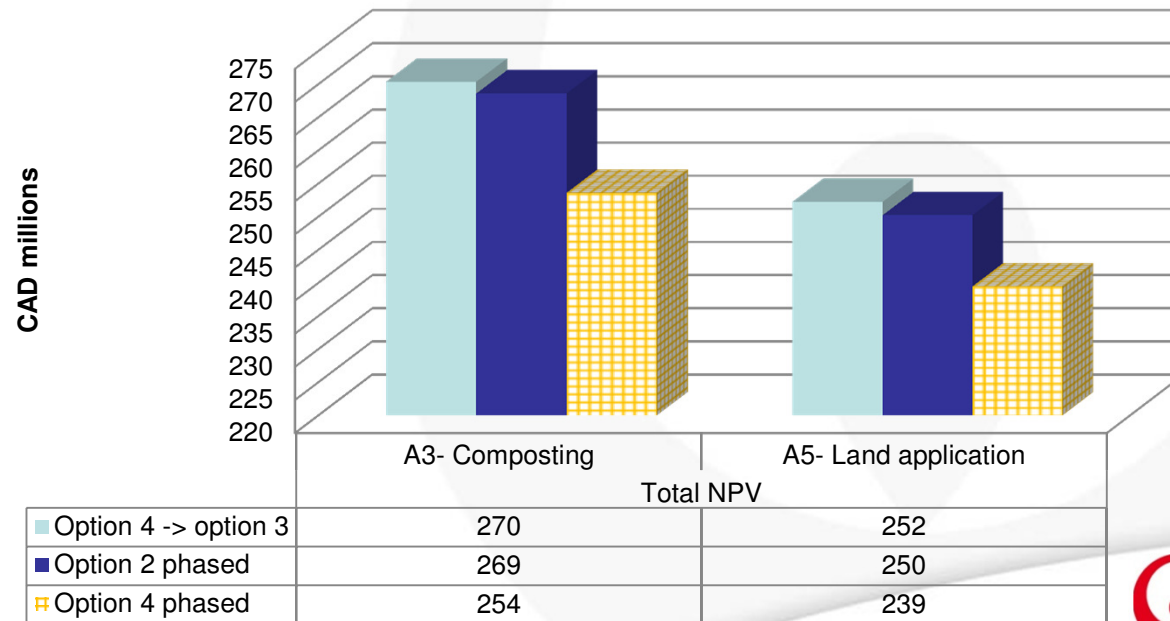


➔ Phasing leads to ≈ similar savings for the 2 options

① Assessment of the modularity of option 4 (Bio-P Removal) (Includes Bio-solids treatment)



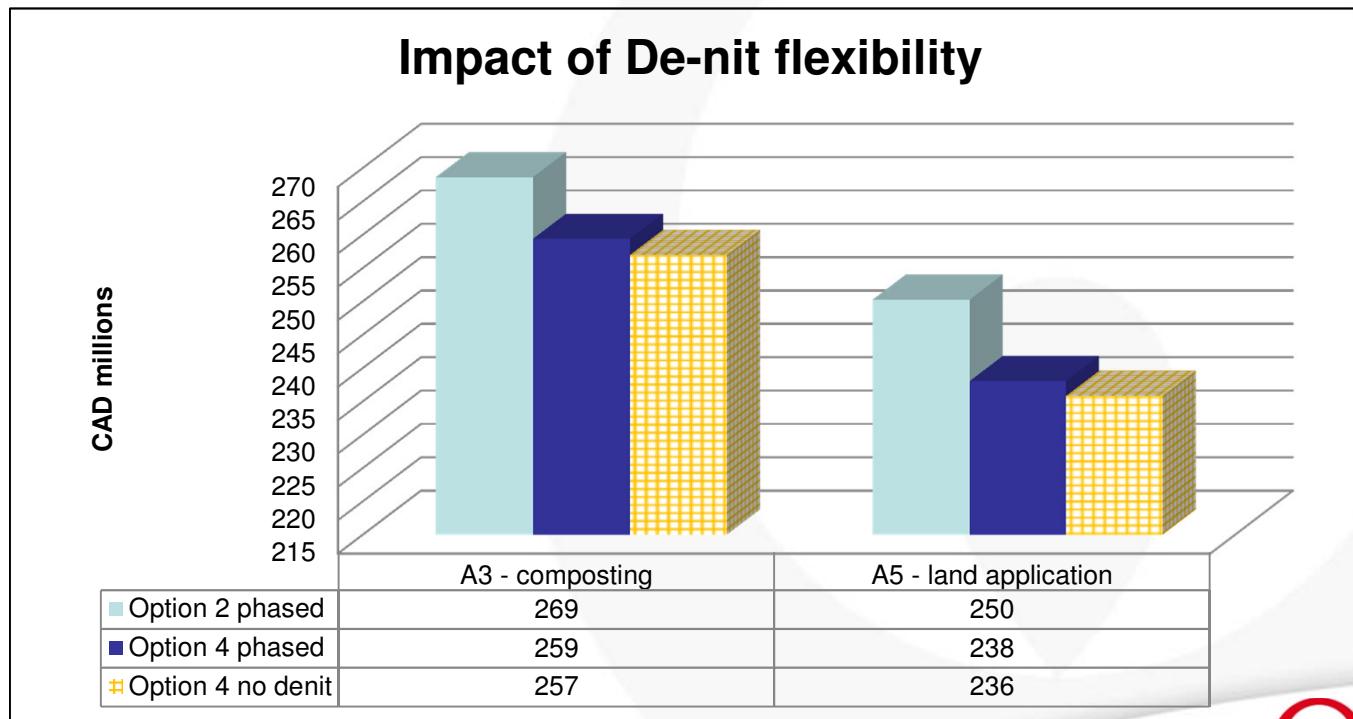
Impact of phasing option 4 with bioP removal



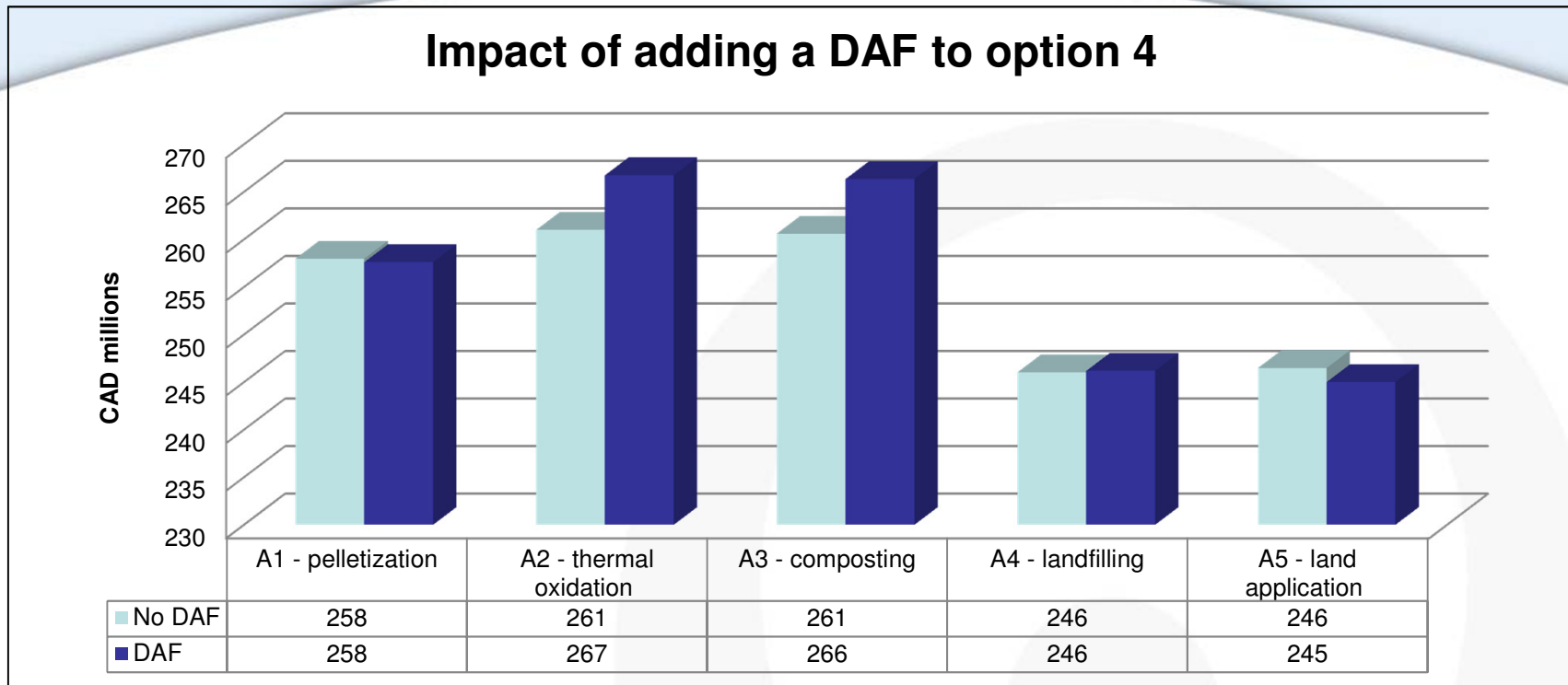
① Assessment of the flexibility of option 4 : optional De-nit (Includes Bio-solids treatment)

Optional De-nit only possible in option 4, as :

- 1- De-nit cannot be removed from option 2
- 2- Option 4 can be initially built not to De-nit then PDN cells added later



① Assessment of the flexibility of option 4 : add of DAF (Includes Bio-solids treatment)

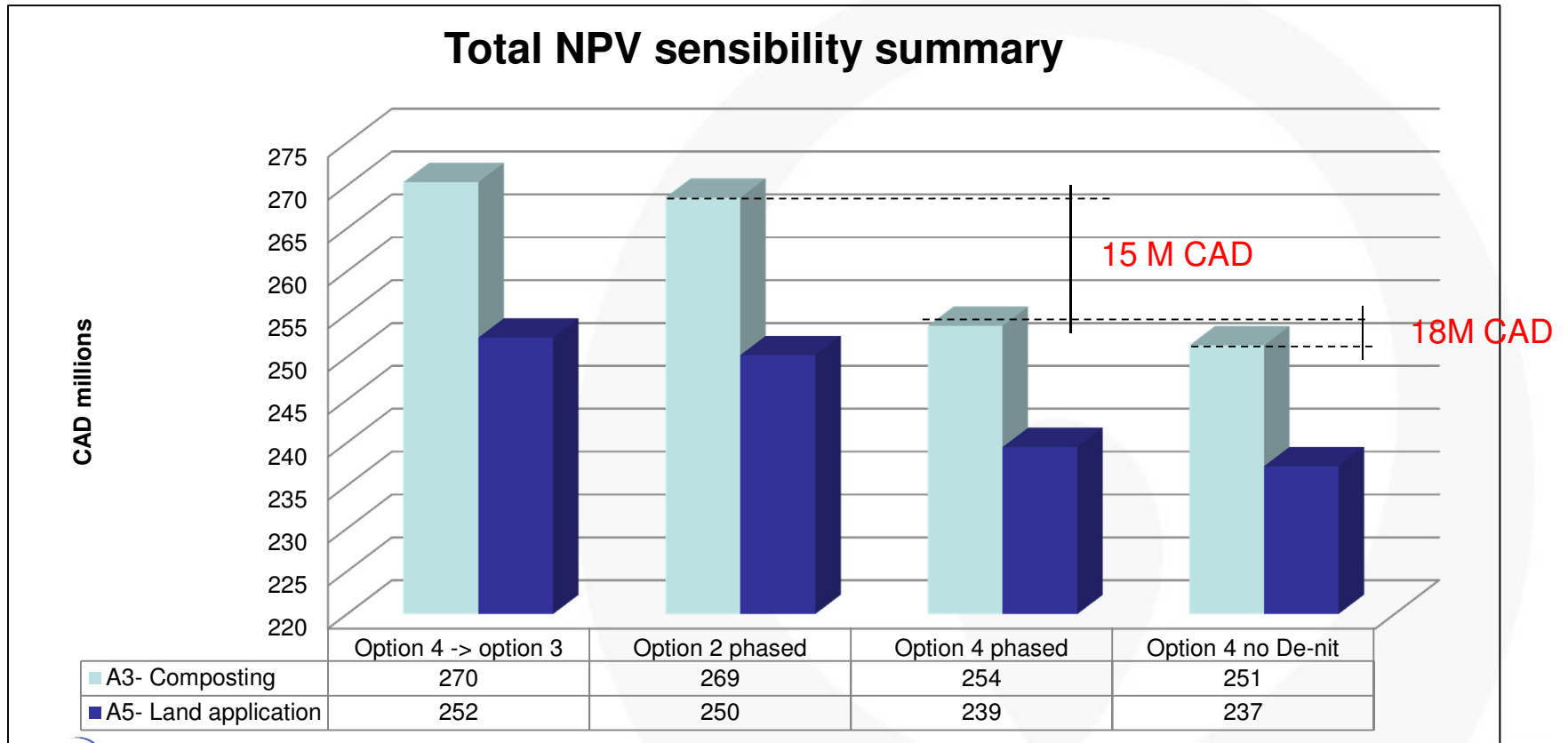


- No interest for DAF for alternatives A2 and A3 as we assumed that the sludge processes were not volume related
- Small + impact in A5 because of the sludge hauling SEWPCC -> NEWPCC
- Impact of DAF on alternatives A1 & A4 not significant

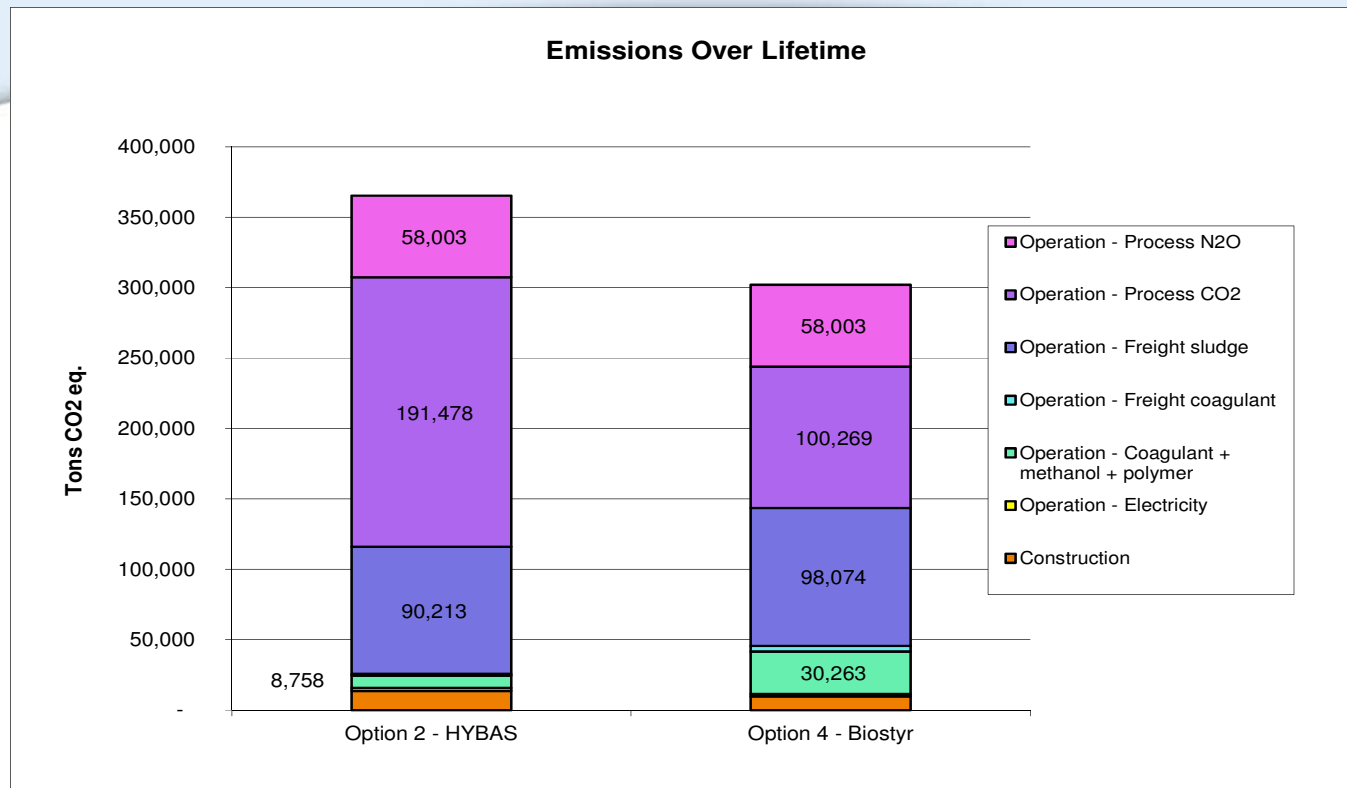
① Assessment of modularity and flexibility

- Summary

- ▶ Option 4 remains most economical in all configurations



② Carbon Footprint – Assessment including secondary treatment emissions



Option 2

- Less carbon removed in primaries
- Carbon removed in secondary's is released as CO2

Option 4

- More Carbon removed in primary clarifier due to chemical coagulant and captured in bio-solids

N2O released from each option is broadly the same

② Carbon Footprint – Impact of Bio-solids Emissions

- More Carbon captured in option 4 bio-solids
- Leads to opportunity and risk for GHG emissions from bio-solids treatment – dependent on bio-solids treatment options
- Large number of scenarios depending on bio-solids process options

Opportunity - Use Carbon in processes that generate:

- Bio-gas (use to avoid GHG emissions)
- Other products such as fertilizers that can avoid (or displace) GHG emissions

Risks

- Release of methane with higher Global Warming Potential (e.g. untreated sludge sent to landfill)

Neutral

- Displaced GHG not recognized
- After all Carbon has been oxidised (either through process emissions or bio-gas combustion) same amount of GHG produced from both options

③ Ammonia – Risk assessment of having to meet tighter limits

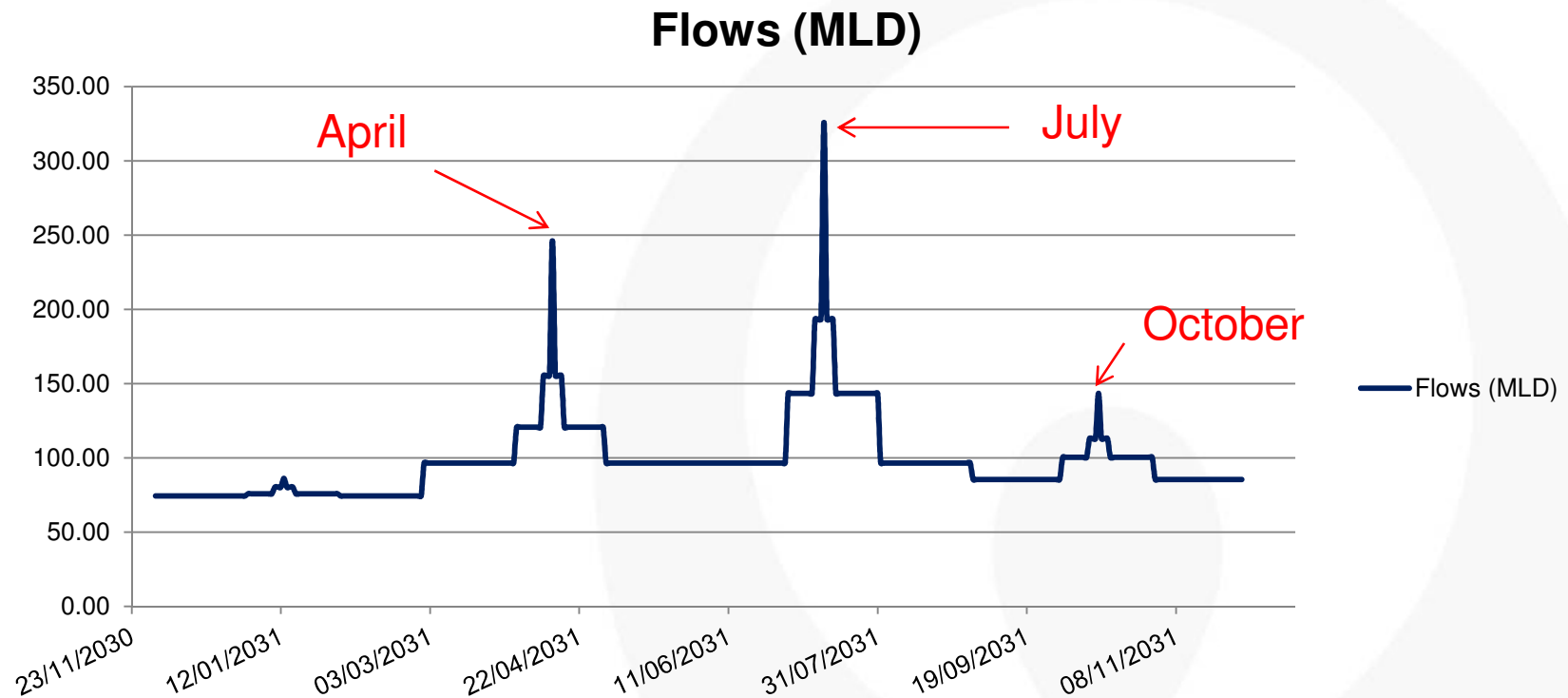
- The license requires a never to exceed daily limit for ammonia :

Ammonia Nitrogen	on effluent	never to exceed	1975 (January)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	2403 (February)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	4196 (March)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	12926 (April)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	5311 (May)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	3103 (June)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	1517 (July)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	607 (August)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	703 (September)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	811 (October)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	1152 (November)	kg N/day	24 h effluent composite sample
	on effluent	never to exceed	1550 (December)	kg N/day	24 h effluent composite sample

- As the ammonia is only treated in the biological stream, the critical months are those during which rainy events occur ➔ Summer months
- Can options 2 & 4 meet the license?

③ Ammonia – Risk assessment of having to meet tighter limits

- According to Stantec's work :

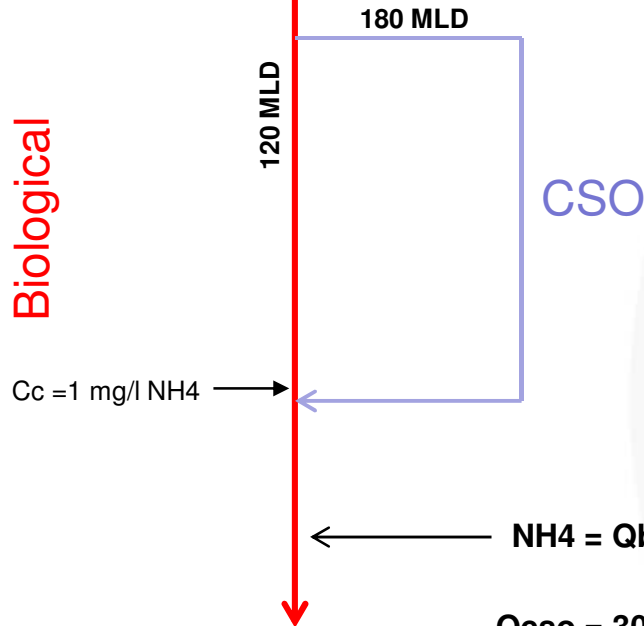


③ Ammonia – Risk assessment of having to meet tighter limits

- Design conditions :

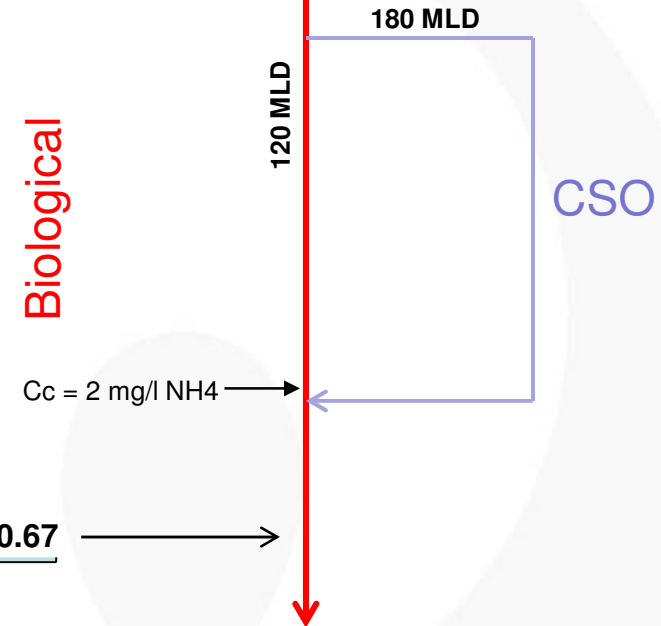
Option 2

NH₃/NTK = 0.67
NTK = 16.8 mg/l



Option 4

NH₃/NTK = 0.67
NTK = 16.8 mg/l



$$\text{NH}_4 = Q_b \times C_c + Q_{cso} \times \underbrace{16.8 \times 0.67}_A$$

$$Q_{cso} = 300 - Q_b$$

$$\text{NH}_4 = Q_b (C_c - A) + 300A$$

- Check that C_c and other requirements are reached for Q_b

③ Ammonia – Risk assessment of having to meet tighter limits

- For both options : TSS is critical and limiting, not nitrification capacity

- Results for option 2:

With $T_{\text{influent}} = 19^{\circ}\text{C}$, $C_c = 1 \text{ mg/l}$ and $\text{TSS} \leq 25 \text{ mg/l}$ for $Q_b = 175 \text{ MLD}$

⇒ **Current design fully compliant without modification**

- Results for option 4:

With $T_{\text{influent}} = 19^{\circ}\text{C}$

Use of existing clarifiers & actiflo for primary clarification

↪ $C_c = 2 \text{ mg/l}$ and $\text{TSS} \leq 25 \text{ mg/l}$ for $Q_b = 200 \text{ MLD}$

⇒ **Current design fully compliant without modification**

④ Impact of Government Subsidies

Impact of Provincial and Federal fundings

Existence of a strategic infrastructure fund agreement between CANADA, Manitoba and Winnipeg to fund Winnipeg WASTEWATER TREATMENT UPGRADES (signed in 2007)

- expansions and improvements to WEWPCC / NEWPCC / SEWPCC in Winnipeg
 - WEWPCC: expansion of existing BNR and addition of ultraviolet disinfection facility
 - NEWPCC: addition of Centrate Nutrient removal and of effluent ultraviolet disinfection facility
 - SEWPCC: addition of BNR processes. NOTE: EXPANSION TO SECONDARY TREATMENT UNDERWAY BUT NOT PART OF THIS PROJECT.

The agreement outlines eligible vs. in eligible expenditures, deadlines, etc.

- Canada contribution (no more than 50% of the total Eligible Costs) during six Fiscal Years 2007-2013, **up to a maximum of \$42 million**
- Manitoba contribution (**no more than \$25 million**) toward Eligible Costs incurred and paid by Winnipeg for the Project during seven Fiscal Years 2007-2013
- Winnipeg responsible for **complete, diligent and timely implementation of the Project**, and for the costs net of Canada's and Manitoba's contributions.



4 Impact of Government Subsidies

Impact of Provincial and Federal fundings

- ✓ Manitoba has already fulfilled their \$25M obligation
- ✓ Canada has only funded \$10.8M of their \$42M obligation
- ✓ The only project still eligible for funding from Canada is SEWPCC BNR for \$31.2M
- ✓ Claims are due on 31 March of the FY; next claim is due on 31 March 2011 and will be zero
- ✓ All expenditures must be in the g/l to be audited by an external auditor for a claim to be made
- **All Approved CAPEX and effective funding agreements are factored in the current rate calculation cash flow projection**
- ✓ Another funding agreement for **SEWPCC wet weather** currently on hold
- ✓ \$20M equally funded by Canada and Manitoba
- ✓ **New agreement with Manitoba** currently negotiated for **\$206M for wastewater infrastructures**
- ✓ Will probably be only available to fund new projects, i.e. NEWPCC for example

④ Impact of Government Subsidies

Impact of Provincial and Federal fundings

Conclusion :

- The granted amount is a fixed value
- The \$20M possible will also be based on a fix value

→ The granting of money will have no impact on the preferred option.

② Impact of Government Subsidies

Impact of Provincial and Federal fundings

Amendment No. 6 DRAFT - Schedule B – Detailed Cash Flow by Project Component (\$ Millions)

Name of Project Component	Total Costs	Eligible Costs	Contribution by	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	GRAND TOTAL	Component Total
1. West End Water Pollution Control Centre (WEWPCC) BNR Upgrade and Effluent Disinfection	46.87	35.99	Canada	0.00	3.48	1.59		0.00	0.00	0.00	5.07	46.87
			Manitoba	0.06	2.43	3.10	2.60	0.00	0.00	0.00	8.19	
			Winnipeg	2.47	9.28	3.80	0.49	17.57	0.00	0.00	33.61	
2a. North End Water Pollution Control Centre (NEWPCC) Centrate Treatment	32.96	21.83	Canada	0.00	5.59	0.00	0.00	0.00	0.00	0.00	5.59	32.96
			Manitoba	3.64	0.00	0.00	1.64	0.00	0.00	0.00	5.28	
			Winnipeg	5.50	11.68	1.98	0.50	2.44	0.00	0.00	22.09	
2b. North End Water Pollution Control Centre (NEWPCC) Effluent Disinfection	19.04	16.13	Canada	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.04
			Manitoba	4.50	0.00	0.00	0.96	0.00	0.00	0.00	5.46	
			Winnipeg	11.91	0.39	0.75	0.30	0.24	0.00	0.00	13.58	
3. South End Water Pollution Control Centre (SEWPCC) BNR Upgrade	101.2	79	Canada	0.00	0.00	0.11	0.00	0.00	15.00	16.24	31.34	101.20
			Manitoba	0.00	6.08	0.00	0.00	0.00	0.00	0.00	6.08	
			Winnipeg	0.00	0.00	0.21	0.50	20.00	30.00	13.08	63.79	
Total	200.07	152.95	Canada	0.00	9.07	1.70	0.00	0.00	15.00	16.24	42.00	200.07
			Manitoba	8.20	8.51	3.10	5.20	0.00	0.00	0.00	25.00	
			Winnipeg	19.88	21.35	6.74	1.79	40.24	30.00	13.08	133.07	