THE CITY OF DAWSON

AGENDA - COUNCIL MEETING #C22-13
WEDNESDAY, June 1, 2022 at 7:00 p.m.
Council Chambers, City of Dawson Office

Join Zoom Meeting
https://us02web.zoom.us/j/83991547091?pwd=N09hcElsTElFWFBBdFRPM3VUVFRVZz09
Meeting ID: 839 9154 7091
Passcode: 045222

1. **CALL TO ORDER**

2. **ADOPTION OF THE AGENDA**
   a) Council Meeting Agenda #C22-12

3. **DELEGATIONS & GUESTS**
   a) Public Lands Act Engagement (Shirley Dawson)

4. **BUSINESS ARISING FROM DELEGATIONS & GUESTS**
   a) Public Lands Act Engagement (Shirley Dawson)

5. **ADOPTION OF THE MINUTES**
   a) Special Council Meeting Minutes C22-09 of April 27, 2022
   b) Council Meeting Minutes C22-10 of May 4, 2022
   c) Special Council Meeting Minutes C22-11 of May 19, 2022

6. **BUSINESS ARISING FROM MINUTES**
   a) Special Council Meeting Minutes C22-09 of April 27, 2022
   b) Council Meeting Minutes C22-10 of May 4, 2022
   c) Special Council Meeting Minutes C22-11 of May 19, 2022

7. **BUDGET & FINANCIAL REPORTS**
   a) Accounts Payable 22-08 Cheques #57690-57732
   b) Accounts Payable 22-09 Cheques #57733-57762 and EFT's

8. **SPECIAL MEETING, COMMITTEE, AND DEPARTMENTAL REPORTS**
   a) Request for Decision: Propane Boiler Upgrade
   b) Request for Decision: Solid Waste Diversion Centre Contract Award
   c) Mayors Participation at Robert Service School - Per Diems
   d) Request for Decision: Subdivision Approval #21-049 – Boundary Adjustment
   e) Request for Decision: Approval of Heritage Incentive Applications #22-016 and #22-023

9. **BYLAWS & POLICIES**
   a) Bylaw 2022-13 - Reserves Fund Bylaw -2nd & 3rd Reading
   b) Bylaw 2022-07 – OCP Amendment No. 7 – Klondike River Bench Direct Control District – 2nd reading

10. **CORRESPONDENCE**
    a) Heritage Advisory Committee Meeting Minutes #HAC 22-03, HAC 22-04, HAC 22-05, & HAC 22-06
    b) Georgina Williston, Canadian Wildlife Service-Northern Region RE: Conservation of Migratory Birds
    c) Ramesh Ferris RE: Incoming President of Rotary International Requests Engagement with Dawson Mayor & Council
    d) RCMP Monthly Policing Report: March
    e) RCMP Monthly Policing Report: April
    f) Tom & Susan Pearse Re: Recreation Centre Considerations

11. **BUSINESS ARISING FROM CORRESPONDENCE**

12. **PUBLIC QUESTIONS**

13. **In Camera - Legal**

14. **ADJOURNMENT**

MINUTES OF SPECIAL COUNCIL MEETING C22-09 of the Council of the City of Dawson held on Wednesday, April 27, 2022 at 6:45 p.m. City of Dawson Council Chambers

PRESENT:	Mayor	William Kendrick
	Councillor	Elizabeth Archbold
	Councillor	Alex Somerville
	Councillor	Patrik Pikálek
	Councillor	Brennan Lister
REGRETS:		
ALSO PRESENT:	CAO	Cory Bellmore
	A/EA	Kim McMynn
	PW Manager	Jonathn Howe
	PD Manager	Stephanie Pawluk

Agenda Item: Call to Order

The Chair, Mayor Kendrick called Special Council meeting C22-09 to order at 6:45 p.m.

Agenda Item: Agenda

C22-09-01 Moved by Councillor Somerville, seconded by Councillor Archbold that the agenda for Special Council meeting C22-09 of April 27, 2022 be accepted as presented.
Motion Carried 5-0

Agenda Item: Special Meeting, Committee, and Departmental Reports

a) Waste Diversion Centre Contract Award

C22-09-02 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council approve the use of a Single Source procurement method as allowed by the City's Procurement Policy #2021-03 Section *5.4.3 Sole Source Procurement* for the design-build of the Solid Waste Diversion Centre (SWDC).
Motion Carried 5-0

C22-09-03 Moved by Mayor Kendrick, seconded by Councillor Somerville that Council award the design of the Waste Diversion Centre Contract to Oro Enterprises Ltd. for $76,850, as per the quote attached.
Motion Carried 5-0

b) Civil Emergency Meetings Per Diems

C22-09-04 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council approve the per diems to attend the Civil emergency meetings as per bylaw 2021-10.
Motion Carried 5-0

Agenda Item: Adjourn

C22-09-05 Moved by Mayor Kendrick, seconded by Councillor Pikálek that Special Council meeting C22-09 be adjourned at 6:56 p.m. with the next regular meeting of Council being May 4, 2022.
Motion Carried 5-0

THE MINUTES OF SPECIAL COUNCIL MEETING C22-09 WERE APPROVED BY COUNCIL RESOLUTION #C22-11-06 AT COUNCIL MEETING C22-11 OF JUNE 1, 2022.

William Kendrick, Mayor

Cory Bellmore, CAO

MINUTES OF COUNCIL MEETING C22-10 of the Council of the City of Dawson held on Wednesday, May 4, 2022 at 7:00 p.m. via City of Dawson Council Chambers

PRESENT:	Mayor	William Kendrick
	Councillor	Elizabeth Archbold
	Councillor	Alexander Somerville
	Councillor	Patrik Pikálek
	Councillor	Brennan Lister
REGRETS:		
ALSO PRESENT:	CAO	Cory Bellmore
	EA	Elizabeth Grenon
	Rec Manager	Paul Robitaille
	PW Manager	Jonathan Howe

Agenda Item: Call to Order

The Chair, Mayor Kendrick called Council meeting C22-10 to order at 7:07 p.m.

Agenda Item: Agenda

C22-10-01 Moved by Councillor Somerville, seconded by Councillor Pikálek that the agenda for Council meeting C22-10 of May 4, 2022 be accepted as presented.
Motion Carried 5-0

Agenda Item: Delegations & Guests

a) Derrick Hastings: Recycling and Composting

No delegate.

Agenda Item: Proclamation

a) Journée De La Francophonie Yukonnaise

C22-10-02 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council proclaim May 15, 2022, to be 'Journée De La Francophonie Yukonnaise' in Dawson City.
Motion Carried 5-0

Agenda Item: Minutes

a) Council Meeting Minutes C22-07 of April 13, 2022

C22-10-03 Moved by Councillor Somerville, seconded by Mayor Kendrick that the minutes of Council Meeting C22-07 of April 13, 2022 be accepted as presented.
Motion Carried 5-0

b) Special Council Meeting Minutes C22-08 of April 20, 2022

C22-10-04 Moved by Councillor Pikálek, seconded by Councillor Somerville that the minutes of Special Council Meeting C22-08 of April 20, 2022 be accepted as presented.
Motion Carried 5-0

Agenda Item: Budget & Financial Reports

a) Accounts Payable 22-05 Cheques #57541-57586

C22-10-05 Moved by Councillor Somerville, seconded by Councillor Archbold that Council acknowledges receipt of the Accounts Payables 22-05 Cheques #57541-57586, provided for informational purposes.
Motion Carried 5-0

Cheque#	Vendor Name	Further Information
57543	Advanced Energy Solutions Inc.	What is this?-will look into it

b) Accounts Payable 22-06 Cheques #57587-57645

C22-10-06 Moved by Mayor Kendrick, seconded by Councillor Somerville that Council acknowledges receipt of the Accounts Payables 22-06 Cheques #57587-57645, provided for informational purposes.
Motion Carried 5-0

c) Accounts Payable 22-07 Cheques #57646-57689 and EFT's

C22-10-07 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council acknowledges receipt of the Accounts Payables 22-07 Cheques #57646-57689, provided for informational purposes.
Motion Carried 5-0

Cheque#	Vendor Name	Further Information
57543	Advanced Energy Solutions Inc.	What is this?-will look into it
February 22, 2022	Coles	What Staff Activity?- will look into it
February 22, 2022	Dollarama	What Staff Activity?- will look into it
February 22, 2022	Walmart	What Staff Activity?- will look into it

Agenda Item: Bylaws & Policies

a) Bylaw 2022-13 - Reserves Fund Bylaw -First Reading

C22-10-08 Moved by Councillor Somerville, seconded by Mayor Kendrick that Council give Bylaw 2022-13, being the Reserve Fund Bylaw, first reading.
Motion Carried 5-0

b) Bylaw 2021-14 – OCP Amendment No. 5 – Housekeeping bylaw – Second Reading

C22-10-09 Moved by Councillor Pikálek, seconded by Councillor Archbold that Council give Bylaw 2021-14, being the Official Community Plan Amendment No. 5 Bylaw, second reading.
Motion Carried 5-0

c) Policy 2022-01 Art Procurement Policy

C22-10-10 Moved by Mayor Kendrick, seconded by Councillor Somerville that Council adopt the Art Procurement Policy #2022-01, as amended.
Motion Carried 5-0

- Remove 4.00(c)
- 7.00(d) change 'may' to 'shall'

Agenda Item: Correspondence

C22-10-11 Moved by Councillor Pikálek, seconded by Councillor Somerville that Council acknowledges receipt of correspondence from:
a) Annika Palm, Senior Project Manager, Infrastructure Development Branch RE: City of Dawson Recreation Centre
b) RCMP Monthly Policing Report: February
c) Minister Pillai, Housing Initiatives Fund, provided for informational purposes.
Motion Carried 5-0

Agenda Item: Business Arising from Correspondence

a) Annika Palm, Senior Project Manager, Infrastructure Development Branch RE: City of Dawson Recreation Centre

C22-10-12 Moved by Councillor Pikálek, seconded by Mayor Kendrick that Council confirm that Yukon Government Infrastructure Branch is the project lead on the Schematic Design Phase of the Recreation Centre.
Motion Carried 5-0

c) Minister Pillai, Housing Initiatives Fund

C22-10-13 Moved by Mayor Kendrick, seconded by Councillor Somerville that Council refers the April 27, 2022 letter from Minster Pilai to the Committee of the Whole meeting of May 18, 2022, for further discussion.
Motion Carried 5-0

Councillor Archbold announced her resignation from Council.

Agenda Item: Public Questions

C22-10-14 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council moves to Committee of the Whole for the purposes of hearing public questions.
Motion Carried 5-0

Dan Davidson: There has been some talk this week on the media and elsewhere about coming up with some kind of play space in the recreation center development. Where they in the Option 1 that was eventually picked?
Council: There is an indoor playground space holder space right through the front doors of Concept 1.

Agenda Item: In Camera

C22-10-15 Moved by Councillor Somerville, seconded by Mayor Kendrick that Committee of the Whole move into a closed session of Committee of the Whole, as authorized by Section 213(3) of the Municipal Act, for the purposes of discussing a legal related matter.
Motion Carried 5-0

C22-10-16 Moved by Mayor Kendrick, seconded by Councillor Pikálek that Committee of the Whole revert to an open session of Council to proceed with the agenda.
Motion Carried 5-0

C22-10-17 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council award the contract to Canadian Ramp Company for the rehabilitation of the skate park for an amount not to exceed $188,347.66 as per their attached quote.
Motion Carried 5-0

Agenda Item: Adjourn

C22-10-18 Moved by Councillor Archbold, seconded by Councillor Lister that Council Meeting C22-10 be adjourned at 8:38 p.m. with the next regular meeting of Council being June 1, 2022.
Motion Carried 5-0

THE MINUTES OF COUNCIL MEETING C22-10 WERE APPROVED BY COUNCIL RESOLUTION #C22-11-02 AT COUNCIL MEETING C22-11 OF JUNE 1, 2022.

William Kendrick, Mayor

Cory Bellmore, CAO

MINUTES OF SPECIAL COUNCIL MEETING C22-11 of the Council of the City of Dawson held on Thursday, May 19, 2022 at 6:00 p.m. City of Dawson Council Chambers

PRESENT:	Mayor	William Kendrick
	Councillor	Alex Somerville
	Councillor	Patrik Pikálek
	Councillor	Brennan Lister
REGRETS:		
ALSO PRESENT:	CAO	Cory Bellmore
	EA	Elizabeth Grenon

Agenda Item: Call to Order

The Chair, Mayor Kendrick called Special Council meeting C22-11 to order at 6:00 p.m.

Agenda Item: Agenda

C22-11-01 Moved by Mayor Kendrick, seconded by Councillor Somerville that the agenda for Special Council meeting C22-11 of May 19, 2022 be accepted as presented.
Motion Carried 4-0

Agenda Item: Bylaws & Policies

a) Bylaw 2022-14- Municipal By-Election Bylaw- 1st and 2nd Reading

C22-11-02 Moved by Mayor Kendrick, seconded by Councillor Pikálek that Council give Bylaw 2022-14, being the 2022 Municipal By-Election Bylaw, first reading as amended.
Motion Carried 4-0

- 2.02 add “to fill one Council position”

C22-11-03 Moved by Mayor Kendrick, seconded by Councillor Somerville that Council give Bylaw 2022-14, being the 2022 Municipal By-Election Bylaw, second reading.
Motion Carried 4-0

b) Bylaw 2022-12- Land Acquisition No. 1 Bylaw- 1st & 2nd Reading

C22-11-04 Moved by Councillor Somerville, seconded by Mayor Kendrick that Council give Bylaw 2022-12, being the 2022 Land Acquisition No. 1 Bylaw, first reading.
Motion Carried 4-0

C22-11-05 Moved by Councillor Somerville, seconded by Councillor Pikálek that Council give Bylaw 2022-12, being the 2022 Land Acquisition No. 1 Bylaw, second reading.
Motion Carried 4-0

Agenda Item: Adjourn

C22-11-06 Moved by Councillor Pikálek, seconded by Mayor Kendrick that Special Council meeting C22-11 be adjourned at 6:09 p.m. with the next regular meeting of Council being Juine 1, 2022.
Motion Carried 4-0

THE MINUTES OF SPECIAL COUNCIL MEETING C22-11 WERE APPROVED BY COUNCIL RESOLUTION #C22-12-06 AT COUNCIL MEETING C22-12 OF JUNE 1, 2022.

William Kendrick, Mayor

Cory Bellmore, CAO

The City of Dawson
Cheque Run 22-08
4/22/2022

Cheque Number	Vendor Name	Cheque Amount	Detail	Dept	Description
57690	Advance North Mechanical	$180.59		PW	VehR&M
57691	AFD Petroleum Ltd	$43,095.39	$4,299.61	REC	BldgFuel-Arena
			$116.69	PW	BldgFuel WoodShp
			$1,294.71	PW	BldgFuel Garage
			$318.39	PW	BldgFuel Quigley
			$34,373.81	PW	BldgFuel WTP
			$2,692.18	ALL	Veh Fuel
			$43,095.39		
57692	Air North Partnership	$216.07	$105.49	PW	Freight
			$110.58	PW	Freight
			$216.07		
57693	Munisight Ltd.	$5,034.76		ADM	All-netSoln Training
57694	Arctic Inland Resources Ltd.	$201.03		REC	OpSupp
57695	Bonanza Market	$815.19	$285.04	REC	ProgSupp
			$530.15	ADM	SpecEvt-HR
			$815.19		
57696	Brenntag Canada Inc.	$993.03		PW	Chemicals
57697	Leoni Brousseau	$416.50		REC	Instructor
57698	Bureau Veritas	$233.84		PW	ProFees Water Samp
57699	Canadian Freightways TST-CF	$778.86		PW	Freight
57700	Chief Isaac Incorporated	$2,250.15	$152.25	PW	SafetyLine
			$2,097.90	PW	ContSvs-Jani
			$2,250.15		
57701	Dawson City General Store	$317.99		ADM	OffSupp
57702	Dawson Hardware Ltd.	$1,259.43	$30.23	PW	NonCapEquip
			$69.38	PW	OpSupp
			$57.61	PW	SafetyGear RecyclingCtre
			$77.18	REC	OpSupp
			$58.75	REC	OpSuppArena
			$43.45	PW	JaniSupp
			$18.90	REC	ProgSupp
			$305.09	PW	SafetySupp
			$146.27	REC	OpSupp GrnSpace
			$359.93	ADM	BldgR&M
			$92.64	ADM	OffSupp
			$1,259.43		
57703	Dawson City Golf Association	$45,000.00		REC	2022 OpLease
57704	CentralSquare Canada	$1,180.78		ADM	IT Cemetery program
57705	Emco Corporation	$483.54		PW	HvyEqR&M
57706	Finning (Canada) C3176	$644.26		PW	HvyEqR&M
57707	Friends of Mount Sima Society	$470.62		REC	Ski Instructors
57708	Future Proof My Building Consulting	$1,987.50		ADM	ProFees BldgR&M

The City of Dawson
Cheque Run 22-08
4/22/2022

Cheque Number	Vendor Name	Cheque Amount	Detail	Dept	Description
57709	Grenon Enterprises Ltd.	$88,221.60	$196.88	PW	ContSvs Clear RabbitCrkRd
			$1,260.00	PW	SnowHaul from RobServiceRd
			$11,036.03	PW	ContSvs WtrDel
			$262.50	PW	ContSvs ThawManhole
			$157.50	PW	Toilet R&M RecyclingCtre
			$2,606.63	PW	ContSvs Mar27-Apr2
			$126.00	PW	ContSvs HaulSand
			$4,945.50	PW	ContSvsApr3-9
			$1,168.13	PW	Stm-Vac BonaGoldLiftStn
			$236.25	PW	Toilet R&M RecyclingCtre
			$9,463.13	PW	SpringSnowCleanUp
			$56,763.05	PW	ContSvs SpringRdStripping
			$88,221.60		
57710	Hastings, Derrick	$190.25		PW	Recycling Refund
57711	Infosat Communications	$79.25		PW	SatPhone
57712	Jillian Johnson	$45.00		PW	Reimburse Vehicel Reg
57713	Klondike Visitors Association	$3,000.00		REC	Comm&REC Grants
57714	The Literary Society of the Klondike	$3,092.25	$1,748.25	ADM	Advertising
			$1,344.00	CABLE	Advertising
			$3,092.25		
57715	Manitoulin Transport	$371.51	$83.82	ADM	Freight
			$41.91	PW	Freight
			$245.78	PS	Freight
			$371.51		
57716	Kim A McMynn	$3,000.00		PW-ADM	Recycling Floats
57717	Northern Superior Mechanical	$1,148.81	$826.64	PW	NonCapEquip
			$35.70	PW	SafetySupplies
			$272.31	PW	OpSupplies
			$14.16	PW	HvyEquipR&M
			$1,148.81		
57718	Northwestel Inc.	$5,774.96		ADM	Phones Apr12
57719	Northlands Water & Sewer Supplies	$5,952.25		PW	OpSupp WTP
57720	Raven's Nook	$467.25		PW	SafetyGear
57721	A Ray of Sunshine	$34.83		REC	SafetySupplies
57722	Spectrum Security - Sound Ltd.	$220.47		PW	ContSvs Sec
57723	Superior Propane Inc	$170.42		REC	Fuel
57724	Taylor, Emily	$416.50		REC	Instructor
57725	Tsunami Solutions Ltd.	$170.10		PW	SafetyLine
57726	Tucker Carruthers	$3,664.50		ADM	ProFees-Legal
57727	Unbeatable Printing	$341.25		REC	SafetySupp
57728	Willow Printers Ltd.	$638.40		ADM	OffSupplies
57729	WSP Canada Inc	$459.38		PW	WtrLicense
57730	Yukon Energy Corporation	$38,883.41	$3,256.69	PW	Apr8 Street Lights
			$35,626.72	ALL	Apr19 Main Power
			$38,883.41		
57731	Yukon Service Supply Co.	$306.50		PW	OpSupp-Jani
57732	Yukon WCHSB	$74,851.42	$18,923.81	PS	2022 Assessment
			$55,927.61	ALL	2022 Assessment
			$74,851.42		

The City of Dawson
Cheque Run 22-09
5/6/2022

Cheque Number	Vendor Name	Cheque Amount	Detail	Dept	Description
57733	44478 Yukon Inc.-Tangerine Tech	$13,758.15		ADM	IT Support& annual renewals
57734	AFD Petroleum Ltd	$11,879.92	$3,360.05	ALL	Vehicle Fuel
			$2,388.55	ADM	BldgFuel-CH
			$1,023.68	PS	BldgFuel-FH
			$456.96	ADM	CAO residence
			$4,650.68	REC	BldgFuel-Arena
			$11,879.92		
57735	AirChekLab Inc.	$310.80		PS	ContSvs-Air Test
57736	Air North Partnership	$242.97	$115.99	PW	Freight-WtrSamples
			$47.74	ADM	Freight-ITEquip
			$79.24	PW	Freight-Equip Mtnce
			$242.97		
57737	Arctic Inland Resources Ltd.	$1,071.22	$766.64	REC	OpSupp-Greensapce
			$304.58	REC	OpSupp-Pool
			$1,071.22		
57738	BHB Mini Storage	$105.00		ADM	Archive Storage
57739	Bonanza Market	$258.71	$191.64	REC	ProgSupplies
			$67.07	ADM	Promo-SpcEvt
			$258.71		
57740	Chief Isaac Incorporated	$621.60		PW	ContSvs-Janitorial
57741	Colliers Project Leaders Inc.	$475.13		ADM	CBC Bldg Restoration
57742	Dawson City General Store	$62.80		ADM	OffSupp
57743	Dawson Hardware Ltd.	$760.36	$244.45	REC	OpSupp-GrnSpace
			$26.41	ADM	OffSupp
			$155.87	REC	OpSupp-Pool
			$25.48	REC	Safety supplies
			$45.35	REC	NonCapEquip-Arena
			$105.32	REC	OpSupp-Arena
			$66.23	REC	Tools
			$91.25	REC	OpSupp
			$760.36		
57744	Finning (Canada) C3176	$1,855.51		PW	HvyEquipR&M
57745	Hastings, Derrick	$114.15		ADM	Depositables Refund
57746	Henry, Jalen	$2,981.93		PS	Travel for Training
57747	Juliette's Manor	$2,450.00		ADM	Staff Housing
57748	Klondike Office Systems	$90.87		ADM	CopyCount
57749	Lawson Lundell LLP	$1,628.46		ADM	ProFees-Legal
57750	Maximillian's Gold Rush Emporium	$122.28		REC	ProgSupplies

The City of Dawson
Cheque Run 22-09
5/6/2022

Cheque Number	Vendor Name	Cheque Amount	Detail	Dept	Description
57751	McMynn, Kim In Trust	$2,000.00		ADM	Float RECYCL
57752	Northern Superior Mechanical	$110.04		REC	OpSupp
57753	Norton Rose Fulbright	$2,263.97		ADM	ProFees-Legal
57754	Pacific Northwest Moving	$152.37	$104.97	PW	Freight
			$47.40	ADM	Freight
			$152.37		
57755	Public Service Alliance of Canada	$3,548.28		ADM	Union Dues
57756	Raven's Nook	$231.00		REC	Work Gear
57757	Son of Mendel Inc.	$112.61		REC	ContSvs-Electritian
57758	Perry-Bater, Micah	$180.00		REC	Instructor
57759	Delisle, Jeff	$40.00		REC	FOB return
57760	Nielsen, Coco	$40.00		REC	FOB return
57761	Total North Communications Ltd	$556.50		ADM	ContSvs-IT PhoneSystem
57762	WSP Canada Inc	$2,101.05		REC	ContSvs-Structural Review

Electronic Fund Transfers

Apr 01	Canada Life	$15,940.39	various	April employee benefits
Apr 01	Roynat Leases	$387.51	various	Photocopier leases
Apr 01	Payroll	$107,162.02	ALL	PP#7
Apr 14	Payroll	$104,631.26	ALL	PP#8
Apr 18	Wells Fargo Lease	$261.45	ADM	Photocopier lease
Apr 18	Visa	$15,475.46	various	Per attached
Apr 20	CCSA	$9,548.70	CABLE	monthly cable charge
Apr 26	Dayforce	$191.52	ALL	IT - payroll/training
Apr 29	Payroll	$114,532.96	ALL	PP#9
Apr 26	Wells Fargo Lease	$655.20	ADM	Photocopier lease
Apr 30	Bank charges	$153.58	ADM	Bank/Visa machine
Apr 30	Refund of Dawson Creek Payments	$100.00	ADM	1 Deposit in error

Aventura Visa Statement Date: February 28 to March 27 , 2022

				$846.93		$15,425.46
TX Date	Vendor	Detail	Purchase $	Gst	QST	Total
2/25/2022	Adobe AcroPro Subs	monthlly subscription	$19.99	$1.00		$20.99
3/2/2022	E-Bay	equip repairs	$28.57	$1.43		$30.00
3/3/2022	Flaghouse	programming supplies	$145.58	$7.28		$152.86
3/14/2022	MaintainX	Building R&M	$633.36	$31.67		$665.03
3/14/2022	WhenIWork	Network Charge Waterfront	$28.18	$1.41		$29.59
3/21/2022	RoadPost	Inreach - Safety Supplies	$23.95	$1.20		$25.15
3/23/2022	Adobe - photo	Photo Plan (20GB)	$12.99	$0.65		$13.64
				44.63		$937.26

TX Date	Vendor	Detail	Purchase $	Gst	Total
2/26/2022	Triniti Tech	Cell Phone cases	$214.96	$10.75	$225.71
3/4/2022	Raven Inn	Accomodation - AYC	$203.00	$10.15	$213.15
3/4/2022	Wal-Mart	Office Supplies	$22.30	$1.12	$23.42
3/16/2022	4Imprint Inc	Note books	$840.50	$42.03	$882.53
	4Imprint Inc	Freight	$363.08	$18.15	$381.23
4/16/2022	Red Mammoth	Meeting expense	$76.99	$3.85	$80.84
3/18/2022	Canada Post	postage	$57.10	$2.85	$59.95
3/23/2022	Red Mammoth	Meeting expense	$45.54	$2.28	$47.82
			$0.00	$0.00	$0.00
				$91.17	$1,914.65

TX Date	Vendor	Detail	Purchase $	Gst	Total
2/22/2022	Alberta Forest & Garden	Non-capital equipment	$2,504.12	$125.21	$2,629.33
2/28/2022	YG Building Safety	Membership fee	$2.86	$0.14	$3.00
3/3/2022	EMSL Canada Inc	Safety supplies	$1,248.74	$62.44	$1,311.18
3/11/2022	Northern Safety	Training	$294.00	$14.70	$308.70
3/11/2022	Northern Safety	Training	$294.00	$14.70	$308.70
3/14/2022	Canada Post	Postage	$24.45	$1.22	$25.67
3/15/2022	Northern Safety	Training	$438.00	$21.90	$459.90
3/17/2022	YG Building Safety	Membership fee	$2.86	$0.14	$3.00
3/24/2022	ALLMar	Fire Doors (part payment)	$1,721.90	$86.10	$1,808.00
				$326.55	$6,857.48

TX Date	Vendor	Detail	Purchase $	Gst	Total
3/1/2022	Canada Post	meeting	$22.70	$1.14	$23.84
3/1/2022	Govt of Canada	Radio License	$1,962.84	$98.14	$2,060.98
3/10/2022	Microsoft Store	Windows Pro	$130.00	$6.50	$136.50
3/11/2022	Microsoft Store	Windows Pro	$130.00	$6.50	$136.50
3/11/2022	Pitney Bowes	staff activity	$497.61	$24.88	$522.49
3/11/2022	Canada Post	postage	$108.47	$5.42	$113.89
3/16/2022	Careers in Planning	job posting	$775.00	$38.75	$813.75
3/17/2022	Civic Jobs	job posting	$250.00	$12.50	$262.50
				$193.83	$4,070.45

Card Number:	Bell Mobility				
TX Date	Vendor	Detail	Purchase $	Gst	Total
2/22/2022	Bell Mobility	M&C	$464.88	$25.74	$490.62
		ADM	$50.00	$2.50	$52.50
		PS	$100.00	$5.00	$105.00
		PW	$600.00	$30.00	$630.00
		REC	$300.00	$15.00	$315.00
		WASTE		$0.00	$0.00
		WATER	$50.00	$2.50	$52.50
				80.74	$1,645.62

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	Propane Boiler and Heat Pump Upgrade: Administration Building	
PREPARED BY:	Brodie Klemm	**ATTACHMENTS:** • 3D Energy - Energy Audit • FPMBC - Recommissioning Report
DATE:	May 16, 2022	
RELEVANT BYLAWS / POLICY / LEGISLATION:		

RECOMMENDATION

That Council award the tender for purchase and installation of 2x Propane Boilers and 1x Rooftop Heat Pump and other required infrastructure for the Administration Building to Borealis Fuels and Logistics for $279,487.50 (plus GST) as per their submitted bid.

ISSUE / PURPOSE

To award the tender for purchase and installation of 2x Propane Boilers and 1x Rooftop Heat Pump and other required infrastructure for the Administration Building to replace the existing aged infrastructure that has reached the end of its useful life. Switching from oil-fired to propane-fired heating appliances will also lead to a significant reduction in Greenhouse Gas Emissions due to the higher operational efficiencies of using propane and the ability for the heat pump to accommodate the heat load of the building down to approx. -15°C

BACKGOUND SUMMARY

As per the City of Dawson Equipment Replacement Plan, the 2x 1999 Burnham Corp. Boilers and the 1x 1999 Lennox Rooftop Air-Conditioning Unit that provided heating and cooling to the Administration building are due for replacement. Yukon Government funding through the Community Institutional Energy Efficiency Program has been secured to pay for the purchase and installation in its entirety.

ANALYSIS / DISCUSSION

An initial ASHRAE Level 2 Energy audit was performed on the Admin building in March of 2020 by 3D Energy Ltd. A follow-up Recommissioning and Engineering Assessment Report was completed by Futureproof My Building Consulting Ltd. in April of 2021. Significant research and planning with multiple consultants and funders from the Energy Branch concluded that this combination of options would lead to the highest operational efficiencies and greatest reduction in GHG emissions.

APPROVAL		
NAME:	C Bellmore	**SIGNATURE:** C Bellmore
DATE:	May 6, 2021	

3D ENERGY LIMITED
A VITAL GROUP COMPANY

Detailed Energy Assessment

Dawson City Administration Building

Adam Trovato
ATrovato@3denergy.ca
780-416-8336 EXT 313
www.3DEnergy.ca
2121 Premier Way, Suite 160,

Executive Summary

The energy analysis determined that Dawson City Administration (City Hall/Fire Hall) has weather normalized annual energy consumption of 1,114.67 GJ/year, an Energy Utilization Index (EUI) of **0.93 GJ/m²**, and associated greenhouse gas emissions of **64.4** tonnes of carbon dioxide equivalent (**tCO_2e**) per year. The Energy Star Portfolio Manager benchmark for office facilities is **0.99 GJ/m²**. This suggests a low potential for improvement.

The following Energy Conservation Measures (ECMs) were identified and analyzed. They are listed below in descending order of priority:

- ECM-13: Biomass Boiler
- ECM-1: Door Seals & Sweeps
- ECM-3: LED Lighting Upgrade
- ECM-4: Outdoor Reset Control
- ECM-8: Heating Fluid Additives
- ECM-9: Demand Control Ventilation
- ECM-2: Sensor Suite Thermostats
- ECM-7: Plumbing Fixture Upgrade
- ECM-14: Energy Valve
- ECM-6: Self Sensing Pumps
- ECM-5: AHU-1 Belt Upgrade
- ECM-17: Roof Insulation
- ECM-15: Oil Boiler Upgrade (To Minimum Code if ECM-13 is not installed)
- ECM-12: Recommissioning
- REM-1: Solar PV (With Rebate Only)
- ECM-11: Window Upgrade (To Minimum Code and End of Equipment Life)
- ECM-16: Wall Insulation (Not Recommended based on financial Performance)
- ECM-10: BMC System (Not Recommended based on financial Performance)

If implemented, the recommended ECMs would result in a reduction of 19,200 L of heating oil, 47,760 kWh of electricity, 2.7 kW of electrical demand, and 30 m^3 of water, however, results in an increased wood consumption of 21,330 kg. This is expected to provide **$24,820** in annual savings and **47.6 tCO_2e** of annual greenhouse gas emissions reductions. The approximate total implementation cost is **$360,660** with a net present value of **$30,010.** Funding is available for most ECMs which would reduce the capital cost of the project to **$242,070**, resulting in an improved net present value of **$148,590** and a simple payback of **10** years.

Proposed ECMs offer improved net present values when compared to the minimum code case retrofit and present good investment opportunities with positive environmental benefits. Further actions can be taken to progress each ECM into the implementation stage, which includes:

1. Deciding which ECM's are most desirable for the current building. These decisions can be affected by current equipment condition or capital/operating budget;
2. Applying for funding from for applicable ECMs;
3. Conducting engineering studies on more complex ECMs to ensure physical compatibility, equipment sizing, and specifications; and,
4. Engaging contractors to perform the required work.

Vital Group of Companies can assist in any of the following steps and has extensive knowledge and experience in funding sources and applications, mechanical and electrical engineering, and electrical contracting and installation.

A summary of energy savings, GHG reduction, and financial data for the ECMs are displayed in Table A and Table B.

Energy Conservation Measure Summary

Table A: Energy Savings and GHG Reduction Summary

ECM	Description	Annual Elec. Savings (kWh)*	Annual Heating Oil. Savings (L)*	Annual Wood Savings (Kg)*	Annual Demand Savings (kW)*	Annual Water Savings (m^3)*	Annual GHG Reductions (tCO_2e)	Lifetime (yrs.)	Lifetime GHG Reduction (tCO_2e)
ECM-1	Door Seals & Sweeps	23	3,999	0	0	0	10.9	10	109.4
ECM-2	Sensor Suite Tstat	0	1,833	0	0	0	5.0	15	75.2
ECM-3	LED Lighting Upgrade	10,833	-954	0	3	0	-2.0	39	-78.6
ECM-4	Outdoor Reset Control	13	1,386	0	0	0	3.8	15	56.9
ECM-5	AHU-1 Belt Upgrade	457	-41	0	0	0	-0.1	10	-0.8
ECM-6	Self Sensing Pumps	2,963	-28	0	0	0	0.1	10	0.9
ECM-7	Plumbing Fixture Upgrade	1,004	0	0	0	30	0.1	20	1.1
ECM-8	Fluid Additives	0	2,024	0	0	0	5.5	8	44.3
ECM-9	Demand Control Ventilation	122	1,202	0	0	0	3.3	15	49.4
ECM-10	BMC System	3,250	2,744	0	0	0	7.7	15	115.4
ECM-11	Window Upgrade	639	1,425	0	0	0	3.9	30	118.0
ECM-12	Recommissioning	1,710	2,024	0	0	0	5.6	5	28.2
ECM-13	Biomass Boiler	0	16,185	-34,200	0	0	32.0	25	800.3
ECM-14	Energy Valve	2,675	0	0	0	0	0.2	15	2.3
ECM-15	Oil Boiler Upgrade	0	3,656	0	0	0	10.0	25	289.5
ECM-16	Wall Insulation	32	665	0	0	0	1.8	30	54.6
ECM-17	Roof insulation	899	365	0	0	0	1.1	30	31.5
REM-1	Solar PV	27,855	0	0	0	0	1.6	25	39.7
	Proposed Case†	47,759	19,197	-21,330	3	30	47.6	25	1,186.9

* All savings values in the summary tables are eligible savings (factor of 0.9 applied).

† Proposed case values do not equal the sum of proposed ECMs because the simulation accounts for interactions between ECMs. Greyed out ECMs are not included into the proposed model. Proposed case values do not include Incentives.

Table B: Financial Analysis Summary

ECM	Description	Total Cost ($)	Annual Cost Savings ($)	Simple Payback (yrs.)	ECM NPV ($)	Baseline NPV ($)	Potential Rebate ($)
ECM-1	Door Seals & Sweeps	2,250	4,184	0.5	33,150	-	1,688
ECM-2	Sensor Suite Tstat	9,500	1,436	6.6	7,790	-	5,000
ECM-3	LED Lighting Upgrade	38,730	1,361	28.5	-13,070	-41,140	0
ECM-4	Outdoor Reset Control	3,500	1,451	2.4	13,360	-	2,625
ECM-5	AHU-1 Belt Upgrade	180	43	4.2	160	-	0
ECM-6	Self Sensing Pumps	9,600	524	18.3	-5,350	-6,000	5,000
ECM-7	Plumbing Fixture Upgrade	990	188	5.3	1,570	-	743
ECM-8	Fluid Additives	2,870	2,116	1.4	11,960	-	2,153
ECM-9	Demand Control Ventilation	6,200	1,279	4.8	8,650	-	4,650
ECM-10	BMC System	64,480	3,476	18.6	-24,370	-	5,000
ECM-11	Window Upgrade	57,340	1,609	35.6	-28,290	-13,410	5,000
ECM-12	Recommissioning	6,590	2,435	2.7	4,590	-	4,943
ECM-13	Biomass Boiler	137,340	10,775	12.7	43,800	-	40,000
ECM-14	Energy Valve	4,500	500	9.0	1,070	-	3,375
ECM-15	Oil Boiler Upgrade	19,600	4,426	12.8	37,530	37,530	5,000
ECM-16	Wall Insulation	45,500	701	64.9	-32,800	-	5,000
ECM-17	Roof insulation	4,550	550	8.3	5,290	-	3,413
REM-1	Solar PV	114,260	5,204	22.0	-32,620	-	40,000
	Proposed Case	360,660	24,824	14.5	30,010	15,480	118,5885

01 | Background

1.1 Teams and Qualifications

Client Details		
Ryan Hennessey, Senior Energy Advisor Energy Mines and Resources Government of Yukon 206 Lowe Street Whitehorse, Yukon, Y1A 1W5 867-393-7075 Ryan.Hennessey@gov.yk.ca		
Site Auditors		
Mike Krokis	P. Eng., CEM	
Byron Walker	T.T., EMIT, CRE, PLC	
Analysis and Report		
Komal Kher	B.E.Mech., EMIT	
Review		
Mike Krokis	P. Eng., CEM	
Revision	**Date**	**Description**
0	March 13, 2020	Issued for Client Use - Draft
1	April 17, 2020	Issued for Client Use - Final

1.2 Scope of the Study

3D Energy Ltd has performed a detailed energy assessment meeting the ASHRAE Level 2 standards. The primary goal is to identify energy conservation measures that will facilitate planning for improved performance that will result in reductions in operating expenses and greenhouse gas emissions.

The energy audit followed the guidelines of an ASHRAE Level 2 energy audit, with the following requirements:

1. A quantitative description of the operation and energy use of the facility in its current state (baseline),
2. A comprehensive list of energy efficiency measures,
3. Estimated energy savings and greenhouse gas emission reductions for each measure and the total for all recommended measures,
4. An assessment of the cost-effectiveness of each measure,
5. A report of assumptions, references, and details of measurement and quantification procedures used for all recommended measures.

1.3 Methodology

The level of effort for a Level 2 energy audit is described in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers' (ASHRAE) publication Procedures for Commercial Building Energy Audits, Second Edition. It addresses energy modelling without on-site measurement of equipment energy. Information on equipment operating schedules is obtained from facility operators and from observations made during the site visit. Equipment nameplate data Is recorded or estimated for missing nameplates or inaccessible equipment.

In a calibrated energy simulation approach, savings are estimated through whole-facility energy simulation. The simulation software used is RETScreen Expert, which includes the interactions between ECMs in the calculations. The energy model is then calibrated with daily weather data from the same period as the energy consumption. Heating Oil consumption is normalized using heating degree days, but electricity is not usually normalized unless large cooling loads or electric space heating is involved.

Equipment life is factored into the total energy savings, GHG reductions, and cost savings. HVAC equipment life is obtained from the ASHRAE Equipment Life Expectancy Chart. A weighted average that considers the type (e.g. LED), daily runtime, and the annual usage schedule is used in estimating the life expectancy of a lamp. Life expectancies of all other equipment are obtained from manufacturers' data. The overall life expectancy of the proposed case is obtained from a weighted average of the ECMs.

The Net Present Value (NPV) of each ECM is calculated from the total installed cost and energy savings. The inflation rate, maintenance, and disposal costs are not included. A discount rate of 5% and a fuel escalation rate of 1% are applied. Equipment lifetimes determine the number of cash flow periods.

The replacement cost of baseline equipment with residual life expectancy is defined in the associated year. The replacement year of the existing equipment is at the energy auditor's discretion and may include input by facility operators and equipment manufacturers.

Utility rate codes are referenced to calculate the savings rate of reduced electrical consumption and electrical demand. When possible, a regression analysis is performed to calculate the savings rate of reduced Heating Oil and/or water consumption. Regression analysis improves the accuracy of the savings rate by accounting for variable and fixed charges. More details on regression analysis may be found in the appendices.

1.4 Incentives

The Yukon Good Energy Rebate program is available for municipally owned facilities to install high efficiency products. Rebates are available for certain energy conservation measures like LED lighting upgrade, window upgrade, smart thermostats, HVAC equipment upgrade, VFDs, Solar PV, and others. This rebate could cover up to 75% of project cost of eligible measures. Please see https://yukon.ca/en/commercial-institutional-energy-rebates#standard-energy-upgrades for more details.

1.5 Limitations

This report was prepared by 3D Energy Ltd for the above-listed client. It is based on available data, visual observation, and interviews with the client and site representatives. 3D Energy does not accept responsibility for any incorrect or inaccurate information presented by the three sources. All assumptions on conditions, performance, and costs are made solely to estimate the viability of the ECMs. Confirmation shall be made by the implementing party based on actual designs, conditions, and costs. The client shall indemnify and hold 3D Energy harmless from all claims by third parties arising from or relating to the use of this report in any manner whatsoever.

02 | Facility Characteristics

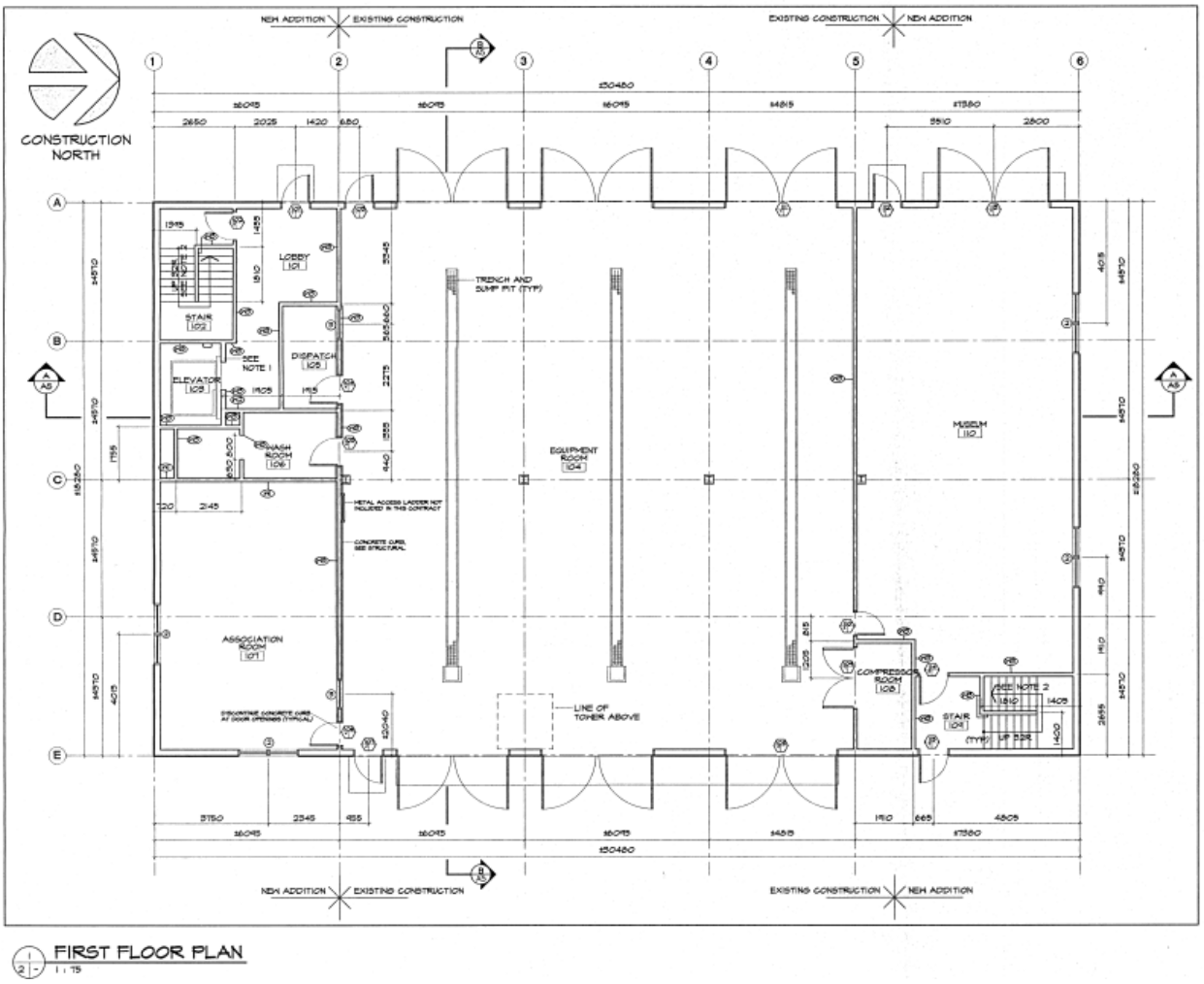


Figure 1: First Floor Plan of Admin Building

Located in Dawson City, Yukon, the administration building (called city hall/fire hall) has two stories and was originally constructed in 1898 with an approximate floor area of 657 m^2. As per provided information and architectural plans, an interior renovation was done to the existing building in 1999 as well as a total of 541 m^2 was added to the north and south of the existing building including mezzanine level on south side. This facility has a total gross floor area of approximately 1,198 m^2.

The admin building houses a museum, equipment room, association (staff) room, washrooms and ancillary spaces on main floor; offices, council chamber, meeting room, washrooms and ancillary spaces on second floor and mechanical room on mezzanine level.

The site was assessed by Mike Krokis and Byron Walker from 3D Energy on January 20, 2020. Photographs were taken of the exterior, interior, heating equipment, lighting equipment, windows, doors, and fans, among others. The facility staff was also interviewed on issues and concerns relating to the facility's energy performance.

2.1 Space Types and Occupancy Schedule

The main facility space types and occupancy schedules are described in **Table 1** below.

Table 1: Space Types and Occupancy

Space Type	Weekday Hours	Average People	Weekend Hours	Average People	Events (Annually)	Average People
City Hall	8AM-6PM	10-12 Staff + Visitors	Closed	-	Council Meetings	Unknown
Fire Hall	Year-round operation				Training one night/week	~30 fire fighters

2.2 Mechanical Equipment Inventory

The heating, cooling, ventilation and plumbing equipment in the facility consists of:

- Boilers (B) (Figure 2) , circulation pumps (P) and hydronic heating loops which supply hot water to the following facility elements:
  - Perimeter baseboard radiant fin tube heating coils;
  - Unit Heaters (UH) heating coil;
  - Heating coils within Air Handling Unit (AHU); and,
  - Fancoil Unit (FCU) heating coil.
- Air Handling Unit (AHU) which mixes return and fresh air, then filters, conditions and supplies air to building spaces except for fire hall and fire hall museum.
- Fan Coil Unit (FCU) which is 100% outdoor air unit which then filters, conditions and supplies air to fire hall.
- Split system direct expansion Air Conditioning (A/C) units that use a refrigerant vapour expansion /compression cycle to directly cool air in an occupied space. The evaporator and fan are located inside the facility while the refrigerant line is run to the condenser outside the facility. This allows the cooling coil to be installed in the main supply duct to provide central cooling to multiple zones.
- Electric storage type Domestic Hot Water (DHW) heater.

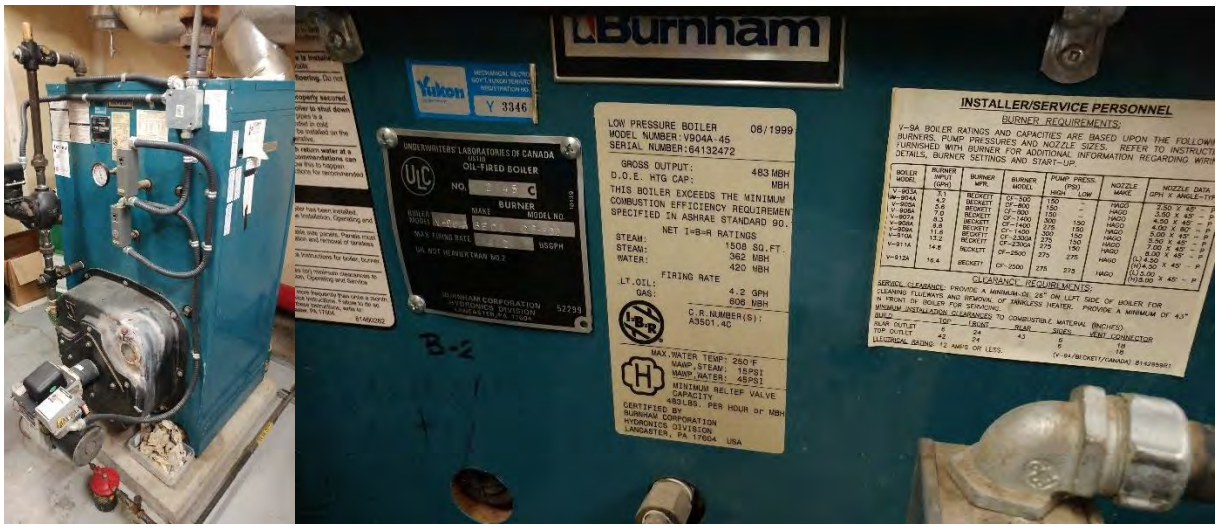


Figure 2: Boiler

2.2.1 Seasonal Efficiency

Seasonal Efficiency represents the actual efficiency of heating and cooling equipment over an entire year. The efficiency of heating and cooling equipment degrades over time and can be calculated from the age of the equipment and a maintenance factor, M. The current Seasonal Efficiency is calculated using the following equation.[1]

$$EF_{current} = EF_{origianl} \times (1 - M)^{Age}$$

Table 2 contains an inventory of the equipment observed during the site visit.

Table 2: HVAC Equipment Inventory

Tag	Equipment Description	Zone	Capacity		Original Seasonal Efficiency		Current Seasonal Efficiency		Age	Condition
			Heating (kW	Cooling (kW	AFUE (%)	COP	AFUE (%)	COP	(yrs.)	
B-1, B-2	Boiler	Whole Facility Heating System	169.14	N/A	83	N/A	68	N/A	20.5	Good
AHU-1	Air Handling Unit	Whole Facility Ventilation System Except Fire Hall/Museum	See Note	47.33	N/A	2.90	N/A	2.37	20	Good
FCU-1.1	Fan Coil Unit	Fire Hall Ventilation	See Note	N/A	N/A	-	N/A	N/A	20.5	Good
DHW	Domestic Hot Water Heater	Whole Facility	3.0	N/A	97.6	N/A	97	N/A	20.5	Good

Note: AHU-1 and FCU-1.1 have hot water heating coils. Heating water is supplied by Boiler system.

2.3 HVAC Controls, Distribution and Setpoints

2.3.1 HVAC Controls

The facility HVAC controls consist of:

- Non-programmable electromechanical thermostats.
- A boiler control system including:
  - Two-Pipe Direct Return – one main is used for supply while one main is used for the return. Allows radiators and terminal units to be separately controlled and serviced because the supply water temp is the same.
  - Two-way control valves.

2.3.2 Distribution

The facility heating and cooling distribution methods are:

- High temperature hydronic (hot water) heating (serving perimeter baseboard heaters, unit heaters and heating coils in AHU and FCU).
- Conditioned forced air supplied to the spaces via ceiling mounted grilles/diffusers.
- Forced air heating through unit heaters.
- Convective heat through baseboard radiation.

The facility zones have the following thermostat types, heating/cooling distribution methods, and temperature setpoints as seen in Table 3.

Table 3: HVAC Space Types and Setpoints

Zone	Thermostat Type	Distribution Method	Mode	Occupied Setpoint (°C)	Unoccupied Setback (°C)	Site Temp (°C)	Occupied Hours (hrs./Wk.)	Un-Occupied Hours (hrs./Wk.)
Main Floor - Museum	Non-Programmable	Forced Air (Unit Heaters)	Heat	17.5	17.5	14	36	132
Main Floor - Fire Hall	Non-Programmable	Forced Air (Unit Heaters)	Heat	17.5	17.5	14	168	0
Main Floor - General	Non-Programmable	Ceiling Mount Diffusers/ Grilles	Heat	22	22	21	50	118
			Cool	22	22	-		
Second Floor - Council Chamber	Non-Programmable	Ceiling Mount Diffusers/ Grilles	Heat	19	19	21	50	118
			Cool	19	19	-		
Second Floor - General	Non-Programmable	Ceiling Mount Diffusers/ Grilles	Heat	22	22	21	50	118
			Cool	22	22	-		

There are approximately 20 non-programmable thermostats which serve the main floor and second floor general space (offices, washroom, storage room, server room, stairwell, lobby/corridor, etc.) with different temperature set points. Therefore, an average of 22°C was used as heating and cooling occupied and unoccupied set points for those zones.

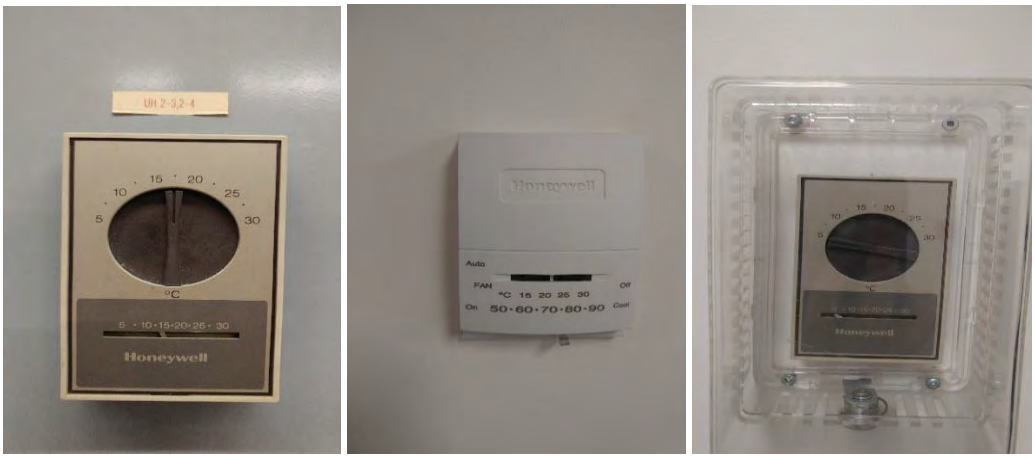


Figure 3: Non-Programmable Thermostats

2.4 Ventilation

The facility ventilation system consists of the following elements:

- AHU fresh air intake damper which is set at minimum 25% position to supply outdoor air continuously depending on the thermostat setting.
- FCU fresh air intake dampers which is set at 100% position to supply outdoor air in fire hall depending on CO level. FCU-1.1 and EF-4.1, EF-4.2 operate together depending on CO level in Fire hall.
- Supply and return fans with a constant operation.
- Low temperature shut/off.

Table 4 summarizes the estimated total ventilation rates and minimum outdoor airflow rates according to ASHRAE 62.1 with reference to the space types and occupancy schedule from Table 1.

Table 4: Ventilation Air Flow Rates

Zone	Estimated Total Ventilation Rate (L/S)	Estimated O/A Ventilation Rate (L/S)	Min O/A Ventilation Rate (ASHRAE 62.1) (L/S)	Estimated Exhaust Rate (L/S)
Main Floor - Museum	0	0	170	0
Main Floor - Fire Hall	531	531	0	1,186
Main Floor - General	3,230	807	60	33
Second Floor - Council Chamber			55	0
Second Floor - General			157	132
Total	3,761	1,338	442	1,351

2.5 Pumps, Fans, and Motors

The facility has a combination of the following pumps, fans, and motors:

- Supply Fan (SF) and Return Fan (RF) on Air Handling Units (AHU);
- Supply Fan (SF) for Fan Coil Unit (FCU);
- Force flow fans (FFF) for unit heaters (UH) and cabinet heaters (CUH);
- Exhaust fans (EF) in washrooms and janitors room;
- Exhaust fans (EF) in fire hall;
- Circulation pumps (P) for the hydronic heating system;
- Condenser Unit Fan (CUF);
- Elevator Motor (M); and,
- Ceiling mounted destratification fans (CF) which are controlled by individual wall mount dial type controller. Controller for CF-3 is broken.

An inventory of pumps, fans and motors can be found in Table 5, along with recorded or estimated efficiencies and schedules.

Table 5: Pumps, Fans and Motors

Tag	Equipment Description	Count	Power Rating (W)	Motor Efficiency Level	Load Factor (%)	Flow Type	Estimated Annual Operating Hours (hrs.)
AHU-1 SF	AHU-1 Supply Fan	1	3,730	Standard	75	Constant	2,607
AHU-1 RF	AHU-1 Return Fan	1	2,238	Standard	75	Constant	2,607
FCU-1.1 SF	FCU-1.1 Supply Fan	1	1,119	Standard	75	Constant	52
EF-3.1 to EF-3.5	Exhaust Fan	5	187	Standard	100	Constant	1,008
EF-4.1, EF-4.2	Exhaust Fan (Fire Hall)	2	821	Standard	75	Constant	52
P-2.1	Boiler HW Circulation Pump	1	1,350	Standard	75	Constant	2,920
P-2.2	Boiler HW Circulation Pump	1	1,200	Standard	75	Constant	2,920
UH-2.1 to UH-2.6	Unit Heater Blower	6	249	Standard	100	Constant	2,920
UH-2.7, UH-2.8	Unit Heater Blower	2	124	Standard	100	Constant	2,920
CUH-1.1, CUH-2.1	Cabinet Unit Heater Blower	2	37	Standard	100	Constant	2,920
CUF-1	Condenser Unit Blower	1	996	Standard	75	Constant	50
CF-1 to CF-4	Ceiling Fans	4	150		100	Constant	4,380
M-1	Elevator Motor	1	11,190	Standard	75	Constant	252

Figure 4: Pump & AHU Fan

2.6 Electrical

2.6.1 Interior Lighting

The interior lighting consists of the lighting types shown in Table 6. All interior lighting is controlled by manual switches.

Table 6: Interior lighting Schedule

Fixture Type	Watts per Fixture (W)	Number of Fixtures	Total Wattage (W)
1x4' T12-surface 1-lamp 34W	43	2	86
1x4' T8-surface 2-lamp	59	147	8,673
1x4' T8-surface 1-lamp	32	8	256
A19 (60W eq) LED Bulb	9.8	8	78
Total		165	9,093

Table 7: Zonal Lighting Power Densities

Space Type / Zone	Floor Area (m^2)	Lighting Power Density (W/m^2)	ASHRAE Benchmark (W/m^2)	Estimated Annual Operating Hours (hrs./yr.)
Main Floor Museum	94	6.67	11.84	1,872
Main Floor Fire Hall	311	7.69	10.76	4,380
Main Floor - General	152	6.50	11.84	2,520
Second Floor - Council Chamber	89	8.74	13.99	521
Second Floor - General	468	8.44	11.84	2,520
Mezzanine	84	4.24	16.15	252
Total	1,198	7.59	12.02	-

The average lighting power density in the facility is 7.59 W/m^2, as seen in Table 7. A typical average LPD for similar facilities from ASHRAE 90.1 2016 is 12.02 W/m^2.

2.6.2 Exterior Lighting

The exterior lighting consists of the lighting types shown in Table 8. These fixtures are controlled by photocells.

Table 8: Exterior Lighting Schedule

Fixture Type	Watts per Fixture (W)	Number of Fixtures	Total Wattage (W)
HPS 50W	70	3	210
Exterior Wall Fixture (70W)	70	6	420
Total		9	630

2.6.3 Plug Loads

Equipment Plug loads are estimated from ASHRAE Fundamentals as shown in Table 9.

Table 9: Plug Load Power Ratings

Zone	Area (m^2)	ASHRAE Power Density Factor (W/m^2)	Plug Load (W)	Duty Cycle (%)	Estimated Annual Operating Hours (hrs./yr.)
Main Floor Museum	94	2.50	235	100	560
Main Floor Fire Hall	311	2.50	777	100	1,314
Main Floor - General	152	7.50	1142	100	756
Second Floor - Council Chamber	89	1.00	89	100	730
Second Floor - General	468	7.50	3,514	100	1,260
Mezzanine	84	1.0	84	100	252
Total	1,198	4.88	5,841	-	-

2.7 Facility Envelope

2.7.1 Opaque Walls

Engineering drawings show wall assemblies as listed in Table 10**.** Thermal properties of the constituent layers are obtained from standard engineering references (e.g. ASHRAE Fundamentals). RETScreen Expert software was used to calculate the effective R-values of the assemblies. A net wall area (excluding fenestrations and doors) of 615 m² was calculated for the building.

Table 10: Facility Envelope Summary

Above Grade Wall Construction	Thickness (mm)	R-Value (m²-°C/W)
Exterior Film Coefficient	-	0.03
Metal siding	13	0.00
Plywood	16	0.15
Wood Framing 38x184	-	-0.34
Fibreglass insulation	184	4.60
Polyethylene - low density	0.15	0.00
Drywall	13	0.08
Interior Film Coefficient	-	0.12
Effective R-value	-	4.64

For comparison, the National Energy Code for Buildings 2017 (NECB 2017) prescribes R-5.46 m²-°C/W for non-ground contacted walls for Climate Zone 8, within which this facility is located. The walls appear to be in fair physical condition.

2.7.2 Roof

The facility has sloped type roof with unvented attic. The insulation is fibreglass batt. A total roof area of 557 m² was calculated for the building, with estimated roof layers and overall thermal resistance displayed in Table 11.

Table 11: Roof Construction

Roof Construction	Thickness (mm)	R-Value (m²-°C/W)
Exterior Film Coefficient	-	0.03
Metal Siding	13	0.00
Batt Insulation	300	7.50
Wood Framing (10%)	-	-0.35
Vapour Barrier	0.15	0.00
Drywall	13	0.08
Interior Film Coefficient	-	0.12
Effective R-value	-	7.38

For comparison, the NECB 2017 prescribes R-8.26 m²-°C/W roofs for Climate Zone 8.

2.7.3 Fenestration & Door

The facility has a total fenestration ratio of 19.4% and consists of the following types of windows and doors, as described in Table 12.

Overall the windows, frames and seals appear to be in good condition. The exterior doors, frames and hardware appear to be in fair condition, however, seals and sweeps appear to be in poor condition.

Table 12: Window and Door Specifications

Window Type	Qty.	Total Area (m^2)	U-Value ($(W/m^2)/°C$)
Operable, Vinyl frame, Double pane, 1/2" air space	24	47.78	2.85
Door Type	**Qty.**	**Total Area (m^2)**	**U-Value ($(W/m^2)/°C$)**
Wood slab, No Glazing	4	7.56	2.61
Wood slab, Single pane, 45% Glazing	7	90.72	3.92
Wood slab, Single pane, 25% Glazing	1	1.89	3.29

For comparison, the NECB 2017 prescribes U-values of 1.4 $W/m^2 \cdot °C$ for windows and doors in Climate Zone 8.

2.7.4 Floor

The floor consists of six inches of uninsulated poured concrete with an effective thermal resistance of R-1.39 m^2-°C/W. For comparison, the NECB 2017 prescribes R-15 (RSI-2.64) insulation under the entire floor area Climate Zone 8.

2.7.5 Overall Facility Envelope Condition

Overall, the facility envelope appeared to be in fair condition except for the exterior door's seals are sweeps are in poor condition.

2.8 Water Fixture Inventory

Table 13 displays the water fixtures observed in the facility during the site visit and their water use rate in Liters per Flush (LPF) and Liters per Minute (LPM).

Table 13: Water Fixture Inventory

Location	Fixture Description	Qty.	Water Use Rate	Annual Water Use (m^3/yr.)	Annual Hot Water Use (m^3/yr.)
Main Floor	Toilet	1	6.0 LPF	18.1	-
	Washroom faucet	1	7.6 LPM	11.5	6.5
	Kitchen faucet	1	8.3 LPM	1.6	0.9
	Showerhead	1	9.5 LPM	14.4	9.5
	Laundry Sink faucet	1	9.5 LPM	1.8	1.0
	Clothes washer	1	71 L/Cycle	14.5	2.9
Second Floor	Mop Sink	1	9.5 LPM	1.8	1.0
	Washroom faucet	2	5.7 LPM	17.2	9.8
	Toilet	1	3.0 LPF	9.1	-
	Toilet	1	6.0 LPF	18.1	-
	Kitchen faucet	1	8.3 LPM	1.6	0.9
Total		12	-	109.6	32.6

03 | Energy Cost Analysis

3.1 Utility Bill Analysis

Energy consumption for the facility was gathered from the utility bills provided and savings rates were calculated. Savings rates are the marginal costs of each utility and account for the charges that vary based on consumption, ignoring fixed charges. Thus, they are suitable for calculating the cost savings associated with reduced consumption of that utility and are used in the financial analysis of proposed ECMs. See Appendix A for the billing data provided.

Energy-saving rates corresponding to each utility type are summarized in Table 14.

3.1.1 Electricity Consumption Cost

The electricity bills from the retailer and the utility rate schedules were referenced to calculate the savings rates for electricity consumption. The electrical energy savings rate consists of the variable ($/kWh) rate provided from the rate schedules and/or utility bills.

3.1.2 Electricity Demand Cost

The utility rate codes from the distributor are referenced to calculate the savings rates for electrical demand. The demand rate is subject to a “Demand Ratchet”, under which the billed demand is the greater of either the peak demand during the billing month or 100% of the peak demand during the 12 months ending with the current billing month, excluding the months April through September. Details of electrical rate codes are displayed in Appendix B**.**

3.1.3 Heating Oil (#2 Oil) Consumption Cost

The heating oil bills were referenced, and regression analysis of the oil charges was performed to calculate saving rate.

3.1.4 Water Consumption Cost

Water bills for the facility were not provided. Therefore, other building, community hall, located in Dawson City was referenced to estimate water rate for this building. A community hall building has following fixed rate per water fixtures:

- Annual Water Fee per Toilet/Urinal, Janitor Sink: $180.
- Annual Sewer Fee per Toilet/Urinal, Janitor Sink: $135.
- Annual Water Fee per Staff Kitchen or Sink: $157.33
- Annual Sewer Fee per Staff Kitchen or Sink: $118.48.
- Annual Waste Management Fee: $300 per Year.

The above listed rate were referenced to calculate water cost for the Admin Building.

Table 14: Utility Cost/Unit

Utility Type	Utility Provider	Savings Rate
Electricity Consumption	Retailer: Yukon Energy	$0.187/kWh
Electricity Demand	Distributor: Yukon Energy (2170)	$10.135/kW/day
Heating Oil	Distributor: CINFRA	$1.05/L
Water	Service Provider: City of Dawson	Fixed Rate Per Fixtures

3.2 Utility Cost Breakdown

Figure 5 and Table 15 show the relative costs of electrical consumption, electrical transmission and distribution, Heating Oil and water averaged over the entire billing period.

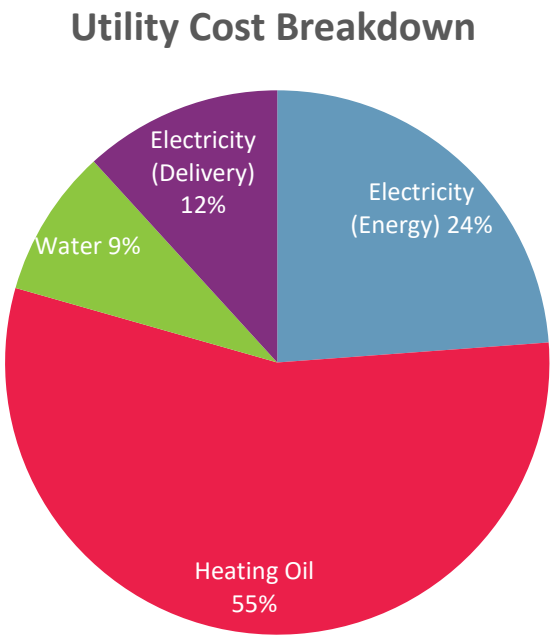


Figure 5: Utility Cost Breakdown

Table 15: Utility Cost Breakdown

Year	Electrical Energy Retail Cost ($)	Transmission and Distribution Charges ($)	Heating Oil Cost ($)	Water Cost ($)
2017 (Jan.-Dec,)	9,068	4,239	23,823	3,530
2018 (Jan.-Dec.)	9,580	4,737	19,486	3,530
2019 (Jan.-Nov.)	9,153	4,785	-	-
2019 (Jan.-Dec.)	-	-	23,501	3,530
Average	9,546	4,717	22,270	3,530
% of Total	24%	12%	55%	9%

04 | Energy Use Analysis

4.1 Electricity Consumption and Demand

The electrical consumption (lines in Figure 6), shows a slightly higher electrical consumption in the summer months due to an increase in run times on the air conditioning system.

The vertical bars in Figure 6 represent the billed demand. The chart indicates that the demand for the facility was consistent 2017, however, it was higher for months May to September in 2018 and May to June in 2019. Any permanent reduction in peak demand will see significant savings.

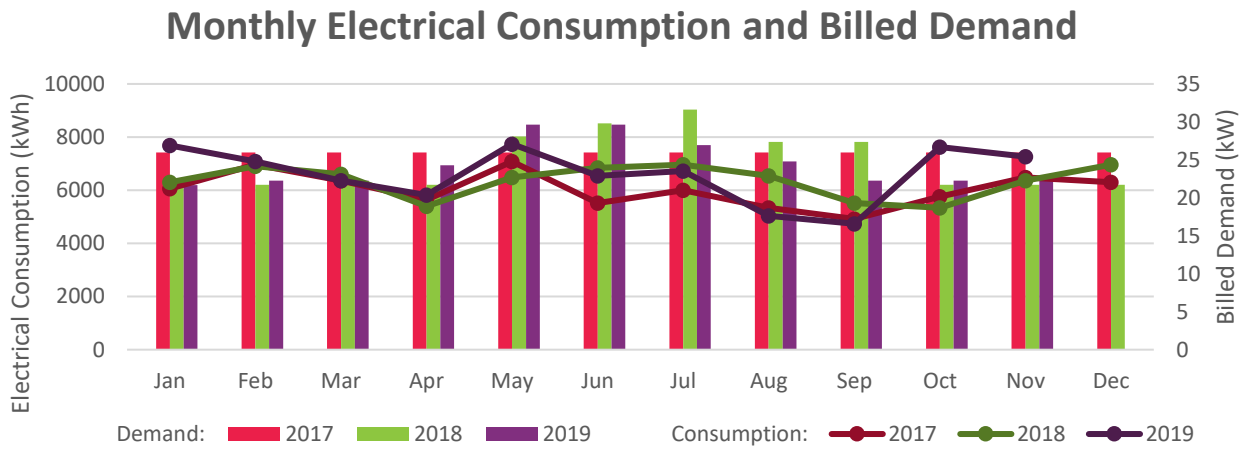


Figure 6: Monthly Electrical Consumption and Billed Demand

Table 16: Electrical Consumption and Demand Summary

Year	Electricity Consumption (kWh)	Peak Demand (kW)
2017 (Jan.-Dec.)	72,400	25.98
2018 (Jan.-Dec.)	76,200	31.62
2019 (Jan.-Nov.)	72,600	29.64
Annual Average	75,950	-

4.2 Heating Oil Consumption

Heating oil is purchased in bulk and stored in a fuel tank located outside. Since heating oil is purchased in bulk and does not occur at regular intervals, but rather when the fuel tank is becoming low. It is difficult to determine the actual consumption of the building based on bulk fuel purchases, as these purchases may occur when the existing fuel tank still has some fuel remaining. Therefore, monthly fuel consumption was determined using bulk purchases and Heating Degree Days (HDD) between each fuel purchase. This results in a L/HDD, which can be applied to each month.

The heating oil consumption pattern is typical for facilities located in a cold climate. Most of the heating is used during the winter months due to the increased heating demands from colder outdoor temperatures. The lowest consumption levels are experienced during the summer months.

Figure 7 shows the heating oil consumption of the facility and the average heating degree days for each month.

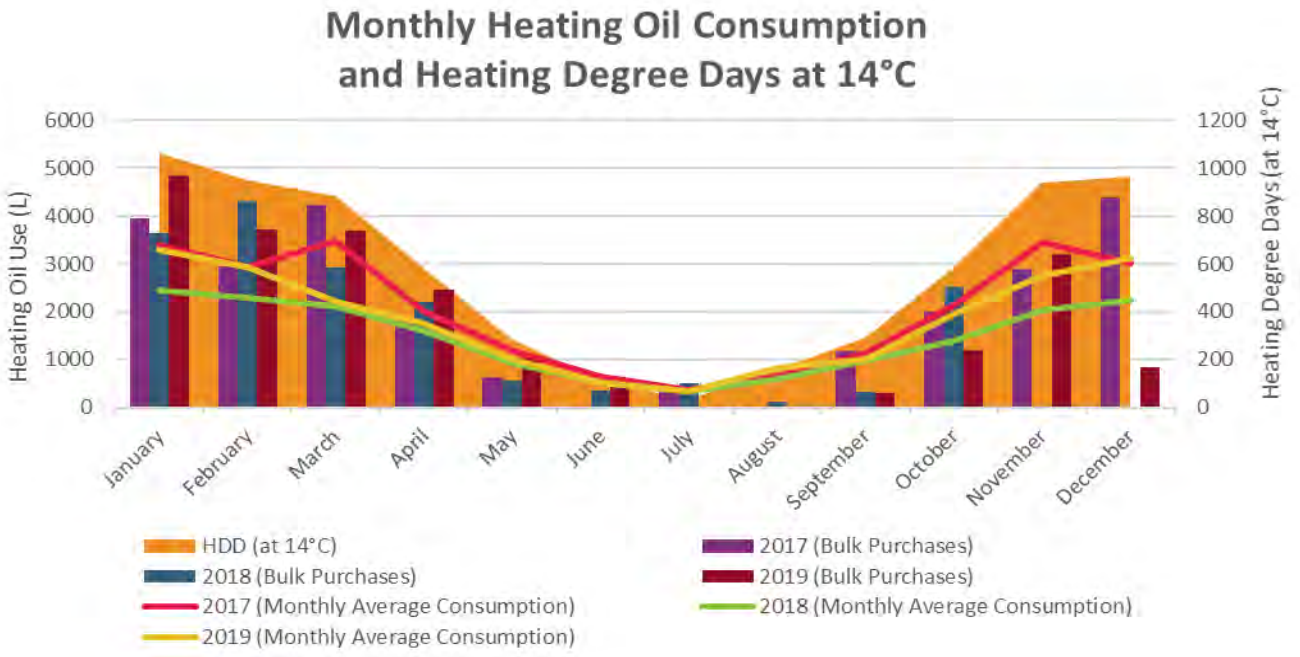


Figure 7: Monthly Heating Oil Consumption

Table 17: Heating Oil Summary

Year	Heating Oil Consumption (L)
2017 (Jan.-Dec.)	24,426
2018 (Jan.-Dec.)	17,484
2019 (Jan.-Dec.)	21,785
Annual Average	21,232

4.3 Water Consumption

Based on the water fixture specifications listed in Section 0 and the facility occupancy patterns described in Section 2.1, annual water consumption of 109.6 m^3/year was estimated for this facility. 32.6 m^3/year of this water is estimated to be used as hot water.

05 | Adjusted Baseline and Benchmark

5.1 Weather Normalization

Heating oil consumption is weather normalized to ensure that any atypical heating degree day values during the billing period do not distort the energy consumption. The number of Heating Degree Days (HDD) for the billing period is compared to a historical reference period (1999-2018) to determine an Adjustment Factor (See Table 18). An adjustment factor above 1.0 indicates that the billing period was hotter than the historical average while an adjustment factor below 1.0 indicates the billing period was cooler than the historical average. Electricity consumption is not usually weather normalized because it is not wholly driven by heating or cooling degree days.

Table 18: Determination of Weather Adjustment Factor

Location	Year	Actual HDD @ 15°C	Average HDD (Billing Period)	Average HDD @ 15°C (1999-2018)	Adjustment Factor
Dawson City, Yukon	Jan, 2017 - Dec, 2017	7,297	7,197	7,445	1.03
	Jan, 2018 - Dec, 2018	7,262			
	Jan, 2019 - Dec, 2019	7,032			

5.2 Adjusted Baseline Energy

A computer model of the facility was created in RETScreen Expert software to evaluate potential Energy Conservation Measures (ECMs). The model inputs were the facility envelope, space loads, HVAC systems, electrical loads, and other energy uses as described in Section 2. The energy model was calibrated to the adjusted baseline energy use, which is based on the weather normalized utility billing data, as described above.

A variance between the adjusted baseline energy and the calibrated model of less than 10% for each energy type is considered acceptable. The results are shown in Table 19.

Table 19: Energy Model Calibration

	Electricity		Heating Oil		Total	
	kWh	% Diff.	L	% Diff.	GJ	% Diff.
Adjusted Baseline Energy	75,950	-	21,965	-	1,114.67	-
Calibrated Energy Model	76,949	1.3%	22,479	2.3%	1,137.96	2.1%

5.3 Changeover Temperature

The facility changeover temperature is the outdoor temperature at which the building heating system is not required in order to reach the desired internal setpoint. It is dependant on the internal heat loads of the facility and the local weather conditions. This is calculated by performing regression analyses of the energy bills and the Heating Degree Days at various temperatures to find the best fit. The calculated changeover temperature for energy simulation is 15°C. The increasing trendline in Figure 8 shows that heating oil consumption tends to increase in months with more degree days (i.e. colder months).

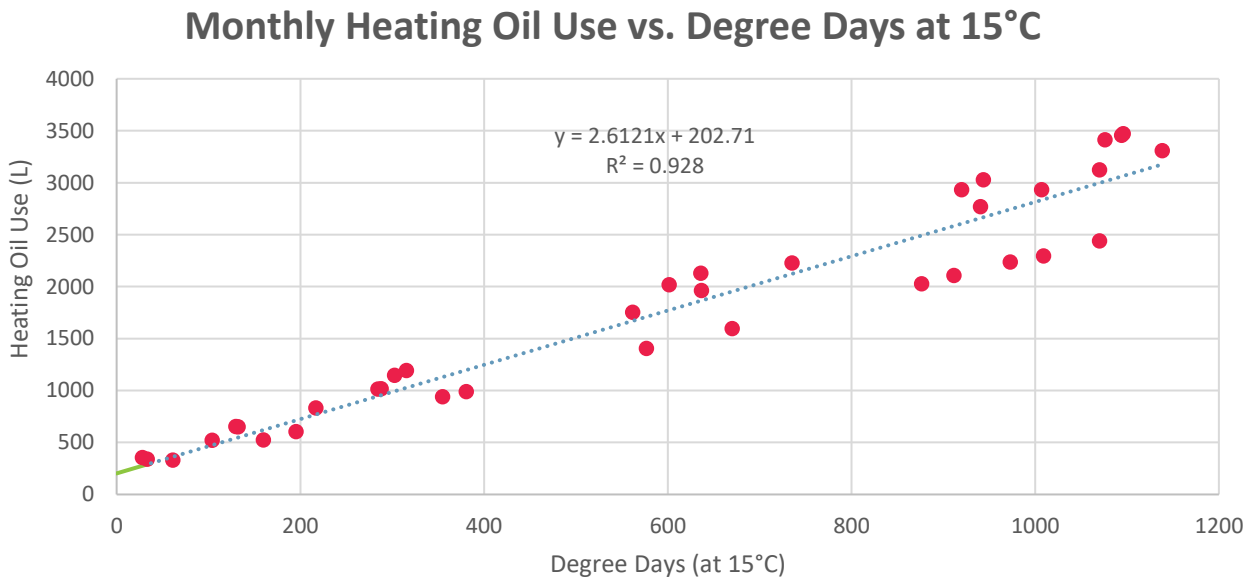


Figure 8: Monthly Heating Oil Use vs. Degree Days

5.4 Greenhouse Gas Emissions

The baseline GHG emissions are calculated from the adjusted baseline energy consumption. This facility has annual greenhouse gas emissions of 64.4 tonnes of CO_2 equivalent (tCO_2e). The following emissions factors are used to estimate GHG emissions:

- 0.000057 tonnes of CO_2 per kWh of Electricity
- 0.00273 tonnes of CO_2 per L of Heating Oil
- 0.00036 tonnes of CO_2 per Kg of Wood

GHG reductions for the proposed case are shown in the Executive Summary section as well as in the individual ECM sections.

5.5 Energy Consumption Benchmarking

The adjusted energy consumption is compared to similar facilities in Canada using the Energy Use Intensity (EUI) expressed in GJ/m². EUI values are published in the Energy Star Portfolio Manager *Canadian Energy Use Intensity by Property Type.* The publication gives the Site EUI and the Source EUI. Site EUI only accounts for consumption by the facility but Source EUI includes transmission and other losses. Only the Site EUI is applied to benchmarking in this case.

The normalized EUI of this facility is 0.93 GJ/m^2, while the median Energy Star Site EUI for Office Buildings in Canada is 0.99 GJ/m^2. This indicates that the facility consumes 6% less energy than an average Offices with similar characteristics. As shown in Figure 9, a substantial portion of the EUI is due to heating oil usage.

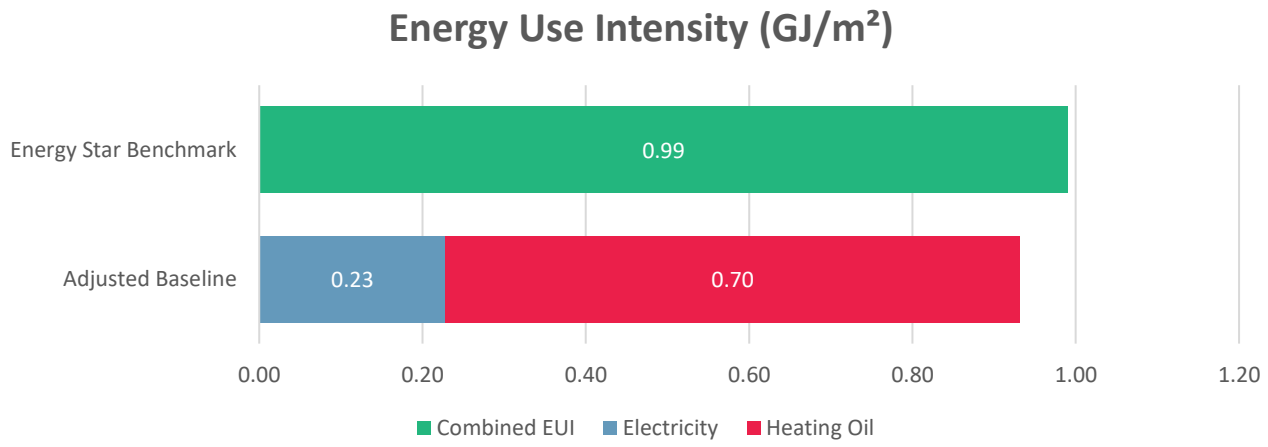


Figure 9: Energy Use Intensity

5.6 Energy End-Use

The calibrated simulation shows that the following end uses (Table 20) are responsible for the facility's total energy consumption (combined kWh and GJ) and shown by end-use percentages in Figure 10.

Table 20: Calibrated (Modelled) Baseline Energy End-Use Breakdown

Energy Use	Electricity (GJ)	Heating Oil (GJ)	Total Modelled (GJ)	Percentage %
Space Heating	-	730.63	730.63	64
Lighting	98.51	-	98.51	9
Ventilation	-	130.33	130.33	11
Electrical Equipment	33.66	-	33.66	3
Space Cooling	20.90	-	20.90	2
Mechanical Equipment	115.67	-	115.67	10
DHW	8.28	-	8.28	1
Total	277.02	860.96	1137.98	100%

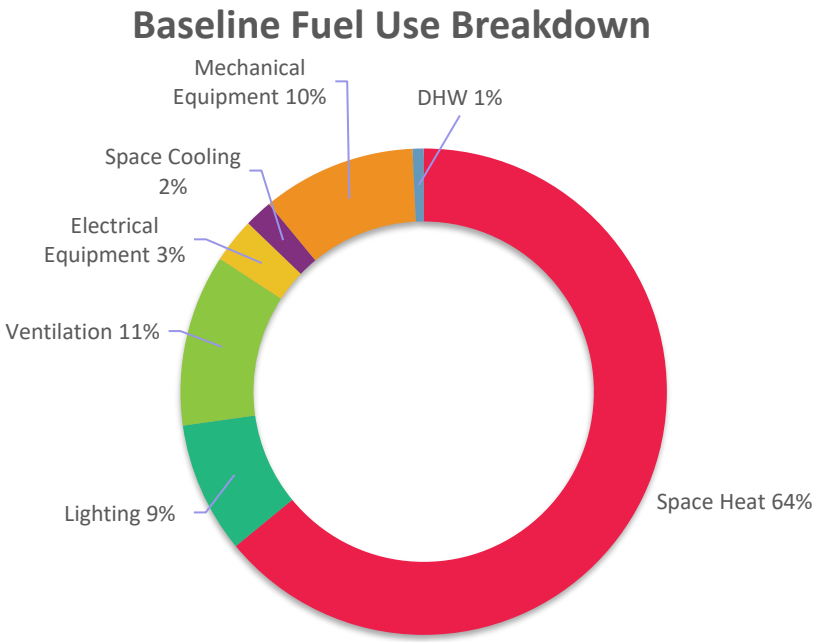


Figure 10: Categorized Facility Energy Uses (GJ)

06 | Energy Conservation Measures

6.1 ECM-1: Door Seals & Sweeps

6.1.1 Measure Boundary & Baseline

This ECM will look at installing new seals and sweeps for all exterior single entry (pedestrian) doors as well as sweeps for all exterior overhead doors. Doing so will reduce outdoor air infiltration, and lower heating demand of the conditioned space.

The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 21.

6.1.2 ECM Description

This ECM proposes installation of the following seals and sweeps:

- **Door Seals:** 25.5 m of perimeter seals for the pedestrian doors, with an installed cost of $30/m;
- **Door Sweeps:** 4.5 m of bottom sweeps for the pedestrian doors, with an installed cost of $50/m.
- **Overhead Door Sweeps:** 25.2 m of bottom sweeps for the overhead doors, with an installed cost of $50/m.

Over time the weather stripping will wear down and gaps will become visible around the perimeter of exterior doors. Poor door seals increase the infiltration/exfiltration rate of the building causing loss of heated and conditioned air, resulting in longer run times on HVAC equipment. Air leakage from a single door can typically be between 12 L/s and 2 L/s depending on the performance of the door seals. Door seals and sweeps can be expected to last from 10 years depending on use and should be periodically inspected and replaced as needed.

6.1.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The energy model simulated the replacement of door seals by adjusting the infiltration rate from leaky/medium to medium/tight.
- The installed cost was estimated from local supplier.

Replacing door seals and sweeps will interact with other HVAC equipment by reducing equipment run times and space heating loads. These interactions are accounted for within the simulation.

6.1.4 Energy, GHG and Financial Performance

Table 21: Door Seals & Sweeps ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,923 kWh	18,036 L	968 GJ
Annual Savings	26 kWh	4,443 L	170 GJ
Annual Eligible Savings	23 kWh	3,999 L	153 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	10.9 tCO_2e	10.9 tCO_2e
Annual Cost Savings	$ 4	$ 4,180	$ 4,184
Lifetime Eligible Savings	200 kWh	39,987 L	1,532 GJ

Description	Total
Equipment Lifetime	10 Years
ECM Total Cost	$ 2,250
Simple Payback	0.5 Years
ECM NPV	$ 33,150
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 41,840
Lifetime GHG Reductions	109.4 tCO_2e
GHG Abatement Rate	$ 21/tCO_2e
Expected Rebate Amount	$ 1,688
ECM total Cost w/ Rebate	$ 560
ECM Simple Payback w/ Rebate	0.1 Years
ECM NPV w/ Rebate	$ 34,830

6.1.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in an positive net present value of $33,150. The installed cost of this ECM is $2,250 and payback with a year. Funding is available from the Good Energy Program which would drop the capital cost to $560, resulting in an improved net present value of $34,830 and a payback within half year.

6.2 ECM-2: Sensor Suite Thermostats

6.2.1 Measure Boundary & Baseline

This ECM consists of replacing all thermostats with sensor suite thermostats and installing all networking equipment to properly operate the system. Proposed temperature schedule can be found in Table 22 while existing and proposed thermostats specification can be found in Table 23. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 24.

6.2.2 ECM Description

This ECM proposes the installation of the following equipment:

- Sensor suite thermostats in replacement of all existing thermostats (20 thermostats simulated for replacement), estimated to have an installed cost of $450 each; and,
- A router for broadcasting signals from the thermostats to a central control computer, estimated to have an installed cost of $500. Additionally, a subscription cost of $2/thermostats is present on an on-going basis

Building Management Control Systems (BMCS) are an overarching control systems which include heating, cooling, and ventilation equipment, lighting, pumps, fan, etc. These systems allow for optimized control and energy savings, however, are typically limited to large buildings (above 100,000 ft²) due to control complexity and economy of scale. Sensor suite is a building management control system designed to be economically incorporated into smaller buildings. Although Sensor Suite does not have the same functionality as a traditional BMCS's, it still incorporates temperatures, schedules, setbacks, and energy consumption into a common control computer, resulting in easy temperature control throughout building zones.

Figure 11: Suite Thermostat

Nightly setbacks can greatly reduce energy consumption, however, are often difficult to maintain as building occupants will change thermostats settings over time, which will degrade energy savings. Having all temperature setpoints and schedules controlled by one central computer allows maintenance personnel to optimize the system, without risking diminishing savings. Additionally, when multiple HVAC systems are present, having centralized control can allow for building operators to enable the operations of the most efficient systems during specific building conditions. Sensor Suite is limited in range to approximately 300-400 ft from the network router, however, range extenders are available if required.

Table 22: Temperature Setpoints and Schedules Specifications

Zone	Occupied			Unoccupied		
	Heating (°C)	Cooling (°C)	Hours (Hrs./Wk.)	Heating (°C)	Cooling (°C)	Hours (hrs./Wk.)
Main Floor - Museum	17.5	-	36	17.5	-	36
Main Floor - Fire Hall	17.5	-	168	17.5	-	0
Main Floor - General	22	23	55	16	28	113
Second Floor - Council Chamber	19	23	15	16	28	153
Second Floor - General	22	23	55	16	28	113

Table 23: Thermostat Model Input Data Summary

Description	Existing Equipment	Proposed Equipment
Type	Non-Programmable	Sensor Suite Thermostats
Thermostat Count	20	20
Life Expectancy[2]	15	15
Replacement Year	2020	2035
Annual Subscription Cost ($)		$480
Installed Cost ($)	-	$ 9,500

6.2.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- Temperature schedules were created based on occupancy schedules displayed in Table 1: Space Types and Occupancy, with an additional 1-2 hours of heating/cooling prior to building operating hours to ensure comfortable space temperatures upon occupant arrival.
- The occupancy schedules have been estimated based on conversations with onsite personnel.
- Installation costs are an estimate based on products available on the market and the probable cost of labour.

This ECM will interact with HVAC equipment by reducing equipment space heating and cooling loads. All interactions from the application of this ECM are accounted for within the simulation.

6.2.4 Energy, GHG and Financial Performance

Table 24: Sensor Suite Controls ECM Performance Summary

Description	Electricity	Heating Oil	Subscription	Total
Baseline Usage	76,949 kWh	22,479 L	-	1,138 GJ
ECM Proposed Usage	76,949 kWh	20,442 L	-	1,060 GJ
Annual Savings	0 kWh	2,037 L	-	78 GJ
Annual Eligible Savings	0 kWh	1,833 L	-	70 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	5.0 tCO_2e	-	5.0 tCO_2e
Annual Cost Savings	$ -	$ 1,916	-$ 480	$ 1,436
Lifetime Eligible Savings	0 kWh	27,500 L	-	1,053 GJ

Description	Total
Equipment Lifetime	15 Years
ECM Total Cost	$ 9,500
Simple Payback	6.6 Years
ECM NPV	$ 7,790
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 21,540
Lifetime GHG Reductions	75.2 tCO_2e
GHG Abatement Rate	$ 126/tCO_2e
Expected Rebate Amount	$ 5,000
ECM total Cost w/ Rebate	$ 4,500
ECM Simple Payback w/ Rebate	3.1 Years
ECM NPV w/ Rebate	$ 12,790

6.2.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $7,790 and saves up to 70 GJ annually. The ECM is estimated to cost $9,500 with an ongoing subscription cost of $480 per year, resulting in a payback within 7 years. A maximum rebate of $5,000 is available from the Good Energy Program which would drop the capital cost to $4,500, resulting in an improved net present value of $12,790 and a payback in just over 3 years. However, a rebate up to 75% of project cost may be available through Good Energy Program.

6.3 ECM-3: Lighting Upgrade

6.3.1 Measure Boundary & Baseline

This ECM will consider replacing all non-LED lamps and fixtures with LED fixtures and lamps, as well as installing occupancy sensors in applicable spaces.

An inventory of existing and proposed lighting fixtures can be found in Table 25; while existing and proposed Lighting Power Densities (LPD) can be found in Table 26. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 27.

6.3.2 ECM Description

This ECM proposes the installation of the following equipment:

- Interior LED fixtures in replacement of all non-LED fixtures.
- Exterior LED fixtures in replacement of all non-LED fixtures;
- Wall mount occupancy sensors in all areas with variable occupancy, which includes: washrooms, offices, etc.

LED lighting has reduced wattages, while maintaining lighting levels, compared to traditional lighting fixtures and will result in lower electricity consumption and electrical demand. Due to the lower operating wattage of LEDs, they give off less waste heat compared to traditional lighting fixtures. As a result, heating equipment will have to operate more frequently to compensate for the reduced heat given off.

Fluorescent lighting has a rated life of approximately 20,000 hours, while incandescent lighting has a rated life of approximately 1,500 hours. LED equivalent fixtures can range from 25,000 hrs for screw-in lamps to over 100,000 hours for fluorescent fixture equivalents. LED fixtures will also generate maintenance savings due to their long lifetime, resulting in less frequent lamp burnouts, and less waste.

Table 25: Lighting Upgrade Specifications

Existing Fixture	Existing (W/Fixture)	Proposed Fixture	Proposed (W/Fixture)	Fixtures #
1x4' T8-surface 2-	59	4' LED Fixture	38	147
1x4' T12-surface 1-	43	4' LED Fixture	38	2
1x4' T8-surface 1-	32	4' LED Fixture	38	8
HPS 50W	70	Exterior Wall Fixture (20W)	20	3
-	-	Occ. Sensor (switch/wall)		16
Total Cost of ECM:		$ 38,732.00	Total	176

Table 26: Existing and Proposed LPD and Run Times

Space Type / Zone	Existing LPD Density (W/m^2)	Existing Operating Hours (hrs./yr.)	Proposed LPD (W/m^2)	Proposed Operating Hours (hrs./yr.)
Main Floor Museum	6.67	1,872	4.85	1,872
Main Floor Fire Hall	7.69	4,380	5.01	4,380
Main Floor - General	6.50	2,520	3.36	1,764
Second Floor - Council Chamber	8.74	521	4.13	521
Second Floor - General	8.44	2,520	3.80	1,764
Mezzanine	4.24	252	2.73	252
Total	7.59 (Average)	-	5.05 (Average)	-

6.3.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The installed cost was estimated from a local supplier.
- A runtime reduction was simulated as per ASHRAE 90.1-2016 for all areas with occupancy sensors installed.
- The baseline case assumes that all existing equipment is replaced with minimum efficiency equipment at the end of its rated life. Applicable building and energy codes are referenced to provide minimum performance levels. A minimum code scenario was considered for this ECM which includes the recurring cost of replacement of the existing lamps

This ECM will interact with space heating and cooling loads. Electricity consumption and electrical demand will be reduced due to the lower operating wattage of LED lighting, however, a greater demand on the heating equipment will be seen due to the reduced heat given off by the LEDs. These interactions are accounted for within the simulation.

6.3.4 Energy, GHG and Financial Performance

Table 27: Lighting Upgrade ECM Performance Summary

Description	Electricity	Heating Oil	Peak Demand	Total
Baseline Usage	76,949 kWh	22,479 L	-	1,138 GJ
ECM Proposed Usage	64,912 kWh	23,539 L	-	1,135 GJ
Annual Savings	12,037 kWh	-1,060 L	3.0 kW	3 GJ
Annual Eligible Savings	10,833 kWh	-954 L	2.7 kW	2 GJ
Annual Eligible GHG Reduction	0.6 tCO_2e	-2.6 tCO_2e	-	-2.0 tCO_2e
Annual Cost Savings	$ 2,024	-$ 997	$ 334	$ 1,361
Lifetime Eligible Savings	427,500 kWh	-37,649 L	-	97 GJ

Description	Total
Equipment Lifetime	39 Years
ECM Total Cost	$ 38,730
Simple Payback	28.5 Years
ECM NPV	-$ 13,070
Minimum Code NPV	-$ 41,140
Lifetime Cost Savings	$ 53,360
Lifetime GHG Reductions	-78.6 tCO_2e
GHG Abatement Rate	-$ 493/tCO_2e

6.3.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in an improved net present value of -$13,070 when compared to the baseline case net present value of -$41,140. The ECM is estimated to cost $38,730 and payback within 29 years. Funding is not available from the Good Energy Program due to no GHG reduction.

6.4 ECM-4: Boiler & Circulation Pump Controls

6.4.1 Measure Boundary and Baseline

This ECM consists of installing boiler/circulation pump controls. This may include modifying the existing hydronic heating system. The building heating systems will be affected. An inventory of the existing and proposed boiler and pump controls can be found in Table 28. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 29.

6.4.2 ECM Description

This ECM proposes the installation of boiler controls, including outdoor temperature reset, warm weather shutdown, and circulation pump controls. Boiler controls have an estimated installed cost of $3,500[3].

When a boiler does not have controls, the supply water temperature remains steady and independent of the outdoor temperature. This may lead to equipment cycling and/or overheating of certain zones, resulting in decreased boiler efficiency and thermal comfort issues. Additionally, if boiler circulation pumps are not controlled, they will operate with no communication with the boiler, until manually shut down.

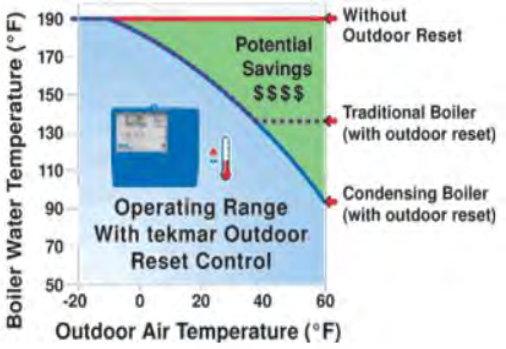


Figure 12: Outdoor Reset Principle

The most common boiler controls in the market are outdoor temperature reset and warm weather shut down. Outdoor temperature resets enable the boiler supply water temperature to fluctuate with the outdoor temperature (Figure 12). Warm Weather Shut Down (WWSD) control enables the boilers to revert to stand-by mode, or to completely shut down when outdoor temperatures rise above their heating/cooling changeover temperature. Outdoor resets and warm weather shutdowns are usually combined in the same boiler controls. Some controllers also have a pump input to allow the pump to be interlocked to the boiler operation.

Table 28: Boiler and Circulation Pump Controls Specifications

Description	Existing Equipment	Proposed Equipment
Boiler Control	Manual	Outdoor Reset, WWSD
Pump Control	Manual	Interlocked
Control Count (ea.)	-	1
Life Expectancy[2] (yrs .)	-	15
Total Installed Cost $	-	3,500

6.4.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- In the simulation, the boiler efficiency increased from 68% to 73% to account for energy savings due to outdoor reset as per 3D Energy personnel experience. This translates to energy savings of 5%. Based on Natural Resources Canada, outdoor reset control can lower energy use by as much as 15%[4].
- Both boilers and associated pumps are turn on and off manually and assumed to be at the same time. Therefore, interlocking pump operation with boiler through control will not impact (or reduce) energy consumed by the pumps.

- The NASA weather data for the building location and billed years were used to determine the number of days when the temperature was at WWSD limit.
- The installed cost was estimated from local supplier.

This ECM will interact with other HVAC systems by reducing equipment run times and space heating loads. These interactions are accounted for within the simulation.

6.4.4 Energy, GHG and Financial Performance

Table 29: Boiler & Circulation Pump Controls ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,935 kWh	20,939 L	1,079 GJ
Annual Savings	14 kWh	1,540 L	59 GJ
Annual Eligible Savings	13 kWh	1,386 L	53 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	3.8 tCO_2e	3.8 tCO_2e
Annual Cost Savings	$ 2	$ 1,449	$ 1,451
Lifetime Eligible Savings	200 kWh	20,790 L	797 GJ

Description	Total
Equipment Lifetime	15 Years
ECM Total Cost	$ 3,500
Simple Payback	2.4 Years
ECM NPV	$ 13,360
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 21,770
Lifetime GHG Reductions	56.9 tCO_2e
GHG Abatement Rate	$ 62/tCO_2e
Expected Rebate Amount	$ 2,625
ECM total Cost w/ Rebate	$ 880
ECM Simple Payback w/ Rebate	0.6 Years
ECM NPV w/ Rebate	$ 15,990

6.4.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $13,360. The ECM is estimated to cost $3,500 and payback within 2.5 years. Funding is available from the Good Energy Program which would drop the capital cost to $880, resulting in an improved net present value of $15,990 and a payback within a year.

6.5 ECM-5: AHU-1 Belt Upgrade

6.5.1 Measure Boundary & Baseline

This ECM includes replacing all smooth V-belts with cogged V-belts. Cogged V-belts have higher efficiencies and generally last longer than regular smooth V-shaped belts. These belts do not require modification to the pulleys and can directly replace existing belts.

An inventory of the existing and proposed drive belt specification can be found in Table 30. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 31.

6.5.2 ECM Description

This ECM proposes the installation of one cogged V-belt for AHU-1. Estimated to have an installed cost of $8/foot.

Approximately one-third of electric motors in industrial or commercial settings use belt drives (Mleziva)[5]. Belts provide a power-transmission system between motor pulleys and are generally low noise, and low maintenance. The most common belts in use are V-belts. These belts are trapezoidal in shape and are designed to create a wedge between itself and the pulley, reducing slip; these belts have a peak efficiency of 95%[6]. It is important to maintain proper tension of the belt, failure to do so can result in system slack, and increased slippage; this can lead to vibration, and increased belt ware. Belt tension should be checked every 3-6 months, depending on usage.

Notched belts have a similar design to V-belts (Figure 13), using a trapezoidal cross-section which rests on the pulley; however, small grooves run perpendicular to the belt. These notches help the belts run cooler, and last longer, and are generally 2% more efficient than V-belts. Notched belts can be directly switched out for V-belts, without changes to the pulley system.

Figure 13: Notched V-Belt (Left), Smooth V-Belt (Right)

Synchronous belts are toothed and require special toothed pulleys for proper operation. These belts are the most efficient belt type, peaking at 98%. Because of the toothed design, the synchronous belts can grip the pulley better than V-belts, or notched belts. This makes synchronous belts better applicable for high torque, or slippery conditions. These belts are not suitable for applications of high vibration, or sudden torque changes, as these can shear the belt teeth.

It is recommended that all regular V-belts be replaced with notched V-belts. This will increase motor efficiency and reduce motor electrical consumption. Notched V-Belts can be purchased for roughly $30/m. These belts can be installed by building maintenance personnel and do not require any modification to existing pulleys.

Table 30: Existing and Proposed Drive Belt Specifications

Description	Existing Equipment	Proposed Equipment
Type	Smooth V-Belt	Notched V-Belt
Count (#)	2	2
Belt Length	~6 m	~6 m
Motor Efficiency (%)	65	67
Life Expectancy (years)	0	10
Installed Cost ($)	-	180

6.5.3 Assumptions and Interactions

Minimal interactions will be seen between the drive belts and the respective motors, as these belts will slightly increase the motor efficiency. An assumed increase of 2% was used when replacing regular V-belts with notched V-belts, this increase in efficiency is well documented, resulting in a low un-certainty.

6.5.4 Energy, GHG and Financial Performance

Table 31: AHU-1 Belt Upgrade (Cogged Belt) ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,441 kWh	22,524 L	1,138 GJ
Annual Savings	508 kWh	-45 L	0.1 GJ
Annual Eligible Savings	457 kWh	-41 L	0.1 GJ
Annual Eligible GHG Reduction	0.03 tCO_2e	-0.1 tCO_2e	-0.1 tCO_2e
Annual Cost Savings	$ 85	-$ 42	$ 43
Lifetime Eligible Savings	4,600 kWh	-405 L	1 GJ

Description	Total
Equipment Lifetime	10 Years
ECM Total Cost	$ 180
Simple Payback	4.2 Years
ECM NPV	$ 160
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 430
Lifetime GHG Reductions	-0.8 tCO_2e
GHG Abatement Rate	-$ 213/tCO_2e
Expected Rebate Amount	$ -
ECM total Cost w/ Rebate	$ 180
ECM Simple Payback w/ Rebate	4.2 Years
ECM NPV w/ Rebate	$ 160

6.5.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $160. The ECM is estimated to cost $180 and payback within 4.5 years. Funding is not available from the Good Energy Program due to no GHG reduction.

6.6 ECM-6: Self Sensing Pumps

6.6.1 Measure Boundary & Baseline

This ECM consists of installing self sensing variable speed pumps in replacement of existing pumps. This may include altering the run conditions of the pump to best fit the current building conditions while still satisfying the heating/cooling load. The building heating systems will be affected. An inventory of the existing, minimum code and proposed equipment can be found in Table 32. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 33.

6.6.2 ECM Description

This ECM proposes the installation of the two self sensing variable speed pumps in replacement of the existing pumps. Self sensing pumps are optimized to match the minimum design head of the system while maintaining heating/cooling loads. Self sensing pumps have an estimated installed cost of approximately $3,764/kW .

Self sensing pumps are available in pump sizes 1 HP or greater and adjust the pump frequency (RPM) to meet the current building conditions based on demand. Self sensing pumps utilize pressure sensing technology within the pump housing that accurately determines the minimum head pressure while still meeting the heating/cooling loads. This reduces the cost of installation, as external wiring, sensors, and variable frequency drives are eliminated and all control/sensing technology is combined within the pump. Each pump operates on a control curve set to the specific function, this control curve can be adjusted after the system has been in operation to further increase optimization and decrease energy costs. If more than one pump is present within the system, such as parallel pumping configurations, communication between the two pumps are automatically controlled to be optimized based on peak operating efficiency opposed to lead/lag or design flow operations.

Figure 14: Armstrong Self Sensing Pump

Additionally, self-sensing pumps ranging from 1-10 HP utilize Electrically Commutated Motors (ECM), which are classified as two efficiency levels above the NEMA Premium motor efficiency class; while pumps above 10 HP use standard Permanent Split Capacity (PSC) premium efficiency motors.

Table 32: Self Sensing Pumps Specifications

Description	Existing Equipment	Proposed Equipment
Equipment Type	Constant Speed Pumps	Self Sensing
Count (ea.)	2	2
Capacity (W)	1,350 & 1,200	1,350 & 1,200
Annual Operating Hours	3,000	3,000
Life Expectancy[2] (yrs .)	0	10
Total Installed Cost $	-	9,600

6.6.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The current equipment capacity was estimated based on the site photos and the equipment age.

- Equipment specified is Armstrong's Design Envelope self sensing pumps or equivalent.
- Electricity savings from self sensing pumps were calculated by modelling premium efficiency variable speed motor in RETScreen Expert. The installed cost was estimated from supplier and auditor's experience.
- As existing pumps have reached their end of useful life; this ECM is compared to replaced existing pump with same. The installed cost was estimated from RSMeans Costing data.

This ECM will interact with other HVAC equipment by reducing equipment run times. These interactions are accounted for within the simulation.

6.6.4 Energy, GHG and Financial Performance

Table 33: Self Sensing Pumps ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	73,657 kWh	22,510 L	1,127 GJ
Annual Savings	3,292 kWh	-31 L	11 GJ
Annual Eligible Savings	2,963 kWh	-28 L	10 GJ
Annual Eligible GHG Reduction	0.2 tCO_2e	-0.1 tCO_2e	0.1 tCO_2e
Annual Cost Savings	$ 554	-$ 29	$ 524
Lifetime Eligible Savings	29,600 kWh	-279 L	96 GJ

Description	Total
Equipment Lifetime	10 Years
ECM Total Cost	$ 9,600
Simple Payback	18.3 Years
ECM NPV	-$ 5,350
Minimum Code NPV	-$ 6,000
Lifetime Cost Savings	$ 5,240
Lifetime GHG Reductions	0.9 tCO_2e
GHG Abatement Rate	$ 10,370/tCO_2e
Expected Rebate Amount	$ 5,000
ECM total Cost w/ Rebate	$ 4,600
ECM Simple Payback w/ Rebate	8.8 Years
ECM NPV w/ Rebate	-$ 350

6.6.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. Existing pumps have reached their end of useful life and to replace with new self sensing type will reduce energy cost as well as maintenance cost. This ECM results in an improved net present value of -$5,350 when compared to the baseline case net present value of -$6,000. The ECM is estimated to cost $9,600 and saves up to 10 GJ energy annually. An engineering study is recommended to provide specifications for control strategies. A maximum rebate of $5,000 is available from the Good Energy Program which would drop the capital cost to $4,600, resulting in an improved net present value of -$350 and a payback within 9 years. However, a rebate up to 75% of project cost may be available through Good Energy Program.

6.7 ECM-7: Low Flow Water Fixtures

6.7.1 Measure Boundary & Baseline

This ECM consists of replacing all existing standard flow water fixtures with low-flow water fixtures. This includes toilets, faucets/aerators, and showerheads. Reduced water usage in fixtures such as faucets and showerheads will reduce both water consumption and the amount of energy used to heat the water used by those fixtures.

An inventory of the existing, and proposed plumbing fixtures can be found in Table 34. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 35.

6.7.2 ECM Description

Reduced water usage in fixtures such as faucets and showerheads will reduce both water consumption and the amount of energy used to heat the water. The following low flow fixtures are recommended for installation:

- **Low flow aerators**: Low flow aerators will reduce both hot and cold-water consumption and can be installed on existing faucets. They can be installed by building staff and have a low initial cost of approximately $10 each. They are recommended in cases where the existing faucets are in good condition and are not in need of replacement. Low flow aerators use a maximum of 1.9 LPM (0.5 GPM) and will reduce water flow when compared to the standard flow rate of 8.3LPM (2.2 GPM).
- **Low flow showerheads**: low flow showerheads are recommended and consume 5.7 LPM (1.5 GPM) which is an improvement over standard showerhead that consumes 9.3 LPM (2.5 GPM). They have an installed cost of approximately $50/each[7].
- **Low Flow toilets**: low flow toilets are recommended and use approximately 4.8 LPF over standard models that use 6.0 LPF. They have an installed cost of approximately $450 each[8].

Table 34: Water Fixture Upgrade Schedule Specifications

Fixture Description	Qty.	Existing Water Use Rate	Proposed Water Use Rate	Annual Water Savings (m^3/yr.)	Annual Hot Water Savings (m^3/yr.)	Installed Cost (ea.)
Toilets	2	6.0 LPF	4.8 LPF	7.0		$ 450
Faucets	1	7.6 LPM	1.9 LPM	8.6	4.9	$ 10
Faucets	1	5.7 LPM	1.9 LPM	11.5	6.5	$ 10
Faucets	2	8.3 LPM	5.7 LPM	1.0	0.6	$ 10
Showerheads	1	9.5 LPM	5.7 LPM	5.7	3.8	$ 50
Total	7	-	-	33.8	15.8	$ 990

6.7.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- Total water use for the building was estimated based on fixture flow rates and occupancy types; assuming 50% male and 50% female.
- Hot water use was estimated based on fixture flow rates, occupancy, and the outlet water temperature of each user type.
- The installed cost was estimated from the local supplier.

This ECM will have no interaction with space heating and cooling loads.

6.7.4 Energy, GHG and Financial Performance

Table 35: Low Flow Fixtures ECM Performance Summary

Description	Electricity	Heating Oil	Water	Total
Adjusted Baseline Usage	76,949 kWh	22,479 L	110 m^3	1,138 GJ
ECM Proposed Usage	75,833 kWh	22,479 L	76 m^3	1,134 GJ
Annual Savings	1,116 kWh	0 L	34 m^3	4 GJ
Annual Eligible Savings	1,004 kWh	0 L	30 m^3	4 GJ
Annual Eligible GHG Reduction	0.1 tCO_2e	0.0 tCO_2e	0.0 tCO_2e	0.1 tCO_2e
Annual Cost Savings	$ 188	$ -	$ -	$ 188
Lifetime Eligible Savings	20,100 kWh	0 L	608 m^3	72 GJ

Description	Total
Equipment Lifetime	20 Years
ECM Total Cost	$ 990
Simple Payback	5.3 Years
ECM NPV	$ 1,570
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 3,750
Lifetime GHG Reductions	1.1 tCO_2e
GHG Abatement Rate	$ 865/tCO_2e
Expected Rebate Amount	$ 743
ECM total Cost w/ Rebate	$ 250
ECM Simple Payback w/ Rebate	1.3 Years
ECM NPV w/ Rebate	$ 2,310

6.7.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $1,570. The ECM is estimated to cost $990 and payback within 5.5 years. Funding is available from the Good Energy Program which would drop the capital cost to $250, resulting in an improved net present value of $2,310 and a payback within 1.5 year.

6.8 ECM-8: Fluid Additive

6.8.1 Measure Boundary and Baseline

This ECM consists of adding a heat transfer fluid enhancement to all water/glycol heating water fluids. This includes hydronic heating lines. Heat transfer fluid enhancers can be directly added to water/glycol lines. The building hot water heating systems will be affected.

An inventory and performance specifications of existing equipment can be found in Table 36. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 37.

6.8.2 ECM Description

This ECM proposes the installation of heat transfer fluid enhancer for all water/glycol-based heating fluids. These fluids enhance the thermal transfer properties of the heating fluid resulting in better heat transfer and reduced energy costs. Heating fluid enhancements cost approximately $220/Liter installed and should consist of 1% of total fluid volume.

Heat transfer fluid enhancements are used to increase heat transfer characteristics within the water and glycol-based heating and cooling systems. Water/glycol solutions have a high surface tension, resulting in reduced thermal contact to the piping/radiator walls. These enhancements work by altering the surface tension of the working fluid, resulting in more heat transfer contact to the external pipe/radiator surface (Figure 15)[9].

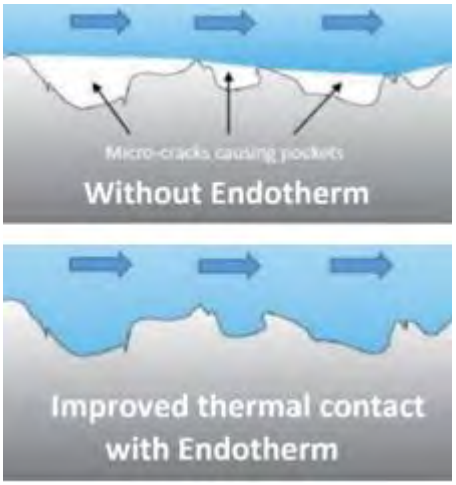


Figure 15: Fluid without Enhancement (top), Fluid with Enhancement (bottom)

Heat transfer enhancements work on water and glycol-based systems. These enhancements have been tested to: have negligible bacteria growth from temperature cycling (compared to baseline system); have no adverse detrimental effects on boilers, components, or warranties (should be verified for specified boiler/chiller manufacturer); have no corrosive effects on aluminum, steel, or copper (base case corrosion inhibitor still recommended), and does not affect the thermal properties/freezing point of the water/glycol solution. Various case studies have been conducted using heat transfer enhancements and result in an average energy reduction of 10-15% for heating and cooling systems.

Table 36: Heat Transfer Fluid Additive Specifications

Description	Existing Equipment	Proposed Equipment
Equipment Type	Boiler	
Equipment Efficiency	68%	
Fluid Application	Hydronic Heating Loops	
Total Estimated Fluid Volume (L)	1,306	1,306
Total Heat Transfer Volume (L)	-	13
Year Installed	-	2020
Useful Life Expectancy	-	8
Total Installed Cost ($)	-	2,870

6.8.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- PACE Chemical LTD. EndoTherm (Heating) heat transfer enhancements were used for values displayed within this ECM.
- Various case studies using heating and cooling enhancements were performed, resulting in gas and electricity savings from 9-22% savings; 10% savings in heating system were simulated for the exiting situation.
- The installed cost and useful life expectancy were estimated from a local supplier.

This ECM will interact with other HVAC systems by reducing equipment run times and space heating loads. These interactions are accounted for within the simulation.

6.8.4 Energy, GHG and Financial Performance

Table 37: Heat Transfer Fluid Additive ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,949 kWh	20,230 L	1,052 GJ
Annual Savings	0 kWh	2,249 L	86 GJ
Annual Eligible Savings	0 kWh	2,024 L	78 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	5.5 tCO_2e	5.5 tCO_2e
Annual Cost Savings	$ -	$ 2,116	$ 2,116
Lifetime Eligible Savings	0 kWh	16,193 L	620 GJ

Description	Total
Equipment Lifetime	8 Years
ECM Total Cost	$ 2,870
Simple Payback	1.4 Years
ECM NPV	$ 11,960
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 16,930
Lifetime GHG Reductions	44.3 tCO_2e
GHG Abatement Rate	$ 65/tCO_2e
Expected Rebate Amount	$ 2,153
ECM total Cost w/ Rebate	$ 720
ECM Simple Payback w/ Rebate	0.3 Years
ECM NPV w/ Rebate	$ 14,110

6.8.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $11,960. The ECM is estimated to cost $2,870 and payback within 1.5 years. Funding is available from the Good Energy Program which would drop the capital cost to $720, resulting in an improved net present value of $14,110 and a payback under half a year.

6.9 ECM-9: Demand Control Ventilation

6.9.1 Measure Boundary and Baseline

This ECM will consider installing Demand Control Ventilation (DCV) control strategies and equipment to existing ventilation equipment. Existing dampers are set at minimum 25% and manually adjusted do different position during cooling season. This ECM includes motorized dampers, CO_2 sensor and electronic/wiring only.

An inventory and performance specifications of existing and proposed ventilation system can be found in Table 38. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 39.

6.9.2 ECM Description

This ECM proposes the installation of the equipment:

- One Carbon Dioxide (CO_2) located in the AHU return ducts;
- Two motorized dampers, exhaust and outdoor air intake; and,
- One DCV logic controller.

A demand control ventilation system should be installed in the building to reduce the outdoor air intake during low occupancy and unoccupied hours. The most applicable method for implementing DCV in this facility is by monitoring spaces' carbon dioxide concentration, which can be done by installing CO2 sensors in each space or in the return plenum. Since CO2 is a by-product of the respiratory process, the concentration of CO2 in the air becomes an indicator of the occupancy, resulting in the adjustment of the outdoor airflow. Reducing the outdoor air intake during low occupancy periods reduces the heating/cooling required to temper it, thereby lowering heating oil consumption (Figure 16).

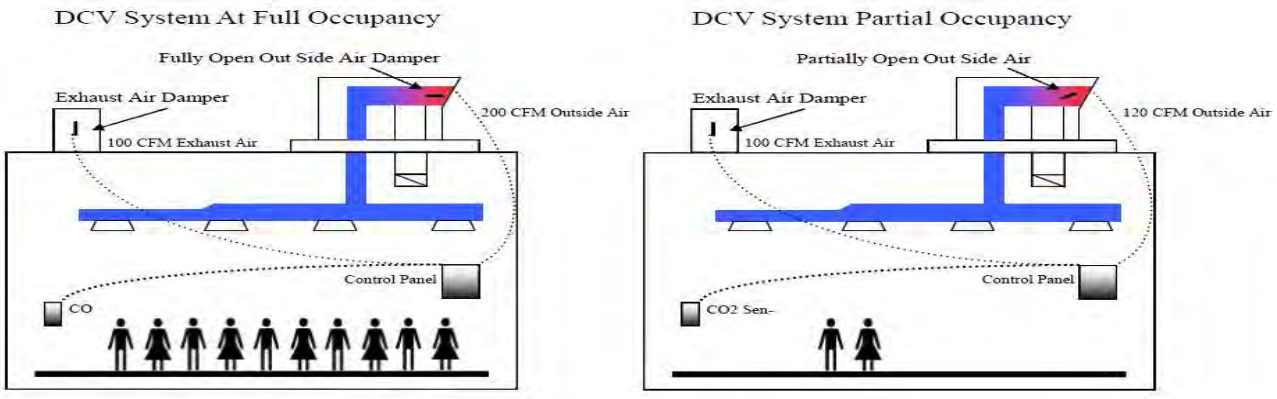


Figure 16: DCV CO2 Air Intake Process

The cost of the DCV ECM is dependent on the sensory hardware, monitoring software and installation. As noted above, the system only provides fresh air when the AHUs are running. Installed CO_2 sensor in return air duct will allow measuring of CO_2 levels and modulate the damper accordingly to maintain acceptable levels of CO_2. The system will function much as it now does, except that a motorized damper will remain at a predetermined minimum when there are no occupants and will gradually open as CO_2 levels increase.

Table 38: Existing & Proposed Ventilation Specifications

Description	Existing Equipment	Proposed Equipment
Equipment Type	Air Handling Unit	
Damper Count	2	2
Motorized Dampers (Yes/No)	No	Yes
Sensor Count	-	1
Occupied Hours	2,067	2,067
Minimum Outdoor Air Flow (L/S)	807	549
Useful Life Expectancy[2]	-	15
Total Installed Cost ($)	-	2,870

6.9.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- RETScreen does not have a CO_2/occupant monitoring function. Therefore, a schedule that best represents occupancy was set up to model the outdoor air intake.
- The installed cost was estimated from experience to be $800 for each CO_2 sensor[10] , $1,000 for each motorized damper and $1,000 for each logic controller. An additional $2,400 was added for labour (confirm pricing with a qualified HVAC installer).
- The ECM is affected by the temperature set-points, outdoor air temperature, and occupant densities.

This ECM will interact with other HVAC systems by reducing equipment run times and space heating and cooling loads. These interactions are accounted for within the simulation.

6.9.4 Energy, GHG and Financial Performance

Table 39: Demand Control Ventilation ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,813 kWh	21,144 L	1,086 GJ
Annual Savings	136 kWh	1,335 L	52 GJ
Annual Eligible Savings	122 kWh	1,202 L	46 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	3.3 tCO_2e	3.3 tCO_2e
Annual Cost Savings	$ 23	$ 1,256	$ 1,279
Lifetime Eligible Savings	1,800 kWh	18,023 L	697 GJ

Description	Total
Equipment Lifetime	15 Years
ECM Total Cost	$ 6,200
Simple Payback	4.8 Years
ECM NPV	$ 8,650
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 19,180
Lifetime GHG Reductions	49.4 tCO_2e
GHG Abatement Rate	$ 126/tCO_2e
Expected Rebate Amount	$ 4,650
ECM total Cost w/ Rebate	$ 1,550
ECM Simple Payback w/ Rebate	1.2 Years
ECM NPV w/ Rebate	$ 13,300

6.9.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $8,650. The ECM is estimated to cost $6,200 and payback within 5 years. Funding is available from the Good Energy Program which would drop the capital cost to $1,550, resulting in an improved net present value of $13,300 and a payback within 1.5 years. An Engineering study is recommended to confirm the performance of existing AHU components.

6.10 ECM-10: BMS System

6.10.1 Measure Boundary & Baseline

This ECM consists of installing a building management system (BMS). This includes monitoring and controlling all operations within the buildings. The building HVAC system will be affected. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 40.

6.10.2 ECM Description

Building management systems are an overarching control system of all building systems. These systems can provide control over pumps, fan, etc. and determine operating hours and operating parameters for each system. Some BMSs have the potential to control multiple building systems/equipment, while other BMSs may only control certain systems.

To fully understand how individual systems are performing within a building, monitoring and controls of the system must be available to the building's operations management. Building management systems (BMS) can provide this monitoring and control from one localized position. Many variables can be inputted into the BMS, but most commonly, controls are related to loads such as pumps, fans, and heating/cooling equipment.

A BMS helps to meet the comfort of occupants within the facility. Equipment can have scheduled run times only for occupied building hours or be operated using demand response controls. Lighting can also be programmed to automatically shut down after certain hours so that no lighting (excluding security lighting) is left on during unoccupied hours. However, it is not included for this building. Building management systems have a multitude of other functions that can be specified, these functions can include smoke detection, burner and combustion controls, electrical monitoring, water consumption monitoring, etc. By allowing the BMS to monitor all necessary equipment, it can ensure proper operating parameters of the equipment, and alert personnel if the equipment is operating abnormally, or have failed.

The typical cost[11] of a BMS ranges from $2.50/ft²-$7.00/ft². For this building, $5/ft² was used.

6.10.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The current equipment capacity and efficiency were estimated based on the interview with building operator, site photos and the equipment age.
- The BMS proposed to have various sensors located on existing AHU system, Boiler system and in building for different zones. Each component monitored by the BMS has different run times.
- Energy savings are calculated by modelling temperature setback for unoccupied hours, reducing ventilation rate by installation of CO_2 sensor in return air duct and reducing fan operating hours due to temperature setback. This translates into approximately 11% savings in fuel consumption.
- Lighting controls and schedules are not included in this BMS and can be added later if desired.

This ECM will interact with other HVAC equipment by reducing equipment run times and space heating and cooling loads. These interactions are accounted for within the simulation.

6.10.4 Energy, GHG and Financial Performance

Table 40: Building Management System ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	73,338 kWh	19,430 L	1,008 GJ
Annual Savings	3,611 kWh	3,049 L	130 GJ
Annual Eligible Savings	3,250 kWh	2,744 L	117 GJ
Annual Eligible GHG Reduction	0.2 tCO_2e	7.5 tCO_2e	7.7 tCO_2e
Annual Cost Savings	$ 607	$ 2,868	$ 3,476
Lifetime Eligible Savings	48,700 kWh	41,162 L	1,752 GJ

Description	Total
Equipment Lifetime	15 Years
ECM Total Cost	$ 64,480
Simple Payback	18.6 Years
ECM NPV	-$ 24,370
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 52,130
Lifetime GHG Reductions	115.4 tCO_2e
GHG Abatement Rate	$ 559/tCO_2e
Expected Rebate Amount	$ 5,000
ECM total Cost w/ Rebate	$ 59,480
ECM Simple Payback w/ Rebate	17.1 Years
ECM NPV w/ Rebate	-$ 19,370

6.10.5 Recommendation

This ECM is not recommended for implementation and is not included in the proposed case based on financial performance, as it results in an inferior net present value of -$24,730. A maximum rebate of $5,000 is available from the Good Energy Program which would drop the capital cost to $59,480, resulting in an improved net present value of -$19,370 and a payback within 17.5 years.

This measure can also provide additional benefits such as improved occupant via improved temperature controls and scheduling and less maintenance hours spent on troubleshooting.

6.11 ECM-11: Window Upgrade

6.11.1 Measure Boundary & Baseline

This ECM consists of installing new triple pane windows in the replacement of existing windows. This includes the removal of the old windows and installation of the new windows. This ECM will be compared with the minimum code requirement replacement windows.

The specification of existing, minimum code and proposed windows can be found in Table 41. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 42 for this ECM; Table 43 for minimum code.

6.11.2 ECM Description

This ECM proposes the installation of the triple-pane, argon filled, low-e windows with rated U-value of 1.4 W/m²·°C or lower. High performing triple pane windows can be installed for approximately $1,200/m².

Installing high-performance windows can drastically decrease heating and cooling loads depending on thermal conductance and solar heat gain properties. It will also improve the airtightness of a building, reducing unintentional air leakage through the fenestrations by air sealing it around perimeter. Better thermal performance of windows can improve occupant comfort and minimize condensation.

Table 41: Window Upgrade Specifications

Description	Existing Equipment	Minimum Code Equipment	Proposed Equipment
Type	Fixed	Fixed	Fixed
Frame Material	Vinyl	Vinyl	Vinyl
Number of panes	Double	Double	Triple
Coating	-	Low-e	Low-e
Gas Fill	Air	Argon	Argon
U-value (W/m^2 °C)	2.85	1.4	0.96
Life Expectancy	10	30	30
Total window area (m^2)	47.78	47.78	47.78
Installed Cost $/m^2	-	$1,020	$1,200
Total Installed Cost	-	$48,736	$57,340

6.11.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The thermal performance is validated by ASHRAE and RETScreen Expert for existing and proposed window types.
- The installed cost was estimated from a local supplier.
- The baseline case assumes that all existing windows are replaced with minimum efficiency windows at the end of its rated life. Applicable building and energy codes are referenced to provide minimum performance levels.

This ECM will interact with HVAC equipment by reducing equipment ventilation run times and space heating and cooling loads. These interactions are accounted for within the simulation..

6.11.4 Energy, GHG and Financial Performance

Table 42: Window Upgrade ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,239 kWh	20,896 L	1,075 GJ
Annual Savings	710 kWh	1,583 L	63 GJ
Annual Eligible Savings	639 kWh	1,425 L	57 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	3.9 tCO_2e	3.9 tCO_2e
Annual Cost Savings	$ 119	$ 1,489	$ 1,609
Lifetime Eligible Savings	19,200 kWh	42,741 L	1,706 GJ

Description	Total
Equipment Lifetime	30 Years
ECM Total Cost	$ 57,340
Simple Payback	35.6 Years
ECM NPV	-$ 28,290
Minimum Code NPV	-$ 13,410
Lifetime Cost Savings	$ 48,260
Lifetime GHG Reductions	118.0 tCO_2e
GHG Abatement Rate	$ 486/tCO_2e
Expected Rebate Amount	$ 43,005
ECM total Cost w/ Rebate	$ 14,340
ECM Simple Payback w/ Rebate	8.9 Years
ECM NPV w/ Rebate	$ 14,720

Table 43: Window Upgrade (Minimum Code) ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 GJ	1,138 GJ
ECM Proposed Usage	76,132 kWh	21,425 GJ	1,095 GJ
Annual Savings	817 kWh	1,054 GJ	43 GJ
Annual Eligible Savings	735 kWh	949 GJ	39 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	2.6 tCO_2e	2.6 tCO_2e
Annual Cost Savings	$ 137	$ 992	$ 1,129
Lifetime Eligible Savings	22,100 kWh	28,458 GJ	1,170 GJ

Description	Total
Equipment Lifetime	30 Years
Minimum Code Total Cost	$ 48,736
Simple Payback	43.2 Years
Minimum Code NPV	-$ 16,120
Lifetime Cost Savings	$ 33,870
Lifetime GHG Reductions	79.1 tCO_2e
GHG Abatement Rate	$ 616/tCO_2e
Expected Rebate Amount	$ 5,000
Min. Code total Cost w/ Rebate	$ 52,340
Min. Code Simple Payback w/ Rebate	32.5 Years
Minimum Code NPV w/ Rebate	-$ 23,290

6.11.5 Recommendation

For financial reasons, it is recommended to replace with equipment meeting the minimum code requirements at the end of its rated life. This ECM results in an inferior net present value of -$28,290 when compared to the baseline case net present value of -$13,410. The ECM is estimated to cost $57,340 and does not payback within its lifetime years. A maximum rebate of $5,000 is available from the Good Energy Program which would drop the capital cost to $52,340, resulting in an improved net present value of -$23,290 and a payback within 32.5 years. However, a rebate up to 75% of project cost may be available through Good Energy Program.

The existing equipment does not meet current building code minimum performance values and upgrading it will increase occupant comfort while saving energy.

6.12 ECM-12: Recommissioning

6.12.1 Measure Boundary and Baseline

This ECM consists of recommissioning (re-optimization) of all mechanical systems inside a building. This will ensure the equipment and systems are operating optimally and as intended to meet facility and occupant needs and to improve its efficiency and performance. The building HVAC and plumbing systems will be affected.

The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 44.

6.12.2 ECM Description

The aim of commissioning new buildings is to ensure that they deliver, if not exceed, the performance and energy savings promised by their design. When applied to existing buildings, Recommissioning (RCx) identifies the almost inevitable "drift", which is the difference between design operating parameters and existing operating conditions. Depending on the age of the building, recommissioning can often resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life.

Recommissioning will touch every system in the building. The top faults identified by recommissioning are:

- Duct, Valves, Leakage;
- Unbalanced airflow;
- Unbalanced waterflow;
- Improper refrigerant charge;
- Actuators and controls are not working properly;
- Insufficient evaporator airflow;
- Improper control setup/commissioning;
- Control component failure or degradation;
- Improper control hardware installation;
- Air cooled condenser fouling; and,
- Sensor Calibration and repair;

As these issues typically occur unnoticed in the building, it will experience "drift", and over time, overall building performance will decrease. Recommissioning also improves a building's Operations and Maintenance (O&M) procedures to enhance and maintain overall building performance, with energy savings lasting over a 3 to 5-year timeframe.

A report on building commissioning (2009) by the Lawrence Berkley National Laboratory[12] estimates a cost of $3.2/m² (USD) for existing buildings resulting in a 16% median whole building energy saving. Adjustments for inflation and the exchange rate display a cost of approximately $5.5/m². Recommissioning should be conducted after all ECM's have been installed; this way all systems are assured to be working properly and to the expected performance. In addition to energy savings, recommissioning also typically results in cost savings due to equipment life improvement, thermal comfort, indoor air quality, ongoing labour and maintenance, and occupant productivity.

6.12.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- Testing and/or measurements on the existing systems were not done, and design conditions are unknown.
- A 5% savings in mechanical related electricity and 10% savings in heating oil were estimated from the NRCan RCx Study Guide[13].
- The installed cost was estimated from the Lawrence Berkley study.

This ECM will interact with other HVAC equipment by reducing equipment run times and space heating and cooling loads. These interactions are accounted for within the simulation.

6.12.4 Energy, GHG and Financial Performance

Table 44: Recommissioning ECM Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	75,049 kWh	20,230 L	1,045 GJ
Annual Savings	1,900 kWh	2,249 L	93 GJ
Annual Eligible Savings	1,710 kWh	2,024 L	84 GJ
Annual Eligible GHG Reduction	0.1 tCO_2e	5.5 tCO_2e	5.6 tCO_2e
Annual Cost Savings	$ 319	$ 2,116	$ 2,435
Lifetime Eligible Savings	8,600 kWh	10,121 L	419 GJ

Description	Total
Equipment Lifetime	5 Years
ECM Unit Cost	$ 5.5 /m^2
Building Area	1,198 m^2
ECM Total Cost	$ 6,590
Simple Payback	2.7 Years
ECM NPV	$ 4,590
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 12,180
Lifetime GHG Reductions	28.2 tCO_2e
GHG Abatement Rate	$ 234/tCO_2e
Expected Rebate Amount	$ 4,943
ECM total Cost w/ Rebate	$ 1,650
ECM Simple Payback w/ Rebate	0.7 Years
ECM NPV w/ Rebate	$ 9,530

6.12.5 Recommendations

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $4,590. The ECM is estimated to cost $6,590 and payback within 3 years. Funding is available from the Good Energy Program which would drop the capital cost for this ECM to $1,650, resulting in an improved net present value of $9,530 and a payback within a year.

6.13 ECM-13: Bio-Mass Boiler (Wood Chips)

6.13.1 Measure Boundary & Baseline

This ECM consists of adding one self contained drop-in-place biomass boiler system to supplement the heating provided by the existing boilers. This drop-in-place unit would a biomass boiler, Biomass (wood chip) storage, automatic wood chip auguring systems, and all installation requirements.

The specification of proposed biomass boiler can be found in Table 41. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 42.

6.13.2 ECM Description

This ECM proposes the installation of one 120 kW wood chip boiler system, with an AFUE of 85%. The proposed system includes a pre-assembly drop-in-place system, which includes the boiler, required piping and controls, a sealed wood chip storage area, and an automated self-auguring system, all located within one self-contained unit. This is estimated to have an installed cost of approximately $1,144.50/kW.

Biomass boilers work like conventional boilers by combusting fuel to produce heat. However, the fuel used in a biomass boiler is wood. Wood is considered a carbon-neutral fuel since the carbon dioxide (CO_2) released during the combustion is compensated by the CO_2 absorbed by the tree while growing. Additionally, wood is a renewable source of energy.

Figure 17: Wood Chip Boiler System

In typical wood log boiler, wood logs are manually loaded to the boiler and it is difficult to control heat/flame of the system. Wood log boiler has an average efficiency of 60%. Wood chips are more economical, and they are residual woods from forests, sawmill, etc. Additionally, wood chip systems can be automated to reduce manual labour for re-stocking the boiler.

Forestry cut logs or wood chips have a moisture percentage (by weight) of approximately 50%. If freshly cut woods are used without seasoning will reduce the efficiency of the system as moisture in wood takes up more energy to boil water content in the wood. Using dry wood will increase efficiency up to 25% which produces fewer smokes and ignites faster. To achieve good combustion and high efficiency, the moisture content in wood should be 15-20%. Wood log and chips have a similar Higher Heating Value (HHV), of approximately 14.5 MJ/kg with the moisture content of 25%.

As wood chip boilers require specifically sized of the wood chips as larger pieces can block the boiler feed system and smaller pieces can affect the combustion process, therefore, special care should be taken to buy wood chips as per the boiler manufacturer requirement. Wood chips can be bought from local wood chip supplier or it can be produced on-site by installing woodchippers.

Table 45: Proposed Boiler Specifications

Description	Proposed Equipment
Boiler Type	Wood Chip Boiler
Boiler Count (ea.)	1
Boiler Input Capacity (kW)	120
Boiler AFUE (%)	85%
Wood Chips HHV (MJ/Kg)[14]	14.5 (25% Moisture Content)
Life Expectancy (yrs.)	25
Boiler Installed Cost ($/kW)	1,144.50
Total Installed Cost	$ 137,340

6.13.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The current equipment capacity and efficiency were estimated based on the site photos and the equipment age.
- Wood chip boilers were estimated to produce approximately 80% of the total heating consumption of the building, with the remaining 20% of the load being covered by existing boilers. This is to simulate the effect of wood chip boiler downtime and extreme weather conditions (increased heat loss of the building).
- Wood chip costs were estimated to range from $100-150/ton (0.11-0.17/kg), however, $150/ton ($0.17) was chose for conservative analysis.
- The installed cost was estimated from equipment suppliers.
- Equipment lifetime was gathered from ASHRAE Equipment Life Expectancy Chart, which prescribed 25 years for a properly maintained boiler.
- Green House Gas Emission rate of 0.00036 tCO_2e/Kg was used for the wood chips.
- An estimated maintenance cost of $500/year was simulated.

6.13.4 Energy, GHG and Financial Performance

Table 46: Biomass Boiler ECM Performance Summary

Description	Electricity	Heating Oil	Wood	Maintenance	Total
Baseline Usage	76,949 kWh	22,479 L	0 Kg	-	1,138 GJ
ECM Proposed Usage	76,949 kWh	4,496 L	38,000 Kg	-	1,000 GJ
Annual Savings	0 kWh	17,983 L	-38,000 Kg	-	138 GJ
Annual Eligible Savings	0 kWh	16,185 L	-34,200 Kg	-	124 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	44.3 tCO_2e	-12.3 tCO_2e	-	32.0 tCO_2e
Annual Cost Savings	$ -	$ 16,918	-$ 5,643	-$ 500	$ 10,775
Lifetime Eligible Savings	0 kWh	404,618 L	-855,000 Kg	-	3,099 GJ

Description	Total
Equipment Lifetime	25 Years
ECM Total Cost	$ 137,340
Simple Payback	12.7 Years
ECM NPV	$ 43,800
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 269,360
Lifetime GHG Reductions	800.3 tCO_2e
GHG Abatement Rate	$ 172/tCO_2e
Expected Rebate Amount	$ 40,000
ECM total Cost w/ Rebate	$ 97,340
ECM Simple Payback w/ Rebate	9.0 Years
ECM NPV w/ Rebate	$ 83,800

6.13.5 Recommendations

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $43,800. The ECM is estimated to cost $137,340 and payback within 13 years. A maximum rebate of $40,000 is available from the Good Energy Program which would drop the capital cost to $97,340, resulting in an improved net present value of $83,800 and a payback within 9 years. However, a rebate up to 75% of project cost may be available through Good Energy Program.

6.14 ECM-14: Energy Valve

6.14.1 Measure Boundary & Baseline

This ECM consists of installing energy valves on the hydronic heating system. This may include modifying the equipment and pumps systems where it is proposed to install the energy valves. The following building systems will be affected; all equipment and pumps where energy valves are installed. The specification of existing and proposed equipment can be found in Table 47. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 48.

6.14.2 ECM Description

This ECM proposes the installation of one Belimo Energy valve. These energy valves are used to measure heating and cooling energy consumption and optimize coil performance. These valves cost approximately $4,500 installed.

Energy valves are used to optimize hydronic systems. Energy valves have built-in flow sensors, supply and return temperature sensors (Delta T), and design condition information for the specific building. Using the flow sensors and supply and return water temperature sensors, real-time energy consumption is calculated and uploaded via cloud-based software. Additionally, the working fluid (glycol) is continuously monitored to ensure proper design concentrations, as any variation to the concentration can result in increased fluid viscosity resulting in increased pumping output, reduced heat transfer effectiveness, the risk of freezing, and/or reduced occupancy comfort and increased utility expense.

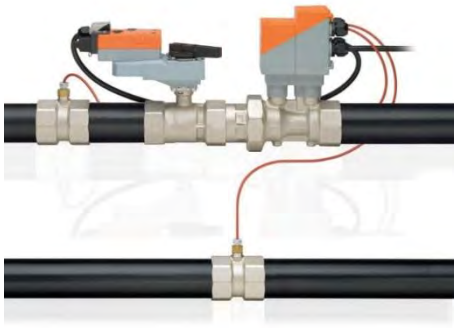


Figure 18: Belimo Energy Valve

The main purpose of energy valves is to enhance delta T management and combat low delta T operations. A low delta T may occur when coils or valves are improperly sized, systems are not dynamically balanced, there is inconsistent maintenance on cooling coils resulting in fouling and increased pressure loss, or an oversupply of chilled water. Any of these factors can reduce the heat transfer of the hydronic system, resulting in sub-optimal performance and increased energy usage by the heating and cooling plant and pumping equipment. During installation, energy valves are programmed with design delta T operating conditions, which alter the operations of the existing system until these conditions are achieved. Addressing low delta T optimizes coil efficiency through optimized coil flow under all conditions which reduces pumping costs while increasing chiller/boiler efficiency. Implementation of these valves requires variable flow through the coil. The installation of variable frequency drives on pumps were not considered in costing.

Table 47: Energy Valve Specifications

Description	Existing Equipment	Proposed Equipment
Equipment Type	AHU Hydronic Heating	
Count (ea.)	1	
Current Delta T (°C)	15 (Assumed)	-
Optimized Delta T (°C)	-	30
Annual Operating Hours	3,000	
Total Installed Cost $	-	$ 4,500

6.14.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- AHU heating coil capacity was estimated based on AHU ventilation capacity.
- There is no dedicated circulation for the AHU heating coil and therefore, the installation of a VFD on existing pump is not included. However, existing HW pumping equipment must be fitted with variable speed drives to ensure a change in the operation (via energy valves) relates to a change in supply HW flow.
- Energy savings were estimated using *Belimo's Energy Valve Savings Estimator*[15].
- The installed cost was estimated from a local supplier.
- The useful life expectancy was assumed to be 15 years[2].

This ECM will interact with other HVAC equipment by reducing equipment run times and space heating loads. These interactions are accounted for within the simulation.

6.14.4 Energy, GHG and Financial Performance

Table 48: Energy Valve ECM Performance Summary

Description	Electricity	Heating Oil	Total
Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	73,977 kWh	22,479 L	1,127 GJ
Annual Savings	2,972 kWh	0 L	11 GJ
Annual Eligible Savings	2,675 kWh	0 L	10 GJ
Annual Eligible GHG Reduction	0.2 tCO_2e	0.0 tCO_2e	0.2 tCO_2e
Annual Cost Savings	$ 500	$ -	$ 500
Lifetime Eligible Savings	40,100 kWh	0 L	144 GJ

Description	Total
Equipment Lifetime	15 Years
ECM Total Cost	$ 4,500
Simple Payback	9.0 Years
ECM NPV	$ 1,070
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 7,500
Lifetime GHG Reductions	2.3 tCO_2e
GHG Abatement Rate	$ 1,968/tCO_2e
Expected Rebate Amount	$ 3,375
ECM total Cost w/ Rebate	$ 1,130
ECM Simple Payback w/ Rebate	2.3 Years
ECM NPV w/ Rebate	$ 4,450

6.14.5 Recommendations

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $1,070. The ECM is estimated to cost $4,500 and payback within 9 years. Funding is available from the Good Energy Program which would drop the capital cost for this ECM to $1,130, resulting in an improved net present value of $4,450 and a payback within 2.5 years.

6.15 ECM-15: Near-Condensing Boilers

6.15.1 Measure Boundary and Baseline

This ECM consists of replacing the existing boilers with new near-condensing boilers. This includes the removal of the boilers and the new equipment. An inventory of existing equipment can be found in Table 49. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 50.

6.15.2 ECM Description

This ECM proposes the installation of two new near-condensing oil-fired boilers. Near-condensing oil-fired boilers have a peak AFUE of 88% and an installed cost of $196.2/kW.

Non-condensing boilers have seasonal efficiencies in the range of 70% to 75%. Poorly maintained boilers may have much lower seasonal efficiencies, usually in the range of 55% to 65%. With new technologies, near-condensing oil-fired boilers can be rated as high as 88% efficient.

Near-condensing boilers can achieve slightly higher efficiencies over non-condensing boilers due to more efficient modulating burner controls. Near-condensing boilers do not condense the flue gases and do not require low return water temperatures otherwise needed for condensing boiler applications. This results in easy retrofit installations without much change to existing hydronic distribution piping/radiators.

Figure 19: Oil Fired Boiler

Table 49: Near-Condensing Boiler with Low-Temperature Radiators Specifications

Description	Existing Equipment	Baseline Equipment	Proposed Equipment
Boiler Type	Non-Condensing		Near-Condensing
Boiler Count (For Replacement)	2	2	2
Boiler Capacity (kW)	169	169	144
Boiler AFUE (%)	68%	83%	86.0%
Life Expectancy[16] (yrs.)	4	25	25
Boiler Installed Cost ($/kW)	-	$ 58.0	$ 196.2
Total Installed Cost $	-	$19,600	$56,510

6.15.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The current equipment capacity and efficiency were estimated based on the interview with building operator, site photos and the equipment age;
- Equipment lifetime was gathered from ASHRAE Equipment Life Expectancy Chart, which prescribed 25 years for a properly maintained boiler.
- The installed cost was estimated from the RSMeans and local supplier data.

- The baseline case assumes that all existing equipment is replaced with minimum efficiency equipment at the end of its rated life. Applicable building and energy codes are referenced to provide minimum performance levels.

This ECM will interact with other HVAC systems by reducing equipment run times and space heating loads. These interactions are accounted for within the simulation.

6.15.4 Energy, GHG and Financial Performance

Table 50: Near-Condensing Boiler ECM Performance Summary-High Efficiency Boiler

Description	Electricity	Heating Oil	Total
Adjusted Baseline Usage	76,949 kWh	22,479 GJ	1,138 GJ
ECM Proposed Usage	76,949 kWh	17,774 GJ	958 GJ
Annual Savings	0 kWh	4,705 GJ	180 GJ
Annual Eligible Savings	0 kWh	4,235 GJ	162 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	11.6 tCO_2e	11.6 tCO_2e
Annual Cost Savings	$ -	$ 4,426	$ 4,426
Lifetime Eligible Savings	0 kWh	105,863 GJ	4,055 GJ

Description	Total
Equipment Lifetime	25 Years
ECM Total Cost	$ 56,510
Simple Payback	12.8 Years
ECM NPV	$ 15,890
Minimum Code NPV	$ 33,520
Lifetime Cost Savings	$ 110,660
Lifetime GHG Reductions	289.5 tCO_2e
GHG Abatement Rate	$ 195/tCO_2e
Expected Rebate Amount	$ 5,000
ECM total Cost w/ Rebate	$ 51,510
ECM Simple Payback w/ Rebate	11.6 Years
ECM NPV w/ Rebate	$ 20,890

Table 51: Non-Condensing Boiler ECM Performance Summary-Baseline Case Boiler

Description	Electricity	Heating Oil	Total
Adjusted Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,949 kWh	18,417 L	982 GJ
Annual Savings	0 kWh	4,062 L	156 GJ
Annual Eligible Savings	0 kWh	3,656 L	140 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	10.0 tCO_2e	10.0 tCO_2e
Annual Cost Savings	$ -	$ 3,821	$ 3,821
Lifetime Eligible Savings	0 kWh	91,395 L	3,500 GJ

Description	Total
Equipment Lifetime	25 Years
Minimum Code Total Cost	$ 19,600
Simple Payback	5.1 Years
Minimum Code NPV	$ 37,530
Lifetime Cost Savings	$ 95,530
Lifetime GHG Reductions	250.0 tCO_2e
GHG Abatement Rate	$ 78/tCO_2e
Expected Rebate Amount	$ 5,000
Min. Code total Cost w/ Rebate	$ 14,600
Min. Code Simple Payback w/ Rebate	3.8 Years
Minimum Code NPV w/ Rebate	$ 41,640

6.15.5 Recommendation

The baseline boilers are recommended for implementation over the high efficiency boilers, and the baseline case boilers are included within the proposed case. The baseline boilers result in an improved net present value of $33,520 over the high efficiency boilers net present value $15,890. The baseline boilers are estimated to cost $19,600, resulting in a payback in just over 5 years. Funding is available for the baseline boilers through the Good Energy Program, resulting in a reduce capital cost of $14,600, resulting in an improved net present value of $41,640 and a payback within 4 years.

6.16 ECM-16: Wall Insulation Upgrade

6.16.1 Measure Boundary and Baseline

This ECM consists of installing additional insulation to the exterior walls of the building. All building zones will be affected. An inventory of existing equipment can be found in Table 52. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 53.

6.16.2 ECM Description

This ECM proposes the installation of Extruded Polystyrene (XPS) insulation: XPS is rigid board insulation that can be fastened to the exterior or interior of walls. XPS has a thermal resistance of RSI-0.034/mm and an installed cost of $43/m²/RSI.

Improving the quality of the walls on a building can result in reduced energy consumption for heating and cooling, reduced condensation and moisture, reduced drafts, enhanced building durability, and improved indoor air quality. It can also ensure no unwanted moisture can enter the building, avoiding moulding and other consequences of moisture.

Table 52: Wall Insulation Upgrade Specifications

Existing Wall Elements	Thickness (mm)	RSI-Value (m²-°C/W)	Proposed Wall Elements	Thickness (mm)	RSI-Value (m²-°C/W)
Exterior Film Coefficient	-	0.03	Exterior Film Coefficient	-	0.03
Metal siding	13	0.00	Metal siding	13	0.00
-	-	-	Rigid XPS Insulation	50	1.72
Plywood	16	0.15	Plywood	16	0.15
Wood Framing 38x184	-	-0.34	Wood Framing 38x184	-	-0.34
Fibreglass insulation	184	4.60	Fibreglass insulation	184	4.60
Polyethylene - low density	0.15	0.00	Polyethylene - low density	0.15	0.00
Drywall	13	0.08	Drywall	13	0.08
Interior Film Coefficient	-	0.12	Interior Film Coefficient	-	0.12
Effective RSI-value	-	4.64	Effective RSI-value	-	6.36

6.16.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- Engineering drawings were available and used within this analysis.
- Insulation has an expected life of over 100 years if it is kept dry and has no physical damages to it. The simulation estimated a 30-year lifetime to be conservative, however, energy savings and insulation effectiveness will be present thereafter.
- The installed cost and the R-values of existing and proposed wall elements were estimated from the RETScreen software and local suppliers.

This ECM will interact with other HVAC systems by reducing equipment run times and space heating and cooling loads. These interactions are accounted for within the simulation.

6.16.4 Energy, GHG and Financial Performance

Table 53: Wall Insulation Upgrade ECM Performance Summary

Description	Electricity	Heating Oil	Total
Adjusted Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	76,913 kWh	21,740 L	1,110 GJ
Annual Savings	36 kWh	739 L	28 GJ
Annual Eligible Savings	32 kWh	665 L	26 GJ
Annual Eligible GHG Reduction	0.0 tCO_2e	1.8 tCO_2e	1.8 tCO_2e
Annual Cost Savings	$ 6	$ 695	$ 701
Lifetime Eligible Savings	1,000 kWh	19,953 L	768 GJ

Description	Total
Equipment Lifetime	30 Years
ECM Total Cost	$ 45,500
Simple Payback	64.9 Years
ECM NPV	-$ 32,800
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 21,040
Lifetime GHG Reductions	54.6 tCO_2e
GHG Abatement Rate	$ 833/tCO_2e
Expected Rebate Amount	$ 5,000
ECM total Cost w/ Rebate	$ 40,500
ECM Simple Payback w/ Rebate	57.8 Years
ECM NPV w/ Rebate	-$ 27,800

6.16.5 Recommendation

This ECM is not recommended for implementation and is not included in the proposed case. This ECM results in a negative net present value of -$32,800, and is estimated to cost $45,500. Funding is available for this ECM through the Good Energy Program, however, still results in a negative net present value of -$27,800.

6.17 ECM-17: Roof Upgrade

6.17.1 Measure Boundary and Baseline

This ECM consists of installing additional insulation to the attic. All zones will be affected. The entirety of the attic area is simulated for insulation, spanning 557 m². An inventory of the existing and proposed roof assemblies can be found in Table 54. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 55.

6.17.2 ECM Description

This ECM proposes the installation of four inches of blow-in cellulose insulation. Blow-in insulation is loose-fill insulation that sits over the top of existing insulation/studs within attic spaces. Blow-in cellulose insulation has a thermal resistance of RSI-0.025/mm and an installed cost of $3.2/m²/RSI.

Improving the quality of the roofing on a building can result in reduced energy consumption for heating and cooling, reduced condensation and moisture, reduced drafts, enhanced building durability, and improved indoor air quality. It can also ensure no unwanted moisture can enter the building through the roof, avoiding moulding and other consequences of moisture.

Table 54: Existing and Proposed Roof Assembly Specifications

Existing Roof Elements	Thickness (mm)	RSI-Value (m²·°C/W)	Proposed Roof Elements	Thickness (mm)	RSI-Value (m²·°C/W)
Exterior Film Coefficient	-	0.03	Exterior Film Coefficient	-	0.03
Metal Siding	13	0.00	Metal Siding	13	0.00
Batt Insulation	300	7.50	Batt Insulation	402	10.1
Wood Framing (10%)	-	-0.35	Wood Framing (10%)	-	-0.35
Vapour Barrier	0.15	0.00	Vapour Barrier	0.15	0.00
Drywall	13	0.08	Drywall	13	0.08
Interior Film Coefficient	-	0.12	Interior Film Coefficient	-	0.12
Effective RSI-value		7.38	Effective RSI-value		9.93

6.17.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- Engineering drawings were available and used within this analysis.
- Insulation has an expected life of over 100 years if it is kept dry and has no physical damages to it. The simulation estimated a 30-year lifetime to be conservative, however, energy savings and insulation effectiveness will be present thereafter
- The installed costs and R-values of the roof assemblies were estimated from the RETScreen software and local suppliers.

This ECM will interact with other HVAC equipment by reducing equipment run times and space heating and cooling loads. These interactions are accounted for within the simulation.

6.17.4 Energy, GHG and Financial Performance

Table 55: Roof Upgrade ECM Performance Summary

Description	Electricity	Heating Oil	Total
Adjusted Baseline Usage	76,949 kWh	22,479 L	1,138 GJ
ECM Proposed Usage	75,950 kWh	22,073 L	1,119 GJ
Annual Savings	999 kWh	406 L	19 GJ
Annual Eligible Savings	899 kWh	365 L	17 GJ
Annual Eligible GHG Reduction	0.1 tCO_2e	1.0 tCO_2e	1.1 tCO_2e
Annual Cost Savings	$ 168	$ 382	$ 550
Lifetime Eligible Savings	27,000 kWh	10,962 L	517 GJ

Description	Total
Equipment Lifetime	30 Years
ECM Total Cost	$ 4,550
Simple Payback	8.3 Years
ECM NPV	$ 5,290
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 16,500
Lifetime GHG Reductions	31.5 tCO_2e
GHG Abatement Rate	$ 144/tCO_2e
Expected Rebate Amount	$ 3,413
ECM total Cost w/ Rebate	$ 1,140
ECM Simple Payback w/ Rebate	2.1 Years
ECM NPV w/ Rebate	$ 8,700

6.17.5 Recommendation

This ECM is recommended for implementation and is included in the proposed case. This ECM results in a positive net present value of $5,290 and is estimated to cost $4,550, resulting in a payback within 9 years. Funding is available for the baseline boilers through the Good Energy Program, resulting in a reduce capital cost of $1,140, resulting in an improved net present value of $8,700 and a payback in just over 2 years.

07 | Renewable Energy Measures

This section covers measures on the generation of renewable energy. The ECMs have the potential to generate energy onsite. Some renewable energy measures are recommended contingent upon other non-renewable measures being implemented first. This will be stated in each renewable ECM, wherever applicable.

7.1 REM-1: Solar Photovoltaic System

7.1.1 Measure Boundary & Baseline

The Dawson City Administration (City Hall/Fire Hall) building does not have any renewable energy sources. The building's electricity is provided entirely by the electricity grid. A grid-connected solar photovoltaic (PV) system could be an ideal renewable energy source due to the available roof area exposed to the sun. The building is covered by a slanted (one side) roof, with minimal penetrations of shading. Available roof areas for solar would need to be verified, as the roof was inaccessible during the site walk through.

An inventory of proposed equipment can be found in Table 56. The total annual energy consumption before and after implementation along with the total estimated installed cost can be found in Table 57. See Appendix for helioscope results.

7.1.2 REM Description

It is proposed that a solar PV array is installed on the building. A solar PV system would consist of solar modules on the roof and inverters interconnected into the building's electrical distribution equipment. When the sun is shining on the array, the solar modules produce power and the building will draw electricity from the PV system. If the PV system is producing more power than the building demands, the excess power is exported back onto the electrical grid, and the building will receive a credit on its bill. When the system is not producing enough power to meet the electricity demand, the building draws electricity from the grid as it does today and would be billed on the amount of electricity drawn from the grid.

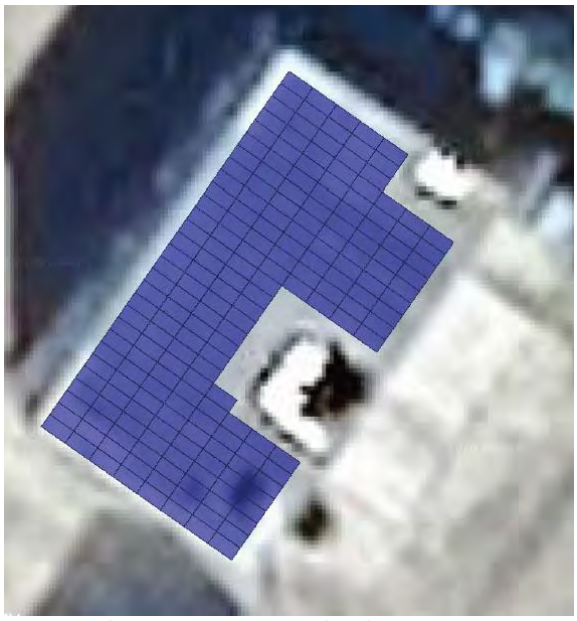


Figure 20: Proposed Solar Layout

The size and cost of the recommended PV system consider available shade-free rooftop space, roof slope and orientation, and the building's estimated annual electricity consumption after all other proposed ECM's have been implemented. Additional model de-rates were input into the analysis to address shading, snow accumulation, soiling, degradation and inverter efficiencies which will reduce the overall energy generation capability of the PV system.

Reducing the building's energy consumption should always be considered before installing energy generation equipment. It is generally more cost-effective to reduce electricity consumption prior to sizing the PV system, as doing so will reduce the required system size and cost.

The roof sections considered for PV installation are shown on the aerial view in Figure 20. The recommended PV system is 39.4 kW, producing approximately 30,950 kWh annually, and covering approximately 56 % of the building's expected annual electrical use after all proposed electrical upgrades have been implemented.

Proposed Solar PV modules specifications can be seen in Table 56.

Table 56: Solar PV System Specifications

Description	Existing Equipment
Type	Hanwha, Q.PEAK 355 W
Count (ea.)	111
Model # (Manufacturer)	Hanwha
Rated power (W/panel)	355 W
Rated DC power capacity (kW)	39.4
Azimuth (°)	125.811
Tilt from horizontal (°)	7.7
Life Expectancy (yrs.)	25
Cost/Watt ($/W)	2.90

7.1.3 Assumptions and Interactions

The following assumptions were used in the savings calculation of this ECM:

- The solar PV design software Helioscope was used to calculate losses due to shading, wire loss, inverter losses, snow, dust, etc.
- A 7.7˚ solar mounting angle was used for available sloped roof solar racking systems.
- The size of the suggested solar PV array in this ECM assumes that all recommended ECM's proposed in this report will be implemented prior to the installation of the PV array.
- Financial analysis was carried out estimating that 100% of the solar energy produced after installation of all recommended ECMs by the PV array will be used on-site.
- The installed cost was estimated from a local supplier, solar PV design software, and installation experience.

7.1.4 Energy, GHG and Financial Performance

Table 57: Solar PV System REM Performance Summary

Description	Electricity	Heating Oil	Total
ECM Proposed Usage-Post ECMs	54,814 kWh	2,407 L	290 GJ
ECM Proposed Usage	23,864 kWh	2,407 L	178 GJ
Annual Savings	30,950 kWh	0 L	111 GJ
Annual Eligible Savings	27,855 kWh	0 L	100 GJ
Annual Eligible GHG Reduction	1.6 tCO_2e	0.0 tCO_2e	1.6 tCO_2e
Annual Cost Savings	$ 5,204	$ -	$ 5,204
Lifetime Eligible Savings	696,400 kWh	0 L	2,507 GJ

Description	Total
Equipment Lifetime	25 Year
REM Unit Cost ($/Watt)	2.90
Number of Units (Watts)	39,400
ECM Total Cost	$ 114,260
Simple Payback	22.0 Years
ECM NPV	-$ 32,620
Minimum Code NPV	$ -
Lifetime Cost Savings	$ 130,110
Lifetime GHG Reductions	39.7 tCO_2e
GHG Abatement Rate	$ 2,879/tCO_2e
Expected Rebate Amount	$ 40,000
ECM total Cost w/ Rebate	$ 74,260
ECM Simple Payback w/ Rebate	14.3 Years
ECM NPV w/ Rebate	$ 7,380

7.1.5 Recommendations

The implementation of the Solar PV REM would require a larger capital investment. However, it is anticipated that maximum of $40,000 will be available from the Good Energy (Rebate) Program[17]. Additionally, the Yukon's Micro-Generation Regulation[18] allows reimbursement rate of $0.30 per kWh for hydro grid for a maximum of 65% of annual modelled generation capacity or 32,500 kWh of exported energy. However, for this REM only Good Energy Rebate program is anticipate. This REM is recommended for implementation and included in proposed case on assumption that rebate of $40,000 will be available.

If funding is available, this REM will have positive NPV of $7,380 and payback within 14.5 years. 3D Energy does not guarantee eligibility for any rebate or funding programs. The facility would be responsible for applying to the program.

A detailed solar PV site assessment by an experienced solar installation company and a structural analysis by a structural engineer would be required to determine the suitability of the roof for a PV array. Solar installation companies can typically offer this service during the initial evaluation of the building. There is a cost associated with engaging a structural engineer that is normally included in the final cost. 3D Energy has not carried out a structural review of the roof to ensure it can handle the load of a solar PV system.

08 | Recommended Measurement and Verification

Measurement and verification (M&V) is the process of monitoring and recording energy use within a facility to quantify the savings delivered by energy efficiency upgrades. In its most basic form, M&V can be accomplished by tracking monthly energy billing information. ENERGY STAR Portfolio Manager is a free online program that can be used to track energy and water consumption, monitor building greenhouse gas emissions, and benchmark the performance of a facility.

The historical energy bills and calculated energy use intensity (EUI) form a baseline to which future energy performance can be compared. It is highly recommended that the Portfolio Manager be used to track monthly energy billing information. Contact us for assistance with setting up or navigating the Portfolio Manager program.

More detailed M&V is recommended and can be accomplished by installing monitoring equipment for the main electrical breaker panel, and gas utility meter to record and display real-time energy use data for the facility. This is commonly referred to as submetering and can be applied to monitor the energy use of a whole facility, part of a facility, or individual equipment.

Submeters measure and log building energy consumption data and make it visible remotely through an online monitoring platform. This makes tracking energy use simple and helps to identify sources of energy waste as well as opportunities for energy savings. Additionally, dashboards can be set up in lobby areas to display facility energy use and targets and to encourage occupants to participate in meeting annual energy goals. The figure shows an example of an energy use dashboard displaying hours of high electricity use.

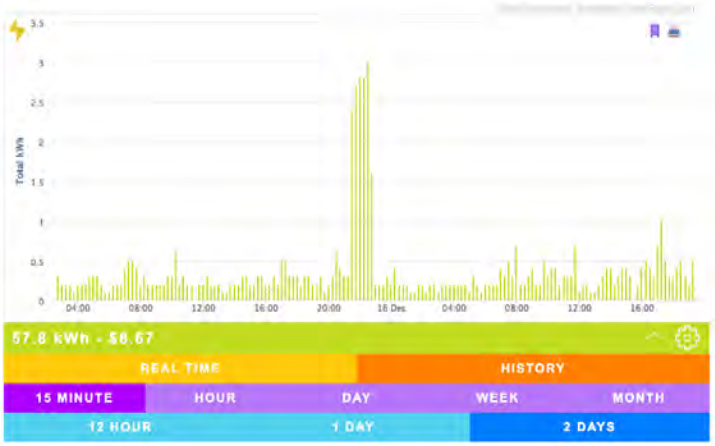


Figure 21: Dashboard displaying electrical energy use

It is recommended that electrical submeters with a web-based monitoring system be installed on the main electrical breaker panel feed conductors and the main Heating Oil supply line so that the facility's electricity and Heating Oil use can be monitored on-site or remotely. This monitoring system would benefit the facility by:

- Providing a simple method of ensuring all non-essential systems are off when the building is unoccupied to avoid unnecessary energy use and cost.
- Logging historical energy use data to verify and quantify the effects of implemented ECMs.
- Allowing malfunctioning building equipment to be identified before a failure occurs.
- Monitoring energy production from any future renewable energy systems installed on the facility.

09 | Proposed Case

9.1 Proposed Model

This section outlines the effect of the proposed ECMs on the energy use breakdown, energy costs, and greenhouse gas emissions. The proposed or project model considers all interactions between ECMs, and usually shows fewer savings than the summation of individual ECMs. A summary of the adjusted baseline model can be found in Appendix C, and the proposed model in Appendix D.

9.1.1 Recommended ECMs

An ECM should be recommended for implementation if it provides energy savings as well as a financial benefit. Net Present Value calculations have been performed for the proposed measures in each ECM, as well as a minimum code case relating to the replacement of the equipment involved in that ECM, if applicable. If the ECM has a greater NPV than its minimum code case, it is recommended for immediate implementation. In some cases, if the ECM is implemented immediately, it will not have a greater NPV than the minimum code case; but if implemented in the year that the existing equipment will need replacing, it will have a greater NPV. In this case, the ECM is recommended for implementation when the existing equipment has reached the end of its expected useful life. Finally, there may be ECMs that are recommended despite not having a greater NPV. This may be the case where there is a deficiency in the current building that requires correcting. This may also be the case if there is a measure that the client has specifically requested or is desirable for other reasons such as improved occupant comfort or aesthetics.

Considering the repair of deficiencies and economic feasibility as the primary selection criteria, the recommended order of implementation is:

- ECM-13: Biomass Boiler
- ECM-1: Door Seals & Sweeps
- ECM-3: LED Lighting Upgrade
- ECM-4: Outdoor Reset Control
- ECM-8: Heating Fluid Additives
- ECM-9: Demand Control Ventilation
- ECM-2: Sensor Suite Thermostats
- ECM-7: Plumbing Fixture Upgrade
- ECM-14: Energy Valve
- ECM-6: Self Sensing Pumps
- ECM-5: AHU-1 Belt Upgrade
- ECM-17: Roof Insulation
- ECM-15: Oil Boiler Upgrade (To Minimum Code if ECM-13 is not installed)
- ECM-12: Recommissioning
- REM-1: Solar PV (With Rebate Only)
- ECM-11: Window Upgrade (To Minimum Code and End of Equipment Life)
- ECM-16: Wall Insulation (Not Recommended based on financial Performance)
- ECM-10: BMC System (Not Recommended based on financial Performance)

ECM-6 is not economical, however, the existing pumps have reached their end of useful life and replacing with new high efficiency motor and self sensing type will reduce electricity consumption as well as maintenance cost. ECM-1,2,3,4,5,7,8,9,12,13,14, and 17 are simulated in the proposed model for economic reasons. ECM-

15 is recommended to proceed if ECM-13 is not installed, or if the existing oil fired boilers are to be replaced due to age related factors. REM-1 is only included in proposed with the rebate provided by the Good Energy Program. ECM-10, 11, and 16 are not recommended due to poor financial performance and are not included in the proposed case.

9.1.2 Energy Analysis

Table 58: Proposed Model ECM Analysis

Description	Electricity	Heating Oil	Wood	Water	Recurring Annual Costs	Peak Demand	Total
Post ECMs Baseline Usage	76,900 kWh	22,479 L	0 kg	110 m^3	-	-	1,138 GJ
ECM Proposed Usage	23,835 kWh	1,149 L	23,700 kg	76 m^3	-	-	473 GJ
Annual Savings	53,065 kWh	21,330 L	-23,700 kg	34 m^3	-	3.0 kW	664 GJ
Annual Eligible Savings	47,759 kWh	19,197 L	-21,330 kg	30 m^3	-	2.7 kW	598 GJ
Annual Eligible GHG Reduction	2.7 tCO_2e	52.5 tCO_2e	-7.6 tCO_2e	0.0 tCO_2e	-	-	47.6 tCO_2e
Annual Cost Savings	$ 8,923	$ 20,066	-$ 3,519	$ -	-$ 980	$ 334	$ 24,824
Lifetime Eligible Savings	1,191,300 kWh	478,858 L	-532,064 kg	758 m^3	-	-	14,914 GJ

Description	Total
Equipment Lifetime	25 Years
Proposed Case Total Cost	$ 360,660
Simple Payback	14.5 Years
Proposed Case NPV	$ 30,010
Minimum Code Case NPV	$ 15,480
Lifetime Cost Savings	$ 618,880
Lifetime GHG Reductions	1,186.9 tCO_2e
GHG Abatement Rate	$ 304/tCO_2e
Expected Rebate Amount	$ 118,588
Total Cost w/ Rebate	$ 242,070
Simple Payback w/ Rebate	9.8 Years
Proposed NPV w/ Rebate	$ 148,590

9.1.3 Final Comments

The energy model with the 14 selected ECMs and 1 REM achieved a total reduction of 19,200 L of heating oil, 47,760 kWh of electricity, 2.7 kW of demand, and 30 m^3 of water, however, results in an increased wood consumption of 21,330 kg due to biomass boiler. This results in approximately $24,820 in savings per year. The selected ECMs have an estimated implementation cost of $360,660 and a payback of 14.5 years. Funding from the Good Energy Program is available for most ECMs, resulting in a reduced capital cost to $242,070, resulting in an improved net present value of $148,590 and a payback within 10 years.

9.2 Energy Consumption Benchmarking

With the proposed ECMs, the facility EUI would be reduced to 0.43 GJ/m^2 from 0.93 GJ/m^2, which translates into an approximate decrease of 54% in facility energy consumption (Figure 22).

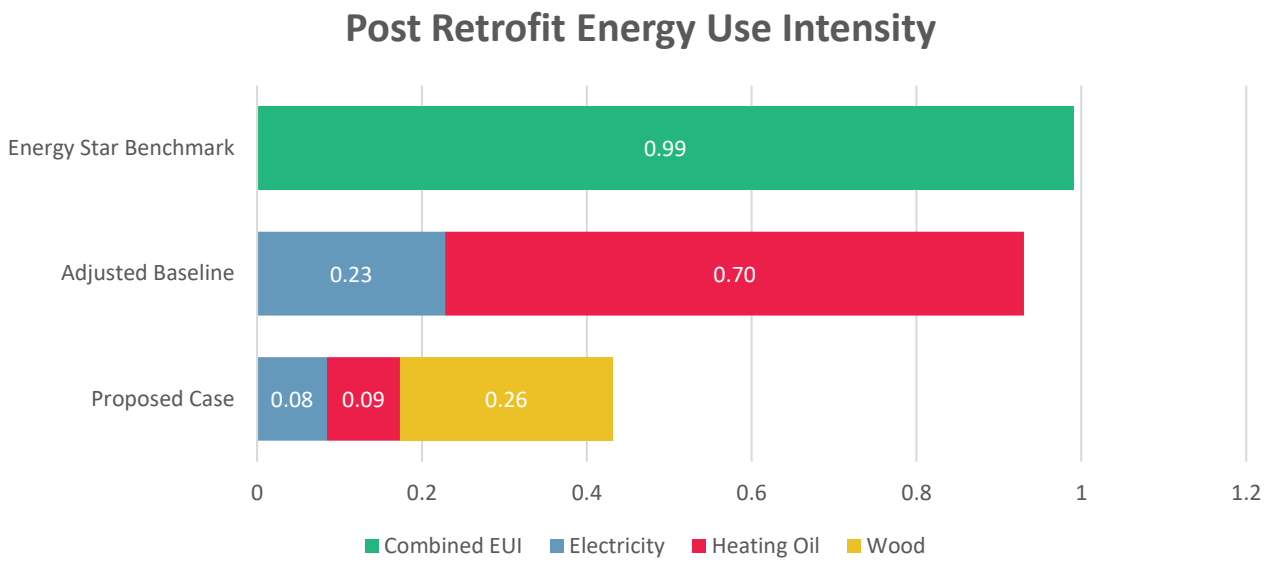


Figure 22: Proposed EUI

9.3 Greenhouse Gas Emission Benchmarking

The proposed facility achieves a 74% reduction in greenhouse gas emissions over the existing facility (Figure 23).

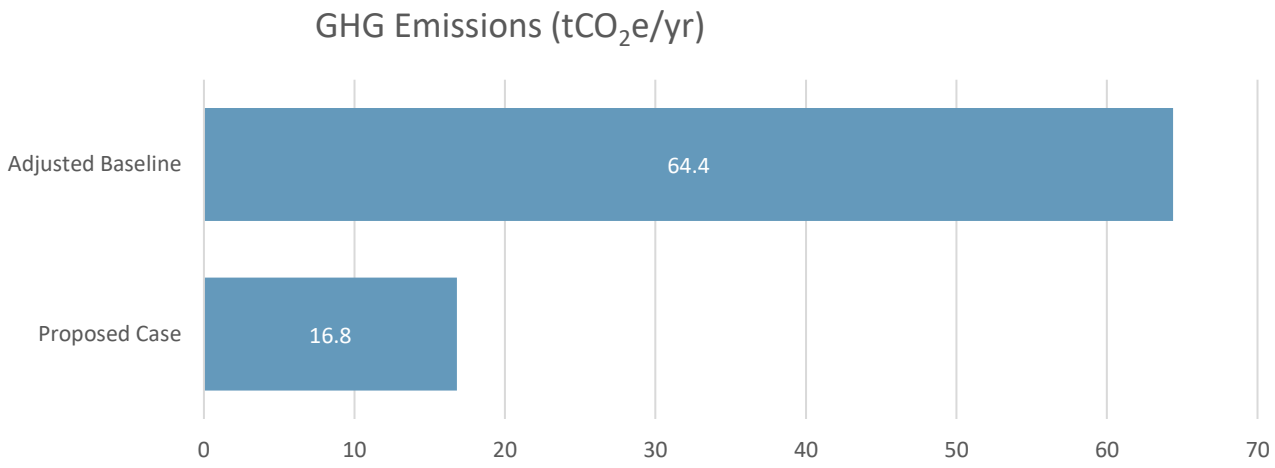


Figure 23: Proposed GHG Reduction

9.4 Energy End-Use Breakdown

Comparing the two graphs (Figure 24) reveals approximately total of 45% in energy savings from ECMs and 9% energy production from REMs, totaling a 54% reduction in energy use from the current building and operations.

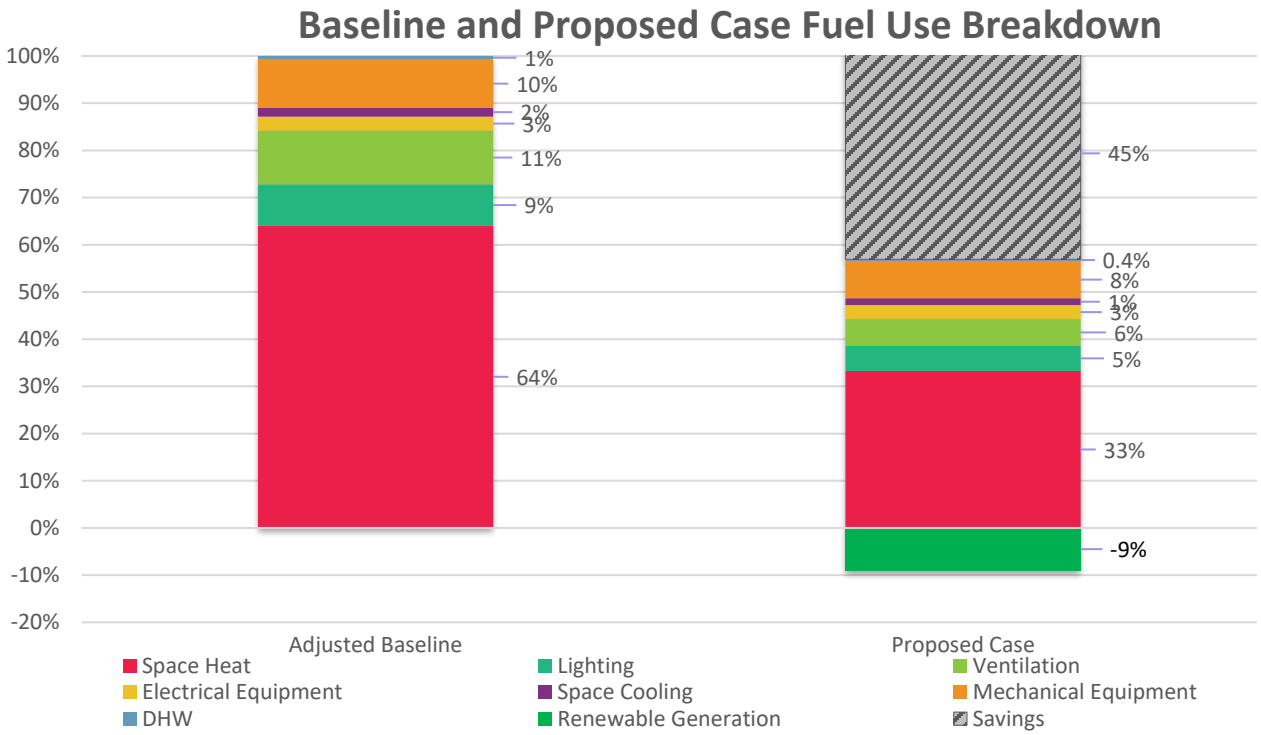


Figure 24: Categorized Energy Consumption for Baseline and Proposed Case

010 | Energy Conservation Measures Summary

Table 59: Energy Savings and GHG Reduction Summary

ECM	Description	Annual Elec. Savings (kWh)*	Annual Heating Oil. Savings (L)*	Annual Wood Savings (Kg)*	Annual Demand Savings (kW)*	Annual Water Savings (m^3)*	Annual GHG Reductions (tCO_2e)	Lifetime (yrs.)	Lifetime GHG Reduction (tCO_2e)
ECM-1	Door Seals & Sweeps	23	3,999	0	0	0	10.9	10	109.4
ECM-2	Sensor Suite Tstat	0	1,833	0	0	0	5.0	15	75.2
ECM-3	LED Lighting Upgrade	10,833	-954	0	3	0	-2.0	39	-78.6
ECM-4	Outdoor Reset Control	13	1,386	0	0	0	3.8	15	56.9
ECM-5	AHU-1 Belt Upgrade	457	-41	0	0	0	-0.1	10	-0.8
ECM-6	Self Sensing Pumps	2,963	-28	0	0	0	0.1	10	0.9
ECM-7	Plumbing Fixture Upgrade	1,004	0	0	0	30	0.1	20	1.1
ECM-8	Fluid Additives	0	2,024	0	0	0	5.5	8	44.3
ECM-9	Demand Control Ventilation	122	1,202	0	0	0	3.3	15	49.4
ECM-10	BMC System	3,250	2,744	0	0	0	7.7	15	115.4
ECM-11	Window Upgrade	639	1,425	0	0	0	3.9	30	118.0
ECM-12	Recommissioning	1,710	2,024	0	0	0	5.6	5	28.2
ECM-13	Biomass Boiler	0	16,185	-34,200	0	0	32.0	25	800.3
ECM-14	Energy Valve	2,675	0	0	0	0	0.2	15	2.3
ECM-15	Oil Boiler Upgrade	0	3,656	0	0	0	10.0	25	289.5
ECM-16	Wall Insulation	32	665	0	0	0	1.8	30	54.6
ECM-17	Roof insulation	899	365	0	0	0	1.1	30	31.5
REM-1	Solar PV	27,855	0	0	0	0	1.6	25	39.7
	Proposed Case†	47,759	19,197	-21,330	3	30	47.6	25	1,186.9

* All savings values in the summary tables are eligible savings (factor of 0.9 applied).

† Proposed case values do not equal the sum of proposed ECMs because the simulation accounts for interactions between ECMs. Greyed out ECMs are not included into the proposed model. Proposed case values do not include Incentives.

Table 60: Financial Analysis Summary

ECM	Description	Total Cost ($)	Annual Cost Savings ($)	Simple Payback (yrs.)	ECM NPV ($)	Baseline NPV ($)	Potential Rebate ($)
ECM-1	Door Seals & Sweeps	2,250	4,184	0.5	33,150	-	1,688
ECM-2	Sensor Suite Tstat	9,500	1,436	6.6	7,790	-	5,000
ECM-3	LED Lighting Upgrade	38,730	1,361	28.5	-13,070	-41,140	0
ECM-4	Outdoor Reset Control	3,500	1,451	2.4	13,360	-	2,625
ECM-5	AHU-1 Belt Upgrade	180	43	4.2	160	-	0
ECM-6	Self Sensing Pumps	9,600	524	18.3	-5,350	-6,000	5,000
ECM-7	Plumbing Fixture Upgrade	990	188	5.3	1,570	-	743
ECM-8	Fluid Additives	2,870	2,116	1.4	11,960	-	2,153
ECM-9	Demand Control Ventilation	6,200	1,279	4.8	8,650	-	4,650
ECM-10	BMC System	64,480	3,476	18.6	-24,370	-	5,000
ECM-11	Window Upgrade	57,340	1,609	35.6	-28,290	-13,410	5,000
ECM-12	Recommissioning	6,590	2,435	2.7	4,590	-	4,943
ECM-13	Biomass Boiler	137,340	10,775	12.7	43,800	-	40,000
ECM-14	Energy Valve	4,500	500	9.0	1,070	-	3,375
ECM-15	Oil Boiler Upgrade	19,600	4,426	12.8	37,530	37,530	5,000
ECM-16	Wall Insulation	45,500	701	64.9	-32,800	-	5,000
ECM-17	Roof insulation	4,550	550	8.3	5,290	-	3,413
REM-1	Solar PV	114,260	5,204	22.0	-32,620	-	40,000
	Proposed Case	360,660	24,824	14.5	30,010	15,480	118,5885

011 | Appendices

11.1 Appendix A: Historical Energy Billing Data

Date	Heating Oil		Electricity		
	Usage (L)	Total Bill ($)	Usage (kWh)	Demand (kW)	Total Bill ($)
Jan-17	3941.10	$3,479.60	6060	25.98	$1,099.15
Feb-17	2961.20	$2,661.83	6960	25.98	$1,236.70
Mar-17	4243.70	$3,827.39	6360	25.98	$1,145.00
Apr-17	1827.90	$1,601.07	5640	25.98	$1,034.99
May-17	628.40	$551.04	7080	25.98	$1,255.04
Jun-17	-	-	5520	25.98	$1,009.35
Jul-17	364.50	$281.36	6000	25.98	$1,059.94
Aug-17	-	-	5340	25.98	$995.30
Sep-17	1165.70	$1,024.57	4920	25.98	$965.80
Oct-17	1997.60	$1,761.68	5760	25.98	$1,100.78
Nov-17	2902.80	$2,931.54	6480	25.98	$1,216.47
Dec-17	4393.30	$4,568.59	6300	25.98	$1,188.38
Jan-18	3653.40	$3,850.32	6300	22.50	$1,160.11
Feb-18	4312.10	$4,635.08	6900	21.72	$1,249.48
Mar-18	2925.00	$3,070.95	6600	21.72	$1,201.01
Apr-18	2204.70	$2,292.67	5400	21.72	$1,007.17
May-18	549.50	$585.16	6480	28.08	$1,243.23
Jun-18	356.40	$403.41	6840	29.82	$1,318.22
Jul-18	515.10	$554.20	6960	31.62	$1,355.89
Aug-18	129.70	$137.86	6540	27.36	$1,253.49
Sep-18	324.00	$343.41	5520	27.36	$1,087.54
Oct-18	2514.30	$2,685.02	5340	21.72	$1,003.63
Nov-18	-	-	6360	21.72	$1,169.60
Dec-18	-	-	6960	21.72	$1,267.20
Jan-19	4850.80	$4,581.37	7680	21.66	$1,383.77
Feb-19	3728.20	$3,588.02	7080	22.26	$1,291.95
Mar-19	3695.30	$3,892.62	6360	22.26	$1,177.93
Apr-19	2461.80	$2,635.11	5820	24.30	$1,148.28
May-19	1042.80	$1,141.24	7740	29.64	$1,526.06
Jun-19	476.90	$522.87	6540	29.64	$1,322.27
Jul-19	-	-	6720	26.94	$1,325.30
Aug-19	-	-	5040	24.78	$1,014.64
Sep-19	294.40	$297.37	4740	22.26	$939.62
Oct-19	1198.60	$1,294.60	7620	22.26	$1,425.42
Nov-19	3202.90	$3,469.07	7260	22.27	$1,382.45
Dec-19	833.70	$959.67	-	-	-

11.2 Appendix B: Utility Rate Code

THE YUKON ELECTRICAL COMPANY LIMITED
An ATCO Company

YUKON ENERGY

Page 1 of 2
Effective: 2011 07 01
Supercedes: 1997 01 01

RATE SCHEDULE 2170
GENERAL SERVICE
HYDRO, GOVERNMENT - MUNICIPAL

AVAILABLE:

In Carcross, Carmacks, Champagne, Dawson, Elsa, Faro, Haines Junction, Johnson's Crossing, Keno, Marsh Lake, Mayo, Pelly Crossing, Stewart Crossing, Ross River, Tagish, Teslin and Whitehorse.

APPLICABLE:

To any use of electric energy not inconsistent with safe and adequate service to all non - government customers of the Company, except as more favorable options may apply.

RATE:

Charges for service in any one billing month shall be the sum of the following:

(a) Demand Charge

All kW of billing demand	$7.39 / kW

(b) Energy charge

For the first 2,000 kW.h	10.00 ¢/kW.h
Between 2,001 - 15,000 kW.h	12.88 ¢/kW.h
Between 15,001 - 20,000 kW.h	15.68 ¢/kW.h
For energy in excess of 20,000 kW.h	12.86 ¢/kW.h

MINIMUM MONTHLY BILL:

Shall be the Demand Charge but not less than $36.95.

BILLING DEMAND:

The billing demand may be estimated or measured and will be the greater of the following:

(a) The highest metered demand during the billing period.

(b) The highest metered demand during the 12 months ending with the current billing month, excluding the months April through September.

(c) The estimated demand.

(d) 5 kilowatts.

Approved in Board Order 2011-05 (April 28, 2011)
YECL/YEC Joint 2009 Phase II

THE YUKON ELECTRICAL COMPANY LIMITED
An ATCO Company

YUKON ENERGY

Effective: 2011 07 01
Supercedes: 1997 01 01

Rate Schedule 2170 (Continued)

POWER FACTOR:

The foregoing rate is designed on the assumption that the customer will maintain a power factor of 90 percent or better during the period of his peak load. In those cases in which, by estimate or test, such power factor is not maintained, the customer's demand will be measured in kV.A and for the purposes of application of the foregoing rate, one kV.A shall be taken as one kW.

RATE MODIFICATIONS APPLICABLE:

For customers who have small constant loads, and whose monthly energy requirements can be estimated closely, see Rider B. For fuel adjustment Rider, see Rider F.

TERMS AND CONDITIONS OF SERVICE:

The Company's Terms and Conditions of Service approved by the Yukon Utilities Board form part of this rate schedule and apply to the Company and every customer supplied with electric service by the Company in the Yukon and British Columbia. Copies of the Terms and Conditions of Service are available for inspection in the offices of the Company during normal working hours.

11.3 Appendix C: Calibrated Baseline Model

Project verification

Fuel type	Fuel consumption - unit	Fuel consumption - historical	Fuel consumption: Base case	Fuel consumption - variance
Diesel (#2 oil)	L	21,965	22,479	2.3%
Wood Chips	kg		0	
Electricity	kWh	75,950	76,949	1.3%

Savings

Fuel consumption / kWh	Heating kWh	Cooling kWh	Electricity kWh	Total kWh	Plan kWh	Variance %
Base case	241,455	5,805	68,844	316,104	293,510	7.7%
Proposed case	108,862	5,021	17,631	131,514	249,484	-47.3%
Fuel saved	132,593	784	51,213	184,590	44,027	319%
Fuel saved - %	54.9%	13.5%	74.4%	58.4%	15%	

Commercial/Institutional - Office building

- Fuels & schedules
  - Electricity and fuels
    - Wood Chips
  - Schedules
- Equipment
  - Heating
    - Boiler
    - Water heater
    - Biomass Boiler
  - Cooling
    - AHU-1
- End-use
  - AHU-1 SF
  - AHU-1 RF
  - FCU- SF
  - UH Fan
  - CUH Fan
  - Condenser Fan
  - Ceiling Fans
  - Exhaust Fan (3.1 to 3.5)
  - Exhaust Fan (4.1-4.2)
  - Process electricity
    - RCx
    - Energy Valve
  - Process heat
    - Heating Fluid Additives Oil
    - RCx Oil
    - Wood Chip Boiler
    - Heating Oil Boilers
    - Heating Fluid Additives Wood
    - RCx Wood
- Optimize supply
  - Power
    - Photovoltaic
- Summary
- Include measure?
- Comparison

Show: All; Fuel consumption - base case

	Heating GJ	Cooling GJ	Electricity GJ	Incremental initial costs $	Fuel cost savings $	Incremental O&M savings $	Simple payback yr	Include measure?
Heating								
Boiler				0	0	0		☐
Water heater				0	0	0		☐
Biomass Boiler				0	0	0		☐
Cooling								
AHU-1				0	0	0		☐
Building envelope								
Musuem	90.6			0	0	0		☐
Fire Hall	361			0	0	0		☐
Main Floor - General	108	3.4		0	0	0		☐
Second Floor - Council Chamber	24.4	3.2		0	0	0		☐
Second Floor - General	147	11.5		0	0	0		☐
Ventilation								
AHU-1	128	2.8		0	0	0		☐
FCU-1.1	2			0	0	0		☐
Lights								
Museum			4.2	0	0	0		☐
Fire Hall			37.7	0	0	0		☐
Main Floor General			9	0	0	0		☐
Second Floor - Council Chamber			1.5	0	0	0		☐
Second Floor - General			35.9	0	0	0		☐
Mezzanine			0.32	0	0	0		☐
Exterior			9.9	0	0	0		☐
Electrical equipment								
Plug Load			23.5	0	0	0		☐
Elevator			10.2	0	0	0		☐
Hot water								
DHWH	8.3			0	0	0		☐
Pumps								
P-1, P-2			24.3	0	0	0		☐
Fans								
AHU-1 SF			35.2	0	0	0		☐
AHU-1 RF			21.4	0	0	0		☐
FCU- SF			0.19	0	0	0		☐
UH Fan			21.8	0	0	0		☐
CUH Fan			1	0	0	0		☐
Condenser Fan			0.16	0	0	0		☐
Ceiling Fans			9	0	0	0		☐
Exhaust Fan (3.1 to 3.5)			2.2	0	0	0		☐
Exhaust Fan (4.1-4.2)			0.37	0	0	0		☐
Process electricity								
RCx			0	0	0	0		☐
Energy Valve			0	0	0	0		☐
Process heat								
Heating Fluid Additives Oil	0			0	0	0		☐
RCx Oil	0			0	0	0		☐
Wood Chip Boiler	0			0	0	0		☐
Heating Oil Boilers	0			0	0	0		☐
Heating Fluid Additives Wood	0			0	0	0		☐
RCx Wood	0			0	0	0		☐
Power								
Photovoltaic				0	0	0		☐
Total	**869**	**20.9**	**248**	**0**	**0**	**0**		

11.4 Appendix D: Proposed Case Model

Project verification

Fuel type	Fuel consumption - unit	Fuel consumption - historical	Fuel consumption - Proposed case	Fuel consumption - variance
Diesel (#2 oil)	L	21,965	1,149	-94.8%
Wood Chips	kg		23,700	
Electricity	kWh	75,950	23,835	-68.6%

Savings

Fuel consumption / kWh	Heating kWh	Cooling kWh	Electricity kWh	Total kWh	Plan kWh	Variance %
Base case	241,455	5,805	68,844	316,104	293,510	7.7%
Proposed case	108,862	5,021	17,631	131,514	249,484	-47.3%
Fuel saved	132,593	784	51,213	184,590	44,027	319%
Fuel saved - %	54.9%	13.5%	74.4%	58.4%	15%	

Commercial/Institutional - Office building

- Fuels & schedules
  - Electricity and fuels
    - Wood Chips
  - Schedules
- Equipment
  - Heating
    - Boiler
    - Water heater
    - Biomass Boiler
  - Cooling
    - AHU-1
- End-use
  - AHU-1 SF
  - AHU-1 RF
  - FCU- SF
  - UH Fan
  - CUH Fan
  - Condenser Fan
  - Ceiling Fans
  - Exhaust Fan (3.1 to 3.5)
  - Exhaust Fan (4.1-4.2)
  - Process electricity
    - RCx
    - Energy Valve
  - Process heat
    - Heating Fluid Additives Oil
    - RCx Oil
    - Wood Chip Boiler
    - Heating Oil Boilers
    - Heating Fluid Additives Wood
    - RCx Wood
- Optimize supply
  - Power
    - Photovoltaic
- Summary
  - Include measure?
  - Comparison

Show: All — Fuel consumption - proposed case

	Heating GJ	Cooling GJ	Electricity GJ	Incremental initial costs $	Fuel cost savings $	Incremental O&M savings $	Simple payback yr	Include measure?
Heating								
Boiler				0	1,219	0	0.0	☑
Water heater				0	0	0		☑
Biomass Boiler				0	0	0		☑
Cooling								
AHU-1				0	0	0		☑
Building envelope								
Musuem	57.1			0	135	0	0.0	☑
Fire Hall	204			0	720	0	0.0	☑
Main Floor - General	58.8	3		0	246	0	0.0	☑
Second Floor - Council Chamber	14.8	2.9		0	49	0	0.0	☑
Second Floor - General	83.5	10.4		0	317	0	0.0	☑
Ventilation								
AHU-1	69.5	1.7		0	308	0	0.0	☑
FCU-1.1	1.6			0	0.37	0	0.0	☑
Lights								
Museum			3.1	0	32	0	0.0	☑
Fire Hall			24.6	0	365	0	0.0	☑
Main Floor General			4.6	0	121	0	0.0	☑
Second Floor - Council Chamber			0.98	0	13.1	0	0.0	☑
Second Floor - General			16.2	0	547	0	0.0	☑
Mezzanine			0.21	0	3.2	0	0.0	☑
Exterior			7.6	0	65.7	0	0.0	☑
Electrical equipment								
Plug Load			23.5	0	0	0		☑
Elevator			10.2	0	0	0		☑
Hot water								
DHWH	4.3			0	112	0	0.0	☑
Pumps								
P-1, P-2			12.5	0	328	0	0.0	☑
Fans								
AHU-1 SF			34.1	0	29.2	0	0.0	☑
AHU-1 RF			20.8	0	17.7	0	0.0	☑
FCU- SF			0.19	0	0	0		☑
UH Fan			21.8	0	0	0		☑
CUH Fan			1	0	0	0		☑
Condenser Fan			0.16	0	0	0		☑
Ceiling Fans			9	0	0	0		☑
Exhaust Fan (3.1 to 3.5)			2.2	0	0	0		☑
Exhaust Fan (4.1-4.2)			0.37	0	0	0		☑
Process electricity								
RCx			-7.5	0	207	0	0.0	☑
Energy Valve			-10.7	0	297	0	0.0	☑
Process heat								
Heating Fluid Additives Oil	-9.8			0	76.6	0	0.0	☑
RCx Oil	-8.8			0	68.9	0	0.0	☑
Wood Chip Boiler	382			0	-4,345	0	0.0	☑
Heating Oil Boilers	-391			0	3,063	0	0.0	☑
Heating Fluid Additives Wood	-38.2			0	434	0	0.0	☑
RCx Wood	-35.2			0	276	0	0.0	☑
Power								
Photovoltaic			-111	0	3,095	0	0.0	☑
Total	**392**	**18.1**	**63.5**	**0**	**7,800**	**0**	**0.0**	

11.5 Appendix E: Solar PV Helioscope Results

Annual Production Report produced by Brandon Sandmaier

Design 1 Dawson city - Admin/Fire hall, 1336 Front St, Dawson City, YT Y0B 1G0

Report

Project Name	Dawson city - Admin/Fire hall
Project Description	C15-2957B
Project Address	1336 Front St, Dawson City, YT Y0B 1G0
Prepared By	Brandon Sandmaier brandon@generateenergy.ca

System Metrics

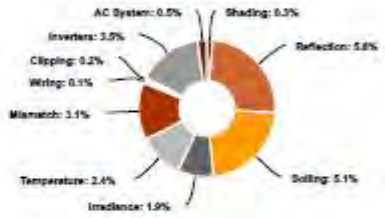
Design	Design 1
Module DC Nameplate	39.4 kW
Inverter AC Nameplate	30.0 kW Load Ratio: 1.31
Annual Production	30.55 MWh
Performance Ratio	79.2%
kWh/kWp	785.5
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Simulator Version	52a80ff061-ddb408471b-b410765f13-2dc56e59f0

Project Location

Monthly Production

Month	GHI (kWh/m²)	POA (kWh/m²)	Shaded (kWh/m²)	Nameplate (kWh)	Grid (kWh)
January	5.4	6.9	6.8	114.2	94.8
February	23.2	28.7	28.6	753.9	738.3
March	70.3	79.7	79.6	2,397.6	2,328.9
April	118.3	125.3	125.1	4,574.7	4,219.2
May	159.3	163.6	163.0	5,991.7	5,278.7
June	165.2	168.2	167.5	6,169.4	5,273.5
July	160.0	163.7	163.1	6,006.8	5,120.2
August	120.7	126.9	126.6	4,641.0	4,045.1
September	71.4	77.4	77.2	2,794.2	2,503.2
October	32.0	37.0	36.9	1,083.5	1,014.3
November	9.5	12.5	12.4	314.0	288.6
December	1.5	1.7	1.7	28.5	18.6

Sources of System Loss



Annual Production Report produced by Brandon Sandmeier

Annual Production

	Description	Output	Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	936.9	
	POA Irradiance	991.6	5.8%
	Shaded Irradiance	988.5	-0.3%
	Irradiance after Reflection	932.8	-5.6%
	Irradiance after Soiling	885.2	-5.1%
	Total Collector Irradiance	885.2	0.0%
Energy (kWh)	Nameplate	34,864.6	
	Output at Irradiance Levels	34,197.0	-1.9%
	Output at Cell Temperature Derate	33,371.8	-2.4%
	Output After Mismatch	32,331.5	-3.1%
	Optimal DC Output	32,293.5	-0.1%
	Constrained DC Output	32,237.4	-0.2%
	Inverter Output	31,109.1	-3.5%
	Energy to Grid	30,953.6	-0.5%
Temperature Metrics			
	Avg. Operating Ambient Temp		2.3 °C
	Avg. Operating Cell Temp		13.0 °C
Simulation Metrics			
	Operating Hours		4586
	Solved Hours		4586

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters	Rack Type	a	b	Temperature Delta
	Fixed Tilt	-3.56	-0.075	3°C
	Flush Mount	-2.81	-0.0455	0°C
	East-West	-3.56	-0.075	3°C
	Carport	-3.56	-0.075	3°C

Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	50	25	18	2	2	2	2	2	2	18	25	50

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations	Module	Uploaded By	Characterization
	Q.PEAK L-G4.5 355 (Hanwha)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations	Device	Uploaded By	Characterization
	Symo 15.0-3 208 (Fronius)	Folsom Labs	Spec Sheet

Components

Component	Name	Count
Inverters	Symo 15.0-3 208 (Fronius)	2 (30.0 kW)
Strings	10 AWG (Copper)	9 (341.3 ft)
Module	Hanwha, Q.PEAK L-G4.5 355 (355W)	111 (39.4 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	9-17	Along Racking
Wiring Zone 2	12	9-17	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Portrait (Vertical)	7.7°	125.811°	0.2 ft	1x1	57	57	20.2 kW
Field Segment 2	Flush Mount	Portrait (Vertical)	7.7°	125.811°	0.2 ft	1x1	54	54	19.2 kW

Annual Production Report produced by Brandon Sandmaier

Detailed Layout

11.6 Appendix F: Glossary

Adjusted Baseline: If equipment or components of a facility are broken or inoperable, they should be replaced prior to any upgrades to ensure proper facility function. If there is damaged equipment, it is assumed that it has been in that state throughout the billing period. To account for efficiency upgrades to damaged equipment, an adjusted baseline will be created which simulates the broken equipment to be operating as originally designed. This allows for proper energy and costs savings comparisons between standard and high-efficiency equipment.

ASHRAE: American Society of Heating, Refrigeration and Air-conditioning Engineers, Inc.

Assumptions: For each ECM, all assumptions on performance, lifespan, replacement costs, schedule, and the efficiency of existing equipment will be stated.

CFM: Cubic Feet per Minute

Code Minimum Recommendations: At times the Alberta Building Code or the National Energy Building Code will be referenced for replacement or installation of new equipment. The referencing of building codes does not indicate that any specific code is in effect or applicable. Any building codes referenced in this document provide the minimum recommended equipment performance levels only.

Costing: Material and installation costs are estimated using RETScreen Expert, manufacturer quotes, or RS Means. This section may include corrections to facility deficiencies or components that are performing poorly compared to current standards. Additional costs may be included to account for specific installation issues or site location. All equipment lifespans, material/installation costs, specified in retrofits or presented in the ECMs are for example and modelling purposes only.

ECM NPV: The net present value of the energy conservation measure assumes the replacement of the current equipment with high-efficiency equipment in year one. These efficiencies may be equal to or above current code requirements.

EF: Efficiency or Energy Factor

Equipment Selection: Proposed equipment for each ECM was selected based on existing site conditions and high-efficiency equipment specifications. Manufacturers selected are for example purposes only. Any similar model and/or manufacturer can be implemented based on external factors; however, performance may change if installed equipment differs from proposed equipment.

GPM: Gallons Per Minute

Interactions: An ECM can affect the performance and characteristics of another ECM by altering the load profile and/or flow of energy. RETScreen Expert accounts for interactions between the ECMs. Overall energy and financial performance of the proposed case will be less than the sum of individual ECMs because of the interactions.

Life Cycle Cost Analysis: A fuel escalation factor of 1% and a discount rate of 5% are used in the Life Cycle Cost Analysis of the ECMs. Life Cycle Costing for ECMs and the proposed case requires using a weighted average to calculate the average lifespan of ECMs with multiple installations. This typically affects lighting upgrades and the proposed case model. Life cycle costing for an ECM and the proposed case excludes any financial rebates or incentives.

LPF: Litre Per Flush

Minimum Code NPV: Minimum code net present value is based on the replacement of current equipment with equivalent equipment or equipment meets the minimum applicable code at the end of its rated life. Applicable building codes are referenced to provide minimum performance.

No-cost/low-cost Energy Conservation Measures (ECMs): Those that save significant energy but require zero to small initial capital investments, typically up to $1,000.

Uncertainty: As specified in the *Quantification Protocol for Energy Efficiency in Commercial and Institutional Buildings*[xix], a factor is applied to energy savings to account for uncertainty. Uncertainty for each ECM is estimated to have an impact of less than 5% of the baseline energy use and less than 15% of any individual ECM. If the uncertainty for an ECM is larger than 50%, an additional description will be included with further recommendations or post-retrofit measurements that would reduce uncertainty. An uncertainty factor of 0.9 is applied to all measures.

11.7 Appendix G: References

[1] Office of Energy Efficiency & Renewable Energy – US Department of Energy (2018), *Understanding the Efficiency Rating of Furnaces and Boilers*, https://www.energy.gov/energysaver/home-heating-systems/furnaces-and-boilers
[2] ASHRAE (2017), *ASHRAE Equipment Life Expectancy Chart,* http://empoweringpumps.com/wp-content/uploads/sites/3/2017/01/ASHRAE_Chart_HVAC_Life_Expectancy_2017.pdf
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Client: City of Dawson

Administration Building

Recommissioning and Engineering Assessment Report

HVAC Tender Version

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Executive Summary

This report is a record of recommissioning and assessment activities of the City of Dawson Administration Building/Firehall located in Dawson City, Yukon. It explains components of the facility that were investigated during this project and provides guidance to building operators and project managers with regards to how to proceed with energy saving and greenhouse gas reducing projects. This project was initiated to aid proponents in bidding and provide a detailed scope of work as well as to comment on proposed ECMs from the Energy Audit Report.

This version of the report has been edited to inform proponents of the scope of work that they are bidding on. The action items applicable to the scope of work for this project are indicated in section 5. Sections 1-4 are provided to proponents to give background information.

Proponents to the Request for Proposals should utilize this report to assist with preparing their submission documents. Section 5 lays out the action items/criteria of the project that are being completed and bid on as part of the detailed design. The proponents are instructed to reference each item in section 5 individually as each item will be individually assessed according to the item reference number. This is intended to assist proponents with organizing their submissions and for the owner with regards to scoring proposals.

At the request of the building owner this project focused on the future state of the building rather than its current state. Recommissioning activities took place during the winter.

Operators should familiarize themselves with recommissioning and energy auditing reports to assist with operating the building. Project managers should make themselves familiar with energy auditing and recommissioning reports prior to contracting services or making alterations to a building that has been recommissioned or energy audited to make the best usage of their time and resources. Energy Audit reports are a surface level investigation while recommissioning projects dig into the details of how a building is operating.

Operators should endeavour to continuously commission equipment through the life of a building.

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Buildings are dynamic systems that are constantly changing according to operator inputs and environmental conditions. The observations, findings and operational recommendations within this report may change based on the actions taken by various parties involved with the facility. Terms such as "likely", "potentially", "approximately" etc. are used throughout the document because changes to a single system may greatly impact other systems within the facility rendering findings and predictions as recorded inaccurate.

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1 - Introduction

Future Proof My Building Consulting Ltd. (FPMBC) was contracted by the City of Dawson to carry out recommissioning activities at the Fire Hall/Administration Building in Dawson, YT to identify sources of excessive energy usage in the facility and provide recommendations for the correction of mechanical, electrical and control systems that can save energy in the facility and reduce greenhouse gas (GHG) emissions. The project is intended to help clarify and facilitate the successful implementation of energy conservation measures (ECMs) noted in the Energy Audit Report issued by 3D Energy Limited on April 17, 2020. The Energy Audit inspection appears to have been conducted in January or February of 2019.

Site visits by FPMBC were carried out on December 15 and 17th to assess equipment and the building in general and test controls, mechanical and electrical systems within the building. During the thermal inspection on December 15 the outdoor air temperature was -21°C. On December 17, it was -37°C according to the Weather Network.

This report highlights issues identified and opportunities to save energy within the facility and shall help inform proponents of issues that must be addressed as part of energy efficiency upgrades to the building. Consultation with building operators, engineers, technicians, design consultants and contractors will likely be necessary to address the issues and opportunities identified within this report. This report in whole or in part can be issued to the appropriate parties to request resolutions, provide guidance with detailed designs, provide answers to inquiries or for the sake of providing clarification.

1.1 - Definitions, Acronyms etc.

ESC – Energy Solutions Centre

FPMBC – Future Proof My Building Consulting Ltd.

AHU – Air Handling Unit

AH – Air Handler also referred to as RTU and AHU

BMS - Building Management System – the computer/software that displays the graphics and allows a building operator to control components within the building. The BMS is essentially a SCADA system that displays trends, graphics and monitors the control system to visually describe the state of equipment within a building.

City – Referring to the City of Dawson

CU – Cooling Unit

Cx – short for commissioning

DMP/DMPR – Damper – a device that opens and closes to allow air flow or restrict airflow.

EAD – Exhaust Air Dampers – dampers that exhaust return air to the exterior

EF – Exhaust Fan – a fan that removes exhaust air from a zone

FC or FCU – Fan Coil Unit

HAND – Industry term for "Manual" mode or "ON"

HOA – Hand/OFF/AUTO – a switch that puts equipment in HAND (manual ON), OFF or Automatic as determined by the control system

HtgVlv – Heating Valve – A valve that opens in order to allow hot water to flow through it into a heating coil or radiating device.

HWST - Hot water supply temperature. The temperature of the water that is provided to the building by the boilers.

HWRT – Hot water return temperature. The temperature of the water that returns to the boilers after being used by equipment in the building.

IPP – Independent Power Producers Program – A program administered by the Energy Solutions Centre that allows for selling renewable energy to the grid.

MAD – Mixed Air Dampers – dampers that mix return air with outdoor air

MCC – Motor Control Centre – A switch that allows for turning large equipment such as fans and pumps ON/OFF in HAND/AUTO.

Night Setback – An algorithm that holds a zone at a temperature several degrees below the regular occupancy temperature. A night setback during heating season is typically 17°C or 18°C. Also called an "unoccupied mode." In the Yukon, summer temperatures do not typically require a setback temperature due to cool nights.

OAD – Outside Air Dampers – dampers that open to allow fresh air into an AHU.

OAT – Outside Air Temperature

PID – Proportional Integral Derivative – A mathematically derived equation that controls the behaviour of equipment. A good PID loop is a program that makes equipment find a steady state of operation without oscillating between overshooting and undershooting the desired output.

RCx – short for recommissioning. Recommissioning is a re-optimization process for existing buildings. It ensures building equipment and systems are operating optimally to meet current occupant needs. It provides a rigorous investigation approach to identify problems and integration issues.
The RCx primary focus is on identifying "low cost/no cost" operational improvements given the building's current usage to obtain comfort and energy savings. [1]

[1] https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/fichier.php/codectec/En/2008-167/NRCan_RCx_Guide.pdf

Reset Schedule – an algorithm within the control system that automatically modulates the output temperatures of a boiler according to the OAT. A good reset schedule should be operator adjustable so that the operator can adjust the boiler water temperature at a given OAT according to the dynamics of a building. Warmer OATs allow for cooler boiler water and colder OATs require hotter boiler water to meet the demands of a building. In buildings without a reset schedule, the same temperature water is used whether it's -40°C or 15°C.

RTU – Roof Top Unit – supplies large amounts of tempered air to a building.

SAF – Supply Air Fan – The fan within the air handling unit that pushes air through the zone/ductwork/system as it pulls return air back and mixes it with outside air.

SAT – Supply Air Temperature – typically from an air handling unit

SATSP – Supply Air Temperature Setpoint - the temperature that the AHU should be providing

SHGC - Solar Heat Gain Coefficient – a measure of how well solar gains are transmitted through glass to allow heat to be captured by the glass. SHGC = 1 means that all light frequencies pass through and cause heating. SHGC = 0 means that all visible light is reflected. No window will ever reach SHGC of 1 or 0.

Shoulder Season – typically fall and spring in which heating is required at night or on cloudy days and cooling is required during the heat of the day. The shoulder season is typically when HVAC systems can overheat or cool a building and use excessive amounts of energy unnecessarily. In Yukon the shoulder season can also refer to summer operating conditions.

SWT – Supply Water Temperature – the temperature of water that is being delivered from the boilers to heating equipment

TStat – Thermostat – A device that measures temperature in a zone.

Trends – Trends are graphs of the status of a point as measured or set by a control system. Having the status of points displayed graphically allows an operator or energy manager to understand how well equipment is operating. This assists with determining options that can save energy in buildings and allows for experimentation with regards to scheduling etc.

UPS – Uninterrupted Power Supply – A battery bank that is attached to electrical equipment to prevent the equipment from shutting down or experiencing power failure/power quality issues.

VAV – Variable Air Volume box – A device that mixes and tempers air for delivery to a zone at a setpoint temperature

VFD – Variable Frequency Drive – A device that changes the frequency of power that is delivered to a motor in order to control the speed of the motor. Running a motor with a VFD provides significant efficiencies with regards to electrical energy used if the motor isn't running at full speed. VFDs can also introduce harmonics and slightly alter the power factor of a circuit.

1.2 - General Notes regarding building history and findings[2]

Located in Dawson City, Yukon, the Administration Building (also called city hall/fire hall) has two stories and was originally constructed in 1898 with an approximate floor area of 657 m^2. According to the information provided to Energy Auditors, an interior renovation was done to the existing building in 1999 as well as a total of 541 m^2 was added to the north and south of the existing building including mezzanine level on south side. This facility has a total gross floor area of approximately 1,198 m^2.

The admin building houses a museum, equipment room, association (staff) room, washrooms and ancillary spaces on main floor; offices, council chamber, meeting room, washrooms and ancillary spaces on second floor and mechanical room on mezzanine level.

The city hall component of the building is occupied from 8am to 6pm on weekdays and closed on weekends. There are 10-12 regular staff plus a maximum of 5 visitors. The Fire Hall component is open year-round with training one night per week which is attended by approximately 30 fire fighters.

Based on the heating oil consumption records for 2017-2019, the facility uses an annual average of 21,232L of fuel oil per year at $1.05/L. That is an annual fuel cost of $22,270. The cost of a gigajoule of oil at $1.05/L is $27.41. The existing oil boilers are predicted to have an efficiency of 68% in the Energy Audit, however they have been regularly maintained and tested to have an 84.8% and 84.9% efficiency. The cost to deliver 1GJ of energy from burning oil @ $1.05/L in an 85% efficient boiler is $32.24/GJ.

ECM-13 from the Energy Audit recommends implementing a biomass boiler for this building[3] and predicts an annual oil savings of 16,185L (32 t CO_2e yearly reduction). The cost of heat provided by biomass to Haines Junction and the City of Whitehorse is approximately $10/GJ[4] at $150/ton of dry chips. This cost is likely due to an existing market and availability of seasoned, dry chips. The biomass system currently operating in Dawson is paying the sawmill $28/GJ to provide chips to the Yukon Government operated facility[5].

According to Brodie Klemm, the oil tanks for the Admin building are at the end of life and are due for replacement. The cost of oil tank replacement should be factored into their replacement costs. The costs of cleaning up an oil spill and insurance should also be considered since they will factor into the ongoing costs of the system. Though a reduction in premium has not been guaranteed by the current

[2] Many of the statistics from this report have been referenced from the Energy Audit report.
[3] Ideally a biomass district heating system will be constructed for this building, the Public Works building and potentially multiple Chief Isaac properties as well as the City's woodshop to reduce operating expenses and GHG emissions from all buildings connected to the heating loop.
[4] The cost of biomass heating depends upon the moisture content of chips and cost of supplied wood per ton.
[5] The chip quality and dryness will directly affect the performance and efficiency of the biomass system and thus it is recommended to procure dry, seasoned chips. If Chief Isaac or Tr'ondëk Hwëchin have a stake in the biomass system, they will likely participate in the acquisition of wood chips at a more competitive rate while investing in infrastructure to improve chip quality.

insurance provider, there may be some financial incentive to reduce the risk and liability of using an oil-based system.

Based on the electricity consumption records for 2017-2019, the facility uses an annual average of 75,950 kWh of electricity per year with a max peak demand of 31.62 kW in 2018. This usage puts the facility in Block 4 of the new Yukon Energy rate schedule (2020) with a cost of $0.20/kWh and a demand charge of $10.85/kW. The switch gear for the building indicates a Maximum Horizontal Bus Capacity of 400A, Maximum Interrupting Capacity of 22KAIC, Bus Bracing of 50KA at 120V/208V.

The facility heating and cooling distribution methods are:

- High temperature hydronic (hot water) heating (serving perimeter baseboard heaters, unit heaters and heating coils in AHU and FCU).
- Conditioned forced air supplied to the spaces via ceiling mounted grilles/diffusers.
- Forced air heating through unit heaters.
- Convective heat through baseboard radiation.

Currently the Admin building is heated from the combustion of oil-burning aged equipment. There is a hydronic heating system that is used to distribute the heat as well as temper air for the building. This makes it a prime candidate for implementing biomass heating. To significantly reduce the GHGs consumed by the building as well as operational costs, implementing biomass heating in the Administration Building as well as at the Public Works Building is recommended.

There are multiple potential options for implementing biomass heating in the building. Section 3 of this report will discuss potential options for constructing a biomass district heating plant that can be utilized by the City of Dawson as well as potentially Chief Isaac.

2.0 – HVAC Equipment

2.1 – Boilers

Items: 5.1, 5.2, 5.3, 5.18

The building is heated by 2 large 483MBH (141.55kW) oil boilers that were installed in December 1999 according to nameplate stickers. These boilers operate between 180F and 210F (82.2°C and 98.9°C) with water temperatures ranging from 155F to 170F (68.3°C to 76.7°C). The system appears to simply maintain the water temperature as long as the boilers are on. There is no outdoor reset and there are no temperature sensors that report boiler temperatures to the existing control system. Thermometers should be added to the hot water supply and hot water return lines of each boiler when upgrades to the boilers are made.

Hot water is distributed through the system to radiant wall heaters, the air handling unit AHU-1, a fan coil unit and unit heaters. With the exception of AHU-1, this heat is regulated by simple thermostats that have no unoccupied settings. Thermostats for radiant heating were tested and observed to be

functioning, however they must be manually controlled on Fridays to provide setback energy savings. Currently the building operator drops the setpoint by 3°C on Fridays and resets them on Mondays. The zones respond well.

Figure 1: Two large 141.55kW oil boilers heat the Administration Building. The controls cabinet for the building is in the blue cabinet on the left side of the image.

The City of Dawson should decide if oil will continue to be the backup heat source once a biomass system is installed. The oil tank is at end of life and will need to be replaced soon. It may be advisable to change over all equipment within the Administration building to propane now since propane equipment is more efficient, allows for better temperature modulation, creates less GHGs, and has less risk and environmental concern attached to it. The cost alone to replace an oil tank and infrastructure with propane infrastructure may be offset by the cost of cleanup from an oil spill or leaking tank.

In terms of economics, propane typically outperforms oil in terms of cost per heat delivered and has the benefit of reduced GHG emissions. The cost of propane to the City of Dawson was quoted at $0.9141/L on April 27, 2021 which is 208% higher than the $0.44/L that the City of Whitehorse paid in 2019. This equates to a cost of $37.59/GJ of heat delivered when utilized in a 95% efficiency boiler. The cost of a gigajoule of energy delivered from burning oil @ $1.05/L in an 85% efficient furnace (maximum efficiency) is $32.24/GJ.

Regarding expected propane consumption if a biomass boiler is added, the following can be inferred. The Admin Building used an annual average of 21,232L (813.5GJ) of heating oil from 2017 to 2019. The boilers operate at ~85% efficiency, thus only ~691GJ of the 813.5GJ of delivered energy was used for heating by the oil boilers. **691GJ worth of propane used in a 95% efficient boiler(s) is 28,513L per year** if no other energy conservation measures are taken. Since the building will use significantly less energy from ECMs and be approximately 80% heated by biomass, it is reasonable to assume between 2,850L to 11,400L of propane per year (10% to 40% of current energy demand) once biomass is installed and other ECMs are implemented. The 40% figure is in case the biomass is down for a period in the winter. 2,850L @ $0.9141 = $2605/year to 11,400L @ $0.9141 = $10,420. The high end of propane usage is pure propane 28,050L @ $0.9141 = $25,640 per year.

A significant drawback of using propane in Dawson's extreme climate is that it has the potential to stop flowing when outdoor air temperatures are colder than -42°C. There is equipment that is designed to mitigate the chances of propane coagulating under these conditions such as a tank warming electric blanket. A greater issue may be a lack of infrastructure in place and the availability of being able to receive reliable propane deliveries. All of these should be considered prior to making the decision to change to propane.

According to the Superior Propane website[6], 500Gal (2000L) and 1000Gal (4000L) tanks are available. The number of deliveries the City intends in a year will determine the tanks chosen vs. cost per tank. For fewer deliveries and potentially a better cost per liter, select larger tanks. If there is a delivery charge it should be considered as part of the ongoing costs since a delivery to Dawson will likely be expensive and thus the City will want to limit deliveries as much as possible. It is likely that the high cost per liter factors delivery into the cost.

The decision to remain with oil as a backup heat source to biomass should be made prior to moving forward with any equipment upgrades or renovations. If oil remains as a backup heat source, the decision to implement backup oil boilers to the biomass heating system may be advisable, dependent upon the equipment options selected.

This report will assume that oil will remain the primary backup heat source to biomass.

2.2 – Radiant Heating

Hot water from the boiler is circulated through the building and is used as primary heating for the administration area as well as the fire hall. If a biomass boiler system is implemented as discussed in section 3, the existing hydronic system is highly advantageous for making use of the biomass heated water.

Radiant baseboard heating is used throughout the upstairs administrative part of the building. The radiant heating is controlled via manual thermostats which were tested during the site visit. All were found to be controlling the control valves. As part of BMS upgrades, these thermostats will optimally be replaced by operator adjustable thermostats that are monitored and controlled by the BMS. These

[6] https://www.superiorpropane.com/tank-sizes

thermostats must allow for occupancy scheduling. Zones that may be occupied after hours such as the Council Chambers should have an occupancy sensor or zone override button that keeps the zone at occupied temperatures after hours as required. This will allow for maintaining heating setpoints in winter as well as cooling setpoints during summer. The Council Chambers can reportedly overheat during summer months due to solar gains as it is located on the south west side of the building.

Unit heaters are used within the firehall to heat the firehall and museum. The unit heaters are currently controlled by manual thermostats that activate flow through the unit heater.

According to building operators, some radiant valves have been changed out as required due to failure. The installed valves can remain until their end of life however it is recommended that during boiler upgrades all radiant control valves be replaced with Normally Open control valves and the radiant system be drained to replace the glycol in the system. A strainer for the glycol system should also be added or replaced if it does not currently exist.

2.2.1 – Radiant Heating Recommissioning Notes

- The Council Chambers has radiant heating around the south west perimeter.
- City Hall Office/Reception office radiators extend into the reception area. This radiant loop is controlled from a thermostat within the reception office. When the thermostat was adjusted, the valve responded and flow through the loop occurred within 2 minutes.
- The CFO office stays sufficiently warm and is controlled from the thermostat located outside of the office. It appears that the thermostat is in the file room or possibly the reception office. CFO opens a window to provide cooling when necessary and does not want a thermostat added to the room.
- The photocopier appears to be controlled by a single thermostat located in the photocopier room.
- The Archive Room (interior file room) has its own thermostat and radiant heater.
- The thermostat located above the edge of a radiator and next to the hallway reportedly controls the bathroom radiator (valve located in the bathroom), adjacent hallway and North exit hallway. The radiator temperature increased to 48°C when activated by the thermostat.
- The mayor's office in the northwest corner has its own thermostat for radiant heating which runs along the north and west walls. The temperature increased from ~35°C to 50°C when tested.
- CAO office has a thermostat for the CAO and Executive Assistant office to the north. When inspected, the rads were sitting at 33°C and increased to 48°C when the thermostat was tested.
- City Planning Office on north wall has a thermostat for that office and for the bylaw office (north east most office). The rads were cool and increased as expected when tested.
- The fire chief office has a thermostat located near the door and baseboard heater. The office is on the east wall near the north most. The radiator temperature increased immediately when tested.
- The northeast stairwell has a unit heater on the ground floor which is controlled by a manual thermostat.

- There are two thermostats that are located in the Firehall Training/General purpose room. One appears to control radiant heating and the other is likely for air conditioning.
- The thermostat for unit heater 2-3 and 2-4 is located in the fire truck room on the south wall.

2.3 – Cooling Equipment

Item 5.4, 5.5

In the summer, the boilers are manually shut down and air conditioning must currently be manually activated. Stage 2 of the air conditioning must be run manually via the control system because the setpoints don't work. This indicates that there are relays wired to the automation system to activate the AC units. Without the relays and automation working correctly, the AC literally must be turned on and off by building operations staff according to the feedback of occupants. Air conditioning is typically activated in the mornings and turned off at night or if the office gets too cold. Upgrading the controls shall address the automatic control of cooling systems so that setpoints are met in automatic mode.

Of note, the AC equipment was installed in 2000 along with the rest of the HVAC equipment[7] and is nearing end of life. Installing a heat pump to replace the AC within the building would allow for cooling in the summer as well as GHG free heating in the summer and shoulder seasons. The cost to operate a heat pump for heating varies according to the heat pump and outdoor air temperature; the colder the OAT, the less efficient the heat pump operates for providing heat. A standard heat pump with a COP = 3 will cost $18.52/GJ and produces no GHGs if the Yukon grid is being fully powered by renewable energy.

If a heat pump is installed, it will likely only be useful until outdoor air temperatures are approximately 5°C, however this will prevent the boilers from being necessary for up to a couple of months and will prevent the building from overheating on temperate days when heating is required in the morning and cooling is required in the afternoons. A heat pump would also help to offset heating that is provided by a biomass boiler system. By not activating the boilers and pumping hot water through the radiant system, the building is less prone to overheating during the summer and shoulder seasons. A heat pump used in this way will require the controls to have a HeatPumpDisableTemp setting that will allow the building operator to disable the heat pump for heating when outdoor air temperatures are colder than an operator adjustable temperature of approximately 5°C. Installing a heat pump to replace the existing air conditioning equipment will require a detailed design, however it is likely that much of the AC infrastructure can be utilized with the heat pump.

2.4 – Air Handling Unit AHU-1[8]

Item 5.6

A conventional AHU provides ventilation to the offices upstairs, council chamber and general area of the main floor. The AHU is controlled via the existing controller. The current controller measures outdoor air

[7] According to Owen Kemp-Griffin, building operator.
[8] Some information from this section is taken from the Energy Audit Report.

temperature, supply air temperature, mixed air temperature, return air temperature and the heating valve position. A heating coil with controlled valve opens to temper the air based on a measured mixed air temperature to meet a supply air temperature setpoint. A large volume of outdoor air is available for free cooling via the outdoor air dampers on the AHU.

Figure 2: View of the AHU from both sides. Note the marked drain line on the floor for reference.

There is a simple control panel that is located at the entrance to the City Hall Reception area on the 2nd floor. This panel provides feedback regarding the AHU being in an ON or FAIL state. The panel tells the control system to manually run the AHU via "AHU ON" or to run according to commands from the existing controller via the "AUTO" setting. For the building operators to shut down the AHU at night to save energy, it was revealed through testing that the "AUTO" setting on this panel must be selected. When this panel is in AUTO setting, the operator can shut down AHU-1 by changing the AHU1_FAN_STATUS to OFF. This command shut down the supply air fan and return air fan, however the outside air dampers reportedly did not appear to close as they should. When restarted, the RAF activated first then the SAF after approximately a 20 second delay.

The existing control system does not allow for scheduling the AHU to be off or for occupancy. This panel will be removed when the BMS is upgraded.

According to the Energy Audit report, that AHU fresh air minimum damper position is set to 25%. While onsite it was observed that during winter, on extreme cold days the minimum outside air dampers are set to 15% via the BMS to save energy and maintain a comfortable environment. Occupants did not express complaints of lingering odors and the air quality within the upstairs area was high during the site visit[9].

[9] During the site visit the OAT was ~ -37°C and the plumbing trap for the building dried up due to the cold dry air. This caused fumes from the sewer system to enter the offices. The trap was filled with water and the OAD were opened beyond 15% overnight to clear out the smell and returned to 15% the following day. The smell from the disturbance was removed.

A visual inspection of these dampers makes them appear nearly closed, however by testing the dampers it was observed that they are controllable and open when commanded. Opening the dampers past 15% was observed to create a sufficiently large temperature drop within the AHU to significantly reduce the supply air temperature and increase the amount that the heating valve must open. For this reason, the minimum OAD setting was manually set to 15% from 22% when OAT was -37°C.

No physical measuring devices were noted on the AHU. Upgrades to the AHU should include adding thermometers that can be viewed by operations staff and compared to temperature sensors that are monitored by the building management system. The existing supply air temp (SAT), return air temperature (RAT) and mixed air temp (MAT) sensors should be replaced as part of upgrading the BMS.

2.4.1 – Recommissioning Notes AHU-1

The outdoor air temperature (OAT) sensor was significantly out of calibration. The $OAT_{Weather\ Network}$ = -36°C when the BMS indicated that the sensor was OAT_{Sensor} = -23.3°C. This level of error in temperature readings will cause significant issues in program logic. Whatever option is implemented regarding the new control system, a properly calibrated outdoor air temperature sensor is very important to ensure that the system functions optimally.

The outside air damper (OAD) appeared to be fully closed (0%) when set at 15% which is minimum damper position setting. Tested the dampers at 0% and witnessed no air flow, 5% with no noticeable air flow, 10% minimal outdoor air flow, 15% which provided sufficient outdoor air flow. When tested at 20%, the outdoor air increased significantly from 15% and dropped the mixed air temperature several degrees with outdoor air temperatures at -36°C.

Minimum position was manually set back to 15% based on this observation. Given the cold outside air temperatures in Dawson, 15% was deemed adequate to maintain a healthy environment. The automatic damper position defaulted to 22% but was observed to greatly increase the position of the heating valve required to maintain the SAT. This minimum damper position may be the result of the faulty outdoor air temperature sensor reading -23.3°C when the actual outdoor air temperature was -36°C (feels like -38°C). Building operations staff reduced it to 15% due to cold air complaints during extreme cold temperatures. The OAD minimum position should be put back into AUTO setting if condensation is witnessed on windows and from spring to fall to ensure high levels of ventilation when temperature issues do not occur. The minimum damper position using the current configuration should not be reduced below 15% to ensure adequate ventilation during the most extreme cold weather.

- Changed AHU1_Mixing_Dampers value to 50% to test automation sequences and observed SAT and MAT drop as expected with heating valve opening. The boiler also kicked on at the same moment, but that may have been a coincidence.
- The relief air dampers were checked and observed to be fully closed.
- SAT_{Sensor} = 22.9°C , $SAT_{Measured}$ = 19.7°C – Sensor is slightly out of calibration but will be replaced with new control system.
- The supply air temperature setpoint is met well by the automation

- The Heating Valve responded as expected when tested.
- MAT_{Sensor} = 20.2°C , $MAT_{Measured}$ = 19.4°C – Sensor is working well but will be replaced with new control system.
- The mixed air temperature setpoint is met well by the automation.
- RAT_{Sensor} = 21°C , $RAT_{Measured}$ = 19.4°C, RAT_{Gauge} = 70F (21.11°C) – Sensor matches gauge and will be replaced with new control system.

3 – Biomass heating

Item 5.8,

At this time, fire smarting is being completed around West Dawson and this wood is being burned on site and wasted. This wood would be better utilized as a heating source for buildings within Dawson City.

Since there is a lot of capacity to provide wood chips in Dawson City due to the large biomass boiler already in place at the Water Treatment plant, a biomass boiler may be considered for installation as primary heat source for the Administration Building, Public Works Building, and for potentially multiple Chief Isaac owned properties in the vicinity.

ECM-13 of the Energy Audit recommends implementing a 120kW biomass boiler specifically for the Administration Building as top recommendation, however this sized boiler will be insufficient if multiple buildings are heated using biomass. Further, it is advisable to utilize multiple biomass boilers for this project so that they can be activated during colder weather and biomass can still be utilized if a single boiler requires maintenance.

Of important note, permafrost gets worse within Dawson City at the north end of town. Since the buildings that would benefit from biomass as discussed here are in the north end of town, permafrost concerns should be considered as part of the design and installation.

During the site visit, FPMBC investigated City property to determine where a biomass boiler could best be located. Due to the importance of access and egress from the Firehall, the most plausible option on City property is to possibly convert the existing woodshop into a biomass boiler facility. Even this option has complications however with regards to efficient chip deliveries regarding access and egress and thus the neighboring Chief Isaac property was considered.

FPMBC spoke with Gina Nagano past Chair of Chief Isaac Group of Companies. Ms. Nagano served 6 years on the board and is knowledgeable of the location. She indicated that Chief Isaac would be keen to discuss utilizing biomass at their office that is next door to the Firehall/Admin Building as well as in the Tr'ondëk Hwëch'in daycare which is across the street (behind the admin building). If the City has Chief Isaac/Tr'ondëk Hwëch'in First Nation as a partner, it should reduce the cost and complexity of implementing biomass for the Admin and Public Works Buildings. To size a biomass installation properly for such an application, it will be important to know the heat loads of Chief Isaac buildings and the wood shop if this building is also to be heated using biomass.

To create a biomass district/cluster heating system for use between Chief Isaac and the City, it will be important for the City of Dawson to have some type of heat purchase agreement, MOU or maintenance agreement if a biomass plant is to be constructed on Chief Isaac property for sharing between Chief Isaac and the City of Dawson at the Admin Building and Public Works building.

The only other option that appears possible is to construct a small biomass building in some of the parking spaces near the road on the north side of the Fire Hall/Admin building. This is an option if this building and chip delivery does not interfere with fire truck operation. Given the limited options for constructing a biomass facility on City property as well as the cost benefits of partnering with the First Nation, constructing it on the adjacent Chief Isaac property holds promise.

Figure 3: The area in front of the Firehall must remain clear so that fire trucks can easily exit and enter the hall. This leaves little space for implementing a biomass facility on City property. The exception may be to remove several parking spaces along the fence on the north side of the building (directly in front of the Museum entrance). The adjacent property owned by Chief Isaac holds promise for housing a biomass district heating plant for multiple buildings in the area.

The City of Dawson may wish to simply purchase heat from Chief Isaac, or they may take an ownership through a partnership of some kind. In terms of acquiring funding and reducing project costs, a partnership with Chief Isaac is likely the best option for the City.

In terms of operational costs, the cost of a gigajoule of energy produced from burning oil @ $1.05/L in an 85% efficient furnace is $32.24/GJ. The cost of heat provided by biomass is approximately $10/GJ[1] at $150/ton for dry wood chips. Lower quality (wetter) wood chips will increase the cost per GJ of heat and will increase the amount of maintenance that will be required to operate the biomass boiler(s). The cost of heat currently being paid for biomass heat in Dawson City is $28/GJ[10].

Figure 4: A google map of the City Fire Hall/Admin Building, City Public Works Building, City Woodshop, Chief Isaac Office, Tr'ondëk Hwëch'in Daycare and Chief Isaac wood working shop. The most likely location for a biomass facility is highlighted in red. The buildings that have potential for biomass heating have orange and yellow lines running to them. A detailed design would be required to accomplish this work. An engineering/energy assessment and optimally recommissioning of other buildings to be connected to the biomass must be conducted prior to detailed design to ensure that they are using energy efficiently and to prevent oversizing the biomass system.

[1] The cost of biomass heating depends mostly upon the moisture content of chips and cost of supplied wood per ton. There will also be losses through the distribution system.

[10] See Appendix 2 regarding costs provided to the City of Dawson. These costs will likely decrease with improved chip quality due to increased demand and infrastructure, participation from Chief Isaac/ Tr'ondëk Hwëchin and greater uptake of biomass in the Dawson area. Having a reliable demand for wood chips will help to improve the quality and supply.

By implementing biomass heating in the Administration building, the existing or replacement boilers will be required when the biomass boiler is unable to meet demand or if the biomass system fails. Since the building is already setup to utilize radiant hot water in unit heaters, radiant wall heaters and within the AHU, the Admin Building is an ideal candidate for the implementation of biomass heating.

Implementing biomass heating in this location would greatly reduce greenhouse gases, reduce the cost of heating fuel[11], provide local employment to Dawson citizens, and significantly increase the life expectancy of the new or existing oil boilers. If propane boilers replace the existing oil boilers, they would be able to be modulated more accurately to save further energy while also reducing greenhouse gases.

A trench will need to be created to run insulated hot water lines (supply and return) from the biomass building to the boiler room of the Firehall/Admin Building. The lines would tie into the building and connect with the existing hot water circulation system via a heat exchanger. The tie in point would be prior to the return water temperature sensor of the system. It is important that the heating loop used for the biomass system is a separate loop than what is utilized within the Administration building.

The biomass lines will likely run through the Fire Hall to the south side of the building to connect to the Public Works building. A small area will need to be excavated next to the building to run the biomass lines (~ 2-inch insulated piping) between the two buildings. A detailed design of such a facility and connection to Firehall would be required. The hot water biomass lines could potentially run through the firehall and trench to the Public Works building, or a more expensive option would be to trench the hot water lines directly to the Public Works building. Since permafrost is an issue in this area, avoiding underground trenching of hot water lines by running connection lines through buildings will not only reduce costs, but will reduce complications from permafrost melting issues while bleeding heat from lines into buildings rather than into the ground, thus increasing system efficiency.

3.1 – Biomass Heating Options

Item 5.9

Since the building is already heated by the circulation of hot water, the addition of a biomass boiler connection to the building would utilize the existing heating equipment. The AHU, unit heaters, and radiant wall heaters would all utilize the heat produced from a biomass system, however there will be times that the boilers will function to provide supplemental heat and as backup.

The boiler loop within the Administration building is a single loop that directly connects the boilers to the heating equipment. Because of this, the connection of a biomass heat plant to the Administration

[11] This option is particularly useful for reducing the high costs of and will help reduce greenhouse gases generated from burning oil. Wood chips are also significantly cheaper as a fuel source ($10/GJ @ $150/tonne in Haines Junction and Whitehorse area) than oil ($32.24/GJ @ $1.05/L consumed by 85% equipment) and electricity ($55.56 @ $0.20/kWh pure electric heating) while providing employment to locals and Tr'ondëk Hwëch'in citizens. The biomass facility in Dawson is currently paying $28/GJ for wood chips. It is likely that these chips are not as well seasoned or of as high quality as in Haines Junction. This cost is predicted to drop with improved infrastructure, experience and demand.

building will require the implementation of a heat exchanger loop that connects to the existing hot water loop since the biomass loop will be a glycol-based loop.

With regards to the existing oil boilers, they are rather large and thus the introduction of a biomass system will cause the oil boilers to fire whenever the water temperature setpoint is not being reached by the biomass system. This has the potential to make the boilers short-cycle which will significantly impact their life. A strategy to combat this is to utilize the control system to monitor all the zones in the building as well as the boiler water temperature and boiler water temperature setpoint. Once the water temperature setpoint cannot be reached by the biomass system AND several zones are at or below their setpoint, the controls will know that the biomass system is not providing sufficient heat. When this occurs the control system would temporarily raise the hot water setpoint by at least 10°C to a maximum of ~92°C so that the oil boilers activate for as long as possible to raise the system and building temperature. This would prevent boiler short-cycling while still allowing the biomass system to provide as much heat as possible. Once the temporary setpoint is reached by the system, the system would ideally default back to the previous hot water setpoint as determined by the reset schedule (outdoor air temperature).

If high efficiency propane boilers replace the existing oil boilers, the above scenario is not necessary because propane boilers are easier to modulate in temperature and will potentially allow for heating the building using lower water temperatures during the milder temperatures of the year in conjunction with the biomass system. If propane boilers are installed, the utility of replacing air conditioning with a heat pump is reduced.

4 – Building Envelope and related ECMs

FPMBC was provided with a word file providing ECMs that were being considered along with funding information for comment. Below is the section of that document relevant to this project with comments for each item in a separate section.

City of Dawson (2 buildings, up to $200,000/building) *(Administration &Public Works buildings)*	
Energy Upgrade Description	**Estimated Cost**
#1. City of Dawson Administration Building	*10th Feb. 2021*
Door Seals & Sweeps (ECM 1)	$2,250
Interior Lighting Upgrades (incl. EXIT signs to LED) (ECM 3)	$38,730
Sensors & Controls (ECM 2, 4, 9, 10, 14) $9,500 + $6,200 + $3,500 + $64,480 +$4,500	$88,180
Self-Sensing Pumps (ECM 6)	$9,600
Recommissioning (ECM 8)	$19,950
Baseline Oil Boiler Upgrade (ECM 15)	$19,600
Wall Insulation Upgrade (ECM 16) Audit estimate	$45,500
Roof Insulation (ECM 17)	$4,550
Magnetite storm windows ($27.24 - $35.30/sqft) (ECM 11)	$18,200
Admin. Bldg. sub-total #1	**$246,560**

Figure 5: Table of proposed ECMs for funding.

4.1 – Door Seals and Sweeps - ECM-1

Item 5.11

Door seals and sweeps improvement is a low-cost ECM that will reduce the heat loss through the bay doors of the Fire Hall as well as the main entrance by preventing heat migration from the interior to the exterior. Installing these sweeps is recommended. The thermal imaging report indicates the bay doors that have the most air leakage.

Figure 6: The middle rear bay door appears to have light shining through it at the bottom. The thermal image on both the interior and exterior indicate that a significant amount of heat is escaping through this door.

4.1.1 – Insulate the bay doors and metal exit doors to reduce heat loss

Item 5.12

This option was not indicated in the Energy Audit report, however after completing a thermal imaging inspection, most heat loss through the building envelope is occurring through the windows and bay doors. A cost-effective option to reduce this heat loss is to insulate the bay doors.

A product option to consider: https://www.curtain-and-divider.com/roll-up-dock-door-curtains/

Pre-cut insulated panels for bay doors are another option: https://www.homedepot.com/p/Cellofoam-Garage-Door-Insulation-Kit-8-Pieces-Garage-Door-Insulation-Kit-8-pcs/203630159

Likely the most cost-effective option is to simply cut some 1.5" – 2" rigid to size so that the pieces don't impede door movement at the hinges and adhere them to the panel portion of the bay doors using foam adhesive. The foam pieces should be combined with this reflective door cover https://www.smartgarage.ca/insulated-roll-up-garage-doors/ or an aluminum or fire resistant, thermally reflective film cover to provide the longest life expectancy and energy efficient benefits.

This same strategy can be utilized to reduce heat loss through metal exit doors. It is important to adhere the rigid to a clean and dry door and ensure that the rigid is covered with aluminum or a fire-resistant material that can handle the abuse that a door typically endures.

4.2 –Interior Lighting Upgrades and EXIT signs to LED - ECM-3

Item: 5.13

The Energy Audit report recommends upgrading all lighting to LED. It also recommends the installation of dimmer switches and timers. Given the dark mornings and late afternoons in the Dawson winter (October to March), the lights within the building will likely be on as long as the zones are occupied due to low natural lighting levels. Also, occupancy sensors are not recommended in offices that have an occupant working at a desk for long periods because they shut lights off when there is no movement.

From March until October, lighting within the offices can be manually implemented if the occupant doesn't find sufficient natural lighting available via windows. It is likely that dimmer switches and occupancy sensors will add to the project costs while adding minimal energy benefit, and they will likely not be well utilized. The exception is installing an occupancy switch in the washrooms.

Replacing all existing lighting with LED is recommended, but occupancy sensors and dimmer switchers are not likely worth the extra cost and are left to the discretion of the City. When replacing outdoor lighting, it is recommended that the replacement lighting is Dark Sky compliant to reduce light pollution levels.

4.3 – Sensors and Controls (ECM 2,4,9,10)

Item 5.14

The controls system at the Administration Building is antiquated and malfunctioning. It should be replaced with a modern control system. Within the Energy Audit report, the recommended functionality of a modern controls system is broken down into multiple ECMs using individual components. The recommended ECMs from the Energy Audit provide the ability to:

1) Monitor zone temperatures and provide occupancy scheduling to individual zones (ECM-2: Sensor Suite Thermostats)
2) Monitor and control the boiler and circulation pump according to outdoor air temperatures and demands of the system (ECM-4: Boiler and Circulation Pump Controls)
3) Provide sufficient ventilation without significantly increasing energy usage. Demand control ventilation via a controller and CO_2sensor (ECM-9: Demand Control Ventilation) is the recommended path in the Energy Audit Report.
4) Installing a Building Management System (BMS) to monitor and control all operations within the building (ECM-10: BMS System).
5) Improving the Delta T (heat transfer efficiency) of the heating coil within AHU-1 via the installation of an Energy Valve (ECM-14: Energy Valve)

Note that all of these individual components work to satisfy the functionality of a properly installed, programmed and commissioned modern control system with graphical interface. The successful implementation of these devices will depend upon their ability to be monitored and controlled by the

new BMS. Having individual components installed as part of an un-integrated system creates the high likelihood of certain components competing with each other and causing control issues.

4.3.1 - ECM-2: Sensor Suite Thermostat

Item 5.15

ECM-2 is estimated to cost $9,500. The solution as presented in ECM-2 looks to be economic and suitable for the application. This solution appears to allow occupants to adjust settings within the zone as appropriate while also allowing the building operators to control the zones. This solution should be simple to implement, but there may be some cost savings possible.

A typical BMS within a new building as per ECM-10 utilizes simpler thermostats[12] that are all wired directly to a controller, and that controller(s) communicates with the BMS. Given the complications and costs of wiring all 20 thermostats to a controller or multiple controllers, using the wireless thermostats and router as proposed is a simple solution.

The City may wish to consider wiring the upstairs thermostats to a compatible controller to the implemented BMS[13] if the office has a drop ceiling[14] and the City has electricians on staff. It may be advisable to wire the upstairs thermostats to a controller and utilize the wireless thermostats on the main floor to reduce the costs of thermostats and ongoing subscription costs. Since most of the 20 thermostats are upstairs, this can potentially cut the costs of this ECM significantly to improve the payback period. This is possible if the BMS/Control system installed is capable of using both wired thermostats connected to a controller and the wireless thermostats and routing controller proposed.

The ongoing subscription cost of the wireless thermostats is $480 per year for 20 thermostats which is significantly less than paying electricians/controls contractor to run wires to all the thermostats and connect them to a controller. This is likely why this option was proposed, however if much of the installation costs can be absorbed by the City, that changes the payback and options possible. Wired thermostats as installed by a controls company may be cheaper at around the 15-year life expectancy mark, but it may be worth using City staff to run thermostat wires in certain zones if it is easy to run these wires and save on the costs of thermostats for wired zones. Also wired thermostats tend to function and report better than wireless thermostats.

4.3.2 - ECM-4: Boiler and Circulation Pump Controls

Item 5.17, Item 5.18

The cost to implement ECM-4 is estimated at $6,200.

[12] The wired thermostats are assumed to be significantly cheaper than $450 each.
[13] If wired thermostats and a controller cannot work with the implemented BMS, then it is advisable to simply utilize the wireless thermostats throughout.
[14] A drop ceiling would making wiring the easiest, but it may be possible to run wires in an existing raceway etc.

Currently the boilers have a hot water setpoint that is the same whether the outside air temperature is 10°C or -40°C. This wastes a lot of energy which would be saved by implementing a boiler reset schedule. This can be accomplished via two methods:

1) Via programming of a modern control system with supply water temperature and return water temperature sensors via the BMS proposed in ECM-10.
2) Via a boiler and circulation pump control device as described in this ECM. Note however that the boilers and building receive flow via the circulation pumps[15] and thus the pumps must run continuously to provide heating to the building, contrary to the assumption in the Energy Audit report.

Replacing the existing circulation pumps with self-sensing pumps as per ECM-6 is recommended, but they must always run during periods of heating for the building to have access to the heat that the boilers produce.

The boilers require thermostats for monitoring supply and return water temperatures as none are currently installed.

Utilizing the BMS with sensors (ECM-10) is advantageous as it allows for more precise control and integration with the biomass system as long as it is programmed and commissioned correctly. This option is recommended since ECM-10 is budgeted for.

A device that accomplishes this function is unlikely to interface with the BMS or be adjustable by the operator according to the dynamics of the building. Without a BMS, this type of device is the best option for boiler control which is likely why it was recommended in the Energy Audit.

4.3.3 - ECM-9: Demand Control Ventilation

Item 5.19

The cost to implement ECM-9 is estimated at $3,500. This ECM is essentially to install a CO_2 sensor and programming to the control system of ECM-10 that will allow the control system to provide outdoor air according to the reading of the sensor. This method of accomplishing the functionality of ECM-9 is recommended.

The costs predicted for this ECM are based on assumptions that were disproven during recommissioning. The Energy Audit is incorrect regarding the nonexistence of motorized dampers and their current functionality. The motorized dampers already exist and are utilized by the simple control system that is currently utilized. The Energy Audit report indicates that the minimum OAD position is 25%, when it reality it has been reduced to 15% to ensure occupant comfort and energy savings in the coldest parts of winter. It also states that the dampers are manually adjusted to do cooling, which is incorrect because they automatically open to provide free cooling using the existing control system. The costing data for the ECM includes the installation of motorized dampers (already exist), $C0_2$ sensor, and

[15] As confirmed via Facetime video call on April 22, 2021 with Owen Kemp-Griffin.

electronic/wiring. Wiring already exists to dampers and AHU temperature sensors but not to a CO_2 sensor.

Installing a CO_2 sensor to monitor and control the OAD should also include the ability of the operator to manually set the damper minimum position, test the dampers, recalibrate the CO_2 sensor etc. It is unknown if the installation of the system as described will allow for a free cooling algorithm to be utilized for cooling the building at night during the summer or during the day. Since free cooling is an option on most nights and during many days of the summer, this is an important consideration that should be implemented.

Essentially this ECM is the installation of a sensor which can fall out of calibration and cause the building to be overventilated or under-ventilated according to the sensor output. The building operator should still have the ability to set a minimum damper position variable and override the sensor within the new control system.

The implementation of this ECM is recommended.

4.3.4 - ECM-10: BMS System

The cost to implement ECM-10 is estimated at $64,480. The implementation of this ECM is highly recommended as it allows the building operators to monitor and control equipment within the facility as well as troubleshoot systems and track the performance of equipment. Implementing this ECM correctly also negates the need to install a device to implement ECM-4 Boiler and Pump Control and a device for ECM-14 Energy Valve as this functionality will be built into ECM-10. This ECM also allows for the implementation of ECM-9 Demand Control Ventilation.

A good BMS also helps manage the boilers with regards to integrating the biomass system by having the ability to be programmed more efficiently for operation. Without a BMS, a simple boiler controller (ECM-4) is likely to activate the boilers whenever the hot water temperature is below the setpoint. This will not only activate the boiler more often the necessary, but it is likely to make the boiler short-cycle and thus significantly reduce the boiler lifespan.

Note that adding a heat pump to the system to replace the air conditioning as discussed in Section 2.3 will necessitate a more advanced controls system.

Installing a propane boiler system will allow for better temperature modulation through the system and will optimally utilize a more advanced control system in cooperation with the propane boiler controls. Figure 12 on page 37 of the Energy Audit report illustrates the additional potential savings possible from implementing a condensing propane boiler with outdoor reset.

Given the advantages of implementing ECM-10 correctly, it is advisable to seek a quote for implementing a control system with graphical interface that can accomplish the tasks of section 4.3 (monitoring and control of 20 zones, occupancy setpoints, operator adjustable boiler reset, CO_2 monitoring, AHU-1 heating valve control for Delta T optimization via the installation of either the Energy Valve (ECM-14) or some programming and a supply water temperature sensor and return water temperature sensor for the heating coil.

Ideally a BMS should also be capable of trending data, providing a graphical interface of each zone, remote monitoring by operators as requested, alarms to inform operators of equipment failure and monitoring and totalizing equipment runtimes[16].

Below is a list of points monitored by the existing control system[17]. Points that have control wires ran to them are indicated. These wires can be reused by the new controller, however the sensors should be replaced with new. The points associated with AHU1 will come from a controller located in the mechanical room that houses AHU1 and thus a controller bus to the main controller in the boiler room already exists and can likely be used by the new control system. Controls for the boiler and biomass interface can be ran to the main controller located in the boiler room.

Point Name	Point Type	Existing Wiring
ALARM_RESET	Digital Output	no
AHU1_FAN_STATUS	Digital Input	yes (assumed)
SUPPLY_AIR_SET_POINT	Analog software	no
AHU1_SUPPLY_AIR_TEMP	Analog input	yes
AHU1_HEATING_VALVE	Analog output	yes
MIX_AIR_SET_POINT	analog software	no
AHU1_MIX_AIR_TEMP	Analog input	yes
AHU1_RETURN_AIR_TEMP	Analog input	yes
AHU1_OUTSIDE_AIR_TEMP	Analog input	yes
DAMPER_MIN_POSITION	Analog software	no
AHU1_MIXING_DAMPERS	Analog output	yes
AHU1_EXHAUST_DAMPER	Analog output	yes
AHU1_COOLING_STG1	Digital output	yes[18]
AHU_COOLING_STG2	Digital output	yes

[16] By totalizing boiler runtimes, the amount of oil/propane consumed can be determined and compared against the quantities of oil/propane delivered.
[17] Point table compiled from photos of the interface taken by Owen Kemp-Griffin.
[18] As of April 23, 2021 there appears to be an issue with Stage 1 cooling. This may be a faulty relay or potentially an issue with the wiring.

AHU1_FILTER	Digital Input (assumed)	yes - assumed but could be a timed filter alarm

Figure 7: Table of control points within the existing automation system.

4.3.5 - ECM-14: Energy Valve

Item 5.20

The cost of ECM-14 is estimated at $4,500. This ECM would replace the existing hot water valve in AHU-1 with a "smart valve". This ECM intends to increase the heat transfer efficiency of the heating coil within AHU-1 by monitoring the supply water temperature to the heating coil and return water temperature after the heating coil. In doing this, the valve position can be modulated to slow the flow rate through the coil to transfer more heat to the air stream.

The operation of this device would typically be calculated by a modern control system that is programmed using a PID control algorithm. The installation of this device is intended to simplify the control system, but it is unknown how well this device would work to satisfy the supply air temperature. It is assumed that this device receives the supply air temperature setpoint and controls itself to meet that setpoint while also working to maximize the Delta T across the coil. It is assumed that this device was recommended as an ECM because ECM-10 BMS system was not recommended.

Note that the supply and return water temperatures measured by this device should be monitored and visible on the BMS control system. If this device is implemented, they may not be able to interface with the controls.

It is likely that this device will require flow input data from the variable flow pumps or it is likely that these devices will counteract each other. Ie. the variable speed pump may slow down to reduce pressure within the system and the valve may have to open more to counteract that or visa versa. This can lead to a problematic feedback loop that can't be controlled by the BMS because these are separate devices/systems. Devices like this must be monitored/controlled by the BMS or they can cause issues. If these devices are installed without a BMS, it is likely that they will fight each other, and it will be nearly impossible to troubleshoot because there will not be an interface to monitor the entire system.

The implementation of the functionality of this device is recommended. Ideally that would be accomplished using the new control system with a couple of new water temperature sensors installed to the supply and return lines. Installing these sensors will be relatively simple if a new controller is installed in the mechanical room because of the existence of the controller that is wired to the current main controller. This wiring is assumed to be reusable.

If this Energy Valve device is installed rather than a couple of sensors with a control algorithm, the contractor should confirm that the supply water temperature and return water temperature can be monitored (and hopefully trended) by the BMS implemented by ECM-10. It is recommended that this functionality is handled by the BMS using two new temperature input sensors with a control algorithm.

4.4 – Self Sensing Pump ECM-6

Item 5.21

The cost of ECM-6 is estimated at $9,600. This ECM would replace the existing circulation pumps with pumps that would sense the pressure within the system and adjust their speed accordingly. This will save electrical energy for pumping because the pump will not have to work as hard when the building is under less heating load due to radiant valves being closed. When valves are closed due to a zone being satisfied, the pumps should slow down and save electrical energy.

As mentioned above in section 4.3.5, self sensing pumps combined with an Energy Valve that modulates to maximize Delta T across a heating coil may not work well together. Also, if Self Sensing Pumps replace the existing circulation pumps, they should not be connected to boiler control shut offs as per section 4.3.2 Boiler and Circulation Pump Controls because these pumps are a single loop through the building and must run constantly to provide heat to the facility. These pumps can be shut down during summer when the boilers are no longer distributing heat.

Replacing the existing circulation pumps with self sensing pumps is recommended. Their operation in cooperation with an Energy Valve should be reviewed by the controls contractor prior to implementing the Energy Valve along with Self Sensing pumps.

4.5 – Baseline Boiler Upgrade – ECM-15

Item 5.22, 5.9

The cost of ECM-15 is estimated at $19,600. This cost is assumed to replace 2 – 169kW oil boilers (with 4 years of remaining life expectancy) with 2 – 144kW near condensing oil boilers (with 25-year life expectancy) as per the Energy Audit report.

As discussed in section 2, the decision to replace oil boilers with high efficiency propane boilers should be investigated prior to moving forward with this ECM. Switching to propane not only reduces fuel costs, but it allows for greater efficiencies and GHG reductions while likely reducing insurance and the costs of an oil cleanup due to the reduced risk to the insurance provider. High efficiency propane boilers are also much smaller in physical size than the existing oil boilers, which should free up space within the mechanical room. It is assumed that 3 - ~112kW high efficiency propane boilers could replace the existing oil boilers.

Figure 8: High efficiency propane boilers (IBC SL 80-399 TI Condensing Boilers) used in the Carcross Learning Centre are 95.7% efficient and have a CSA rated output of 22.6kW – 112kW (77 – 382 MBH) per boiler. Based on the current boilers at the Administration Building, it is assumed that 3 of these propane boilers would work well with a biomass system or as stand alone. Since these boilers can be modulated significantly, their implementation would reduce the usability of a heat pump in replacement of the existing air conditioning equipment. They would also work much better than oil boilers for supplementing the performance of a biomass system.

Note that if the existing oil boilers are changed out, they could potentially be utilized as backup heating for the Public Works Building as indicated within that report. They may even be considered as backup heating to the biomass system by connecting them directly to the biomass loop. This would be for extreme circumstances and would be useful in the event of a biomass boiler shutdown and situation in which buildings on the district energy system require extra heat.

Another option is to leave these boilers within the Administration Building as backup heating to a biomass heating system, as discussed in Section 3. Using the existing oil boilers as backup heating may

extend their life significantly past the expected 4 years as indicated in the Energy Auding report. Since funding is available now and this work can be coordinated as a large project, it is recommended that these boilers are changed out now.

4.6 – Wall Insulation Upgrade – ECM-16

Item 5.23

The cost of ECM-16 is estimated at $45,500. The Energy Audit report indicates that the existing exterior walls are installed at RSI 4.64 (R-26.35). The proposed upgrades are to install 50mm of Rigid XPS Insulation to add an additional RSI of 1.72 (R-9.77), for a total wall performance of RSI 6.36 (R-36.12).

A thermal graphic inspection of the Administration Building was completed on December 15, 2020 and found that the building envelope is in good shape with the exception of two obvious flaws as noted in the report. As indicated in the Energy Audit report, the costs to upgrade the building envelope are high with a very long payback period. Further, the implementation of this ECM would require a great deal of labor and would affect the aesthetics of a building envelop that is aesthetically pleasing and in apparent good shape.

The thermal investigation also showed how most of the heat loss through the building envelope is occurring through the bay doors and office windows. Thus, it is advisable to improve the energy performance of those components as discussed in Section 4.1.1 regarding the bay doors and exit doors and Section 4.8 regarding the windows.

Upgrading the wall insulation is not recommended.

4.7 – Roof Insulation – ECM-17

Item 5.24

The cost of ECM-17 is estimated at $4,550. The Energy Audit report indicates that the existing roof insulation is comprised of batts that are 300mm thick with an RSI 7.50 (R-42.59). The proposed upgrades are to install an additional 102mm of cellulose insulation to add an additional RSI of 2.6 (R-14.76), for a total insulation performance of RSI 10.1 (R-57.35). The effective RSI-value of the roof after the upgrade is expected to be 9.93 (R-56.39).

This upgrade has a low installed cost and a modeled payback period of just over 2 years. This ECM is recommended for implementation. Note that care should be taken not to block or obstruct any venting within the attic space as part of installation.

4.8 – Magnetite Storm Windows – ECM - 11

Item 5.25

The cost of ECM-11 is estimated at $18,200. The Magnetite windows appear to be a good option to replacing the windows and will help to reduce the heat loss via the glass. This will improve the comfort of office staff while saving energy. These panels are cheaper to implement than replacing the existing windows with triple pane and will help reduce heat loss through the lowest performing parts of the

building envelope. Additionally, in the accompanying thermal imaging report, windows throughout the Administration Building appeared to be installed well, thus replacing them is not as attractive as upgrading the performance of the existing windows.

If occupants will be opening windows for cooling, care will need to be taken to ensure that the Magnetite panels for operable windows are stored safely so that they do not crack or get scratched when removed from the windows during summer months. As indicated in section 2.2.1, the CAO currently addresses her office overheating by opening the window, even during winter. This situation will likely make the Magnetite window useless.

Installing Magnetite Storm Windows for the Administration Building is recommended.

5 – Recommendations for the City of Dawson to consider

5.6: Test and replace all components of AHU in order to run in AUTO

Reference: Section 2.4

No physical measuring devices were noted on the AHU. Recommend install thermometers in the air streams and on supply water and return water lines next to sensors of AHU1 (same as ECM-14) so that these values can be viewed by operations staff and compared to temperature sensors that are monitored by the building management system.

Replace the existing supply air temp (SAT), return air temperature (RAT) and mixed air temp (MAT) sensors as part of upgrading the BMS. Replace the existing damper actuators and heating valve actuator. Controls technicians to test all relays and replace as necessary to operate the supply air fan and return air fan in AUTO.

5.7: Perform testing and air balancing of all conditioned zones serviced by AHU1 as part of controls upgrade

The performance of AHU-1 will change as a result of this project. The air balancing during the initial installation is likely to have shifted since 2000 and may not have been completed optimally at that time.

Assessing and testing the air flow to each zone shall be completed once all upgrades to the controls and mechanical systems are complete.

5.14: Implement the indicated functionality into the BMS and HVAC system

Reference: Section 4.3

The proponent shall install a centralized control system to accomplish the functionality of ECM-2, ECM-4, ECM-9 and ECM-14 as part of ECM-10 as defined below. The wireless thermostats and router of ECM-2 will likely be required in much of the facility.

Note that since there is already a controller in the mechanical room of AHU-1, a new controller to control AHU-1 can easily be installed to accomplish ECM-9 and ECM-14 using sensors and programming.

ECM-4 functionality can be wired directly into the new main controller using a few feet of wire and 2 sensors that will replace the existing controller in the boiler room.

The proponent shall implement a control system with:

1) Graphical interface that can accomplish the tasks of section 4.3 including provide a graphical interface of each zone, boiler operation, cooling equipment operation, AHU-1 operation, biomass system integration
2) Monitoring and control of 20 zones using either wireless or wired thermostats
3) Occupancy/unoccupancy setpoints
4) Operator adjustable boiler reset
5) CO_2 monitoring with OAD control
6) AHU-1 heating valve control for Delta T optimization via the installation of either the Energy Valve (ECM-14) or some programming and a supply water temperature sensor and return water temperature sensor for the heating coil.
7) The BMS shall trend data and store data for a minimum of 2 years.
8) Remote monitoring by operators via web-based interface
9) Alarms to inform operators of equipment failure
10) Optimally monitoring and totalizing boiler runtimes to calculate fossil fuel consumption

5.15: Install occupant-adjustable thermostats that are monitored by the BMS and allow for occupancy scheduling - ECM-2

Reference: Section 4.3.1

As part of BMS upgrades, replace manual thermostats with occupant-adjustable thermostats that are monitored and controlled by the BMS. The thermostat/controls shall allow for occupancy scheduling. Zones that may be occupied after-hours such as the Council Chambers should optimally have an occupancy sensor built into the thermostat (smart thermostat) or zone override button that keeps the zone at occupied temperatures after-hours as required.

5.17: Implement an operator adjustable boiler reset schedule (ECM-4) using the control system as part of ECM-10

Reference: Section 4.3.2

The controls contractor shall run a sensor to the supply water line and return water line near the boiler to monitor these boiler water temperatures and create an operator-adjustable boiler reset schedule based on outside air temperature. This allows the operator to optimize the water temperature according to building dynamics.

The BMS should shut down the boiler circulation pumps (self sensing as per ECM-6) when the boilers are not in use according to outdoor air temperatures. Ie. when OAT > ~15°C. The shut down temperature will be interlocked with the implementation of a heat pump for cooling. Ie. The Boilers shall not run when the heat pump is being utilized for cooling.

It is expected that the heat pump will provide primary heating to the building when OAT >0C and there is no shortage of electricity on the grid. Boilers and boiler circulation pumps can activate when the heat pump is in heating mode, however they will provide secondary heating to the heat pump.

5.18: Install thermometers to monitor boiler water temperatures for comparing to sensors

Reference: Section 2.1, Section 4.3.2

The boilers require thermometers for monitoring supply and return water temperatures as none are currently installed. These should be installed near the supply water sensor and return water sensor locations.

5.19: Implement demand control ventilation via CO_2 sensor – ECM-9

Reference: Section 4.3.3

Install a CO_2 sensor for demand control ventilation while including the ability of the operator to manually set the damper minimum position, test the dampers and recalibrate the CO_2 sensor.

The implementation of this ECM is recommended with a reduced minimum damper position of ~5% and CO_2 threshold of ~800ppm to modulate the damper open up to ~25%.

5.20: Implement Delta T control via the BMS ECM-14

Reference: Section 4.3.5

Increase the heat transfer efficiency of the heating coil within AHU-1 by monitoring the supply water temperature to the heating coil and return water temperature after the heating coil. Utilize a PID control algorithm to modulate valve position and provide maximum heat transfer to the air stream. The PID shall operate to meet the operator-adjustable supply air temperature setpoint.

All applicable temperatures, damper positions, valve positions and setpoints shall be indicated on the AHU-1 graphic.

5.21: Replace circulation pumps with self sensing pumps – ECM-6

Reference: Section 4.4

Replacing the existing circulation pumps with self-sensing pumps.

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	Solid Waste Diversion Centre- Estimated Cost Approval	
PREPARED BY:	Jonathan Howe, PW Superintendent	**ATTACHMENTS:** Oro Enterprises Quote
DATE:	March 25, 2022	
RELEVANT BYLAWS / POLICY / LEGISLATION: Procurement Policy #2021-03		

RECOMMENDATION

That Council award the construction of the Solid Waste Diversion Centre to Oro Enterprises LTD for $1,393,485 + GST as per the attached quote.

ISSUE / PURPOSE

To move forward with the construction of the Solid Waste Diversion centre as soon as possible.

BACKGOUND SUMMARY

The Solid Waste Diversion Centre, to be owned and operated by the City, is a project that has been in discussion over the last several years. In 2021, the City began working with Colliers Project Leaders and Oro Enterprises to establish a contract and the construction plan for the Solid Waste Diversion Centre, which is tentatively scheduled to be complete by fall 2022.

The estimated total cost of the complete construction of the SWDC was provided by Oro Enterprises came in at $1,393,485. The estimated total cost includes, the tight to weather building construction as well as utility installation, and recycling processing equipment.

ANALYSIS / DISCUSSION

To continue to move forward with the construction of the Solid Waste Diversion Centre, we ask Council to grant approval for option #1 (below).

OPTIONS:

1. That Council award the contract to Oro Enterprises Ltd.for the construction of the Solid Waste Diversion Centre for 1,393,485 + GST as per their attached quote
2. That Council NOT award the contract to Oro Enterprises Ltd.for the construction of the Solid Waste Diversion Centre for 1,393,485 + GST as per their attached quote

APPROVAL		
NAME:	C Bellmore	**SIGNATURE:** C Bellmore
DATE:	May 27, 2022	

Estimated Cost Breakdown
Owner City of Dawson Recycle Center
Amended 25May2022
4,000 sqft ground floor
280 Lnft parimeter ground floor

	Total	GST
Preconstruction		
Permits		
City of Dawson Development Permit	0.00	0.00
YG Building Permit	750.00	0.00
YG Sewage Disposal Permit	0.00	0.00
Power	20,000.00	1,000.00
Subtotal	20,750.00	1,000.00
Construction		
Professional Fees		
Survey	6,520.00	326.00
Engineering	25,000.00	1,250.00
Architect	8,500.00	425.00
Subtotal	40,020.00	2,001.00
Ground Preperation		
Geotech Fabric, Preliminary Fill, Power & Heat Pump Trenchs and Final Site Grading	35,500.00	1,775.00
Framing		
Building		
Floor		
Formwork & Insulation	35,340.24	1,767.01
Rebard & install	28,976.30	1,448.82
Concrete	119,739.25	5,986.96
Bollards	3,559.00	177.95
Shed Roof pedestal pads	6,626.20	331.31
Exterior walls		
Exterior wall framing & glulams	74,700.20	3,735.01
Exterior sheeting	9,389.04	469.45
Crane	2,800.00	140.00
Typar & tape	500.00	25.00
Strapping	2,394.00	119.70
Insulation	3,106.60	155.33
Energy Shield, caulking & tape	6,272.20	313.61
Fasteners	2,500.00	125.00
Roof		
Shed Roof Beams & columns	8,065.00	403.25
Trusses & install	85,990.00	4,299.50
Crane	2,100.00	105.00
Roof sheeting	15,303.20	765.16
Tin	25,595.10	1,279.76
Avalanch bar & ridge cap etc	0.00	0.00
Roofing screws	1,210.00	60.50
Ceiling strapping & vapour barrier	3,442.00	172.10
Gable ends	1,140.00	57.00
Insulation	11,682.13	584.11
Gutters	12,000.00	600.00
Widows	8,300.00	415.00
Ext doors man doors	4,349.00	217.45
Garage Doors	7,549.00	377.45
Tight to weather Totals	418,311.92	20,915.60
Exterior		
Siding	27,350.66	1,367.53
Trim	4,396.00	219.80
Fasteners	200.00	10.00

Painting	4,500.00	225.00
Soffits	14,960.00	748.00
Exterior Totals	51,406.66	2,570.33
Interior walls		
Framing	18,311.60	915.58
Drywall	26,053.60	1,302.68
Hang, mud & sand	0.00	0.00
5/8" plywood	1,867.52	93.38
Paint	0.00	0.00
Drywall Totals	46,232.72	2,311.64
Mechanical & Plumbing		
Contract	160,720.00	8,036.00
1,500LPD WETTO	112,020.00	5,601.00
Forced Air Heat Pump, backup Electric	0.00	0.00
Mech Totals	272,740.00	13,637.00
Electrical		
Contract	126,588.00	6,329.40
Fixtures	0.00	0.00
Elec Totals	126,588.00	6,329.40
Interior finish		
Interior doors	23,837.00	1,191.85
Cabinetry	30,700.00	1,535.00
Trim	4,957.60	247.88
Interior Totals	59,494.60	2,974.73
Solar System		
Contract	67,894.64	3,394.73
Solar Totals	67,894.64	3,394.73
Recycle Processing Equipment		
Bailer(s)	39,700.00	1,985.00
Glass Crusher & Conveyor	31,000.00	1,550.00
Conveyor	92,000.00	4,600.00
Everun EREL04 or 5 Electric Forklif	18,077.00	903.85
Equipment Totals	180,777.00	9,038.85
Miscellaneous		
Gates Relocated	2,000.00	100.00
	0.00	0.00
Miscellaneous Totals	2,000.00	100.00
Sub Totals	$1,321,716	
	$1,278,665	
Contractor fee	$114,821	$5,741
Grand Total	**$1,393,485**	$5,741

It is understood and agreed by the undersigned that the

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

SUBJECT:	Lots 10, 11, and 12 Block 12 Government Reserve Addition Subdivision Application (#21-049)	
PREPARED BY:	Planning & Development	**ATTACHMENTS:** 1. Application & Supporting Documentation
DATE:	May 24, 2022	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Subdivision Bylaw Official Community Plan Zoning Bylaw Heritage Bylaw		

RECOMMENDATION

It is respectfully recommended that Council grant subdivision authority to adjust the boundaries of Lots 10, 11, and 12, Block 12, Government Reserve Addition (Subdivision Application #21-049), subject to the following conditions:

1. The applicant submit a Stormwater Management Plan to the satisfaction of the PDO and Public Works Manager.
2. The applicant submits a plan of subdivision completed by a certified lands surveyor drawn in conformity with the approval.
3. The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.

ISSUE / BACKGROUND

Subdivision Application #21-049 was received May 2021 and the applicant is requesting to undergo a boundary adjustment of Lots 10, 11, and 12, Block 12, Government Reserve Addition. The public hearing was held on June 15th 2021 and no comments were rendered.

The application was since put on hold pending the submission from the applicant of an updated, comprehensive site plan that includes all affected lots. A comprehensive site plan was received on May 11, 2022 for Lots 10-12 and a zoning assessment was completed.

ANALYSIS / DISCUSSION / ALIGNMENT TO OCP & STRATEGIC PRIORITIES

Comments

Department heads have been asked to comment on this application for the purposes of assessing operational requirements such as access, lot grading, and slope stability, and at the time of writing this report, no concerns have been raised.

The application has been circulated to every property owner within a 100m radius of this property, inviting comments and questions. No comments have been received at the time of submitting this report.

Subdivision Bylaw

Subdivision Control Bylaw s. 3.01 states that every subdivision of land must be made in accordance with the Municipal Act, the Official Community Plan, the Zoning Bylaw, and the Subdivision Control Bylaw. The Analysis/Discussion section of this report is intended to discuss the proposal's conformity with the provisions outlined in the relevant legislation, policies, and plans.

Municipal Act

The Municipal Act S. 314 details the requirements for any proposed plan of subdivision to have direct access to the highway to the satisfaction of the approving authority. The existing vehicle access to the site is via Dugas Street and there is no boardwalk in this area of Dawson (see figure 1 and 2). There is an existing rear alley that is open and in use that provides additional access.

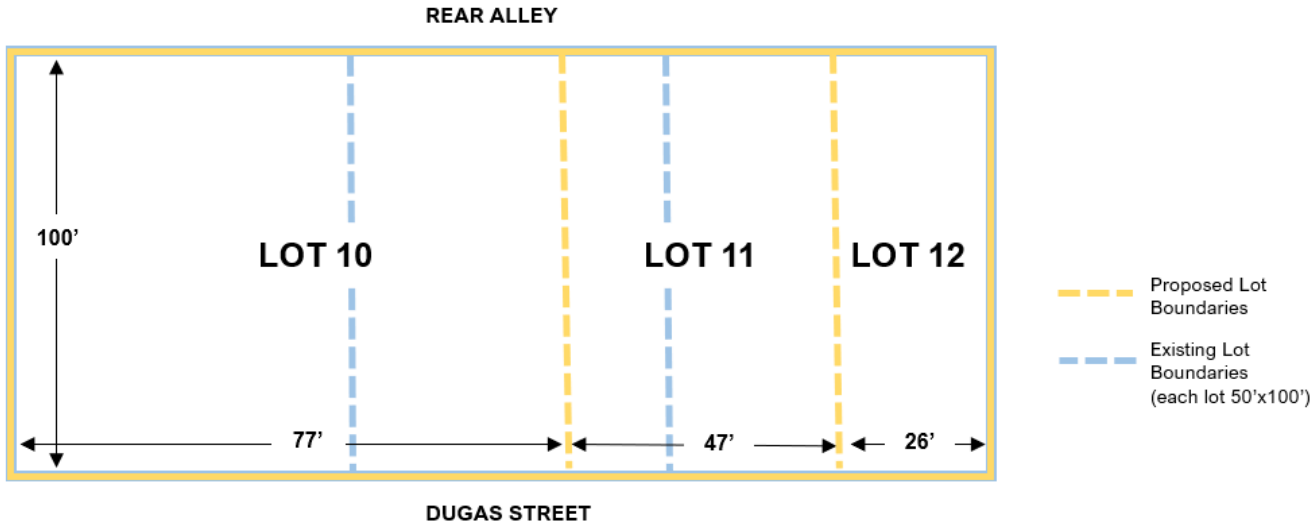

Figure 1 Proposed lot configuration for three lots.

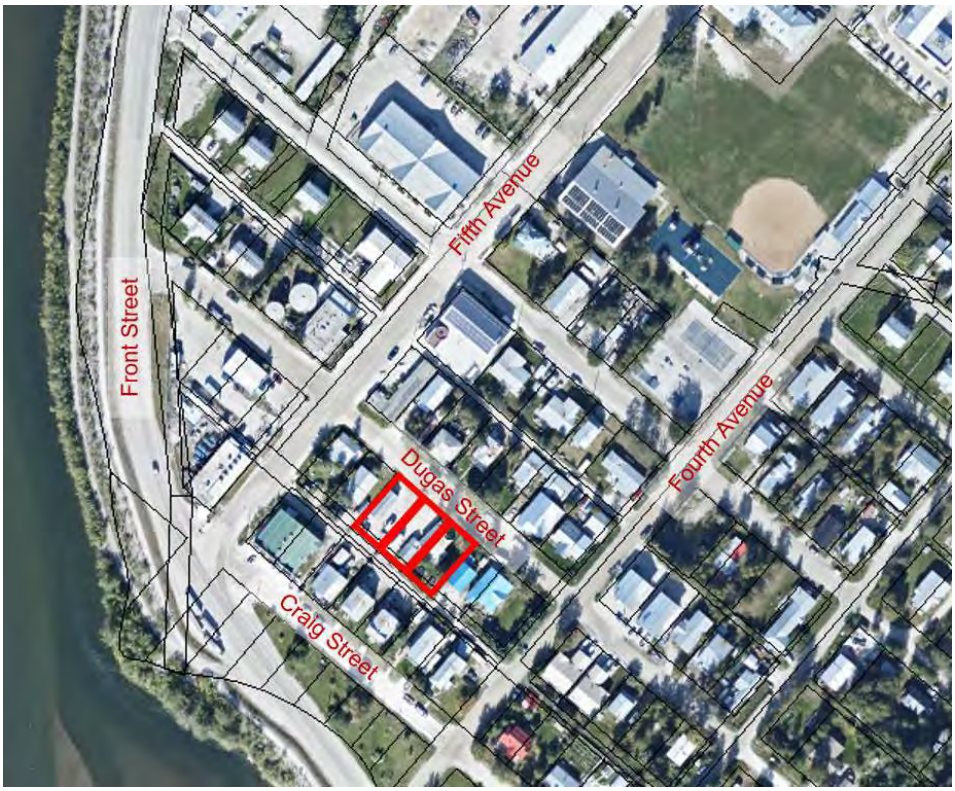

Figure 2 Context map showing location of lots under consideration.

Official Community Plan

The existing properties are currently designated as UR – Urban Residential. The area is predominantly low- and medium-density residential but institutional uses such as religious assemblies can also be located in

this area. Therefore, the current property conforms to the OCP and the adjusted lots would be required to retain the same designation. Any new use or development on the proposed lots would be required to continue conforming to UR – Urban Residential.

Zoning Bylaw

The subject property is currently designated as R1: Single Detached and Duplex Residential. The current land use conforms to this designation. The new lot layout increases the conformity of the lots with the Zoning Bylaw given that a residence and garage currently straddle Lots 10 and 11.

A comprehensive zoning assessment was completed on May 24, 2022, at which point it was determined that Lots 11 and 12 are in compliance with the requirements outlined in the Zoning Bylaw, however Lot 10 has a non-compliant setback of 3ft between the primary residence and the garage. The minimum required setback is 10ft, as per s.7.1.2 of the Zoning Bylaw.

S.5.1.1.I of the Zoning Bylaw states, “At the sole discretion of Council, parcels with a pre-existing legally non-conforming use or structure may be subdivided so long as the subdivision does not increase the legally non-conforming nature of the use or structure.” In 1995, building-development permit #95-007 was approved for the residence and garage. According to the ZBL in effect at the time of approval (Bylaw #92-27), no building-to-building setback was required. Therefore, the non-compliant situation can be considered legally non-conforming. The proposed subdivision would not increase the legally non-conforming nature of the use or structure, rather it would increase overall conformity by remedying the current situation where the residence and garage on Lot 10 overlap the side parcel line.

Heritage Bylaw

Lots 10, 11 and 12 Block 12 Government Reserve Addition are situated in the Historic Townsite and thus are subject to the City’s Heritage Bylaw. Any new development will be required to conform to the Design Guidelines for Historic Dawson and Heritage Management Plan as according to the Heritage Bylaw.

OPTIONS

1. Council grant subdivision authority to adjust the boundaries of Lots 10, 11, and 12, Block 12, Government Reserve Addition (Subdivision Application #21-049), subject to the following conditions:
   1.1. The applicant submit a Stormwater Management Plan to the satisfaction of the PDO and Public Works Manager.
   1.2. The applicant submits a plan of subdivision completed by a certified lands surveyor drawn in conformity with the approval.
   1.3. The applicant shall, on approval of the subdivision plan by the City of Dawson, take all necessary steps to enable the registrar under the Land Titles Act to register the plan of subdivision.
2. Council does not grant subdivision authority to adjust the boundaries of Lots 10, 11, and 12, Block 12, Government Reserve Addition (Subdivision Application #21-049).

APPROVAL		
NAME:	Cory Bellmore	**SIGNATURE:** C. Bellmore
DATE:	May 27, 2022	

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	Heritage Incentive Applications #22-016 and #22-023	
PREPARED BY:	Planning & Development	**Attachments:** Heritage Incentive Application #22-016 Heritage Incentive Application #22-023
DATE:	May 24, 2022	
RELEVANT BYLAWS / POLICY / LEGISLATION: Heritage Bylaw		

RECOMMENDATION

Administration respectfully recommends that Heritage Incentive Application #22-016 and #22-023 be approved in full, awarding the applicants $5,000 each for a Tier II Heritage Incentive.

ISSUE / PURPOSE

Two Heritage Incentive applications have been received prior to the 2022 deadline. According to s.13.11 of the Heritage Bylaw, Council shall decide on the applications upon the recommendation of the HAC. At HAC meeting #22-08, the HAC recommended full approval to Council of the applications.

BACKGOUND SUMMARY

S.13.05 of the Heritage Bylaw outlines the eligibility for owners or lessees of a non-designated Historic Resource to apply for a Tier II Heritage Incentive, which constitutes up to 50% of an eligible project to a maximum of $5,000. The deadline to apply for a Heritage Incentive is April 15 of each year (s.13.07 Heritage Bylaw) – two applications have been received for 2022.

Heritage Incentive #22-016

Incentive Application #22-016 was applied for on March 21st, 2022 for Tier II funding of $5,000. The applicant is proposing to stain the exterior logs of the Caley house, located at Lot 1, Block U, Ladue Estate for conservation purposes. There are many areas that the existing paint/stain has worn through to bare wood and other areas where it is peeling. To prevent the logs from rotting and ultimately causing further damage to the home, the applicant hopes to undertake the staining work this year.

As per S.13.02(g) of the Heritage Bylaw, painting, where it can be demonstrated as a conservation activity is eligible for a Heritage Incentive.

As per S.13.09 of the Heritage Bylaw, applications for incentives will be assessed against a series of criteria. The relevant criteria to this project are as follows:

(b) The degree of deterioration and necessity of restoration;

> *The logs on the development were last painted in 1993 and are facing significant deterioration due to weather. The proposed project will include sanding and staining of the walls, skirting and tin,*

soffits, fascia boards, trim, stairs and railings. Should the logs continue to go untreated, the exterior will degrade further and require significantly more work than is being requested now.

(d) Ability of the applicant to access other funding for the project;

The applicant has also applied for the YG Historic Properties Assistance Program, and is eligible to receive $10,000.

(f) The degree of benefit to the heritage integrity of the site;

The project would benefit the heritage integrity of the site by reducing the possibility of further degradation of the building in the future due to weather.

Heritage Incentive #22-023

Incentive Application #22-023 was applied for on April 19th, 2022 for Tier II funding of up to $5,000. Since the deadline of April 15th landed on a Statutory holiday, the application was accepted on the following work day. The applicant is proposing to repair the foundation of the Melanie Morico house, located at Lot 1, Block H, Menzies Addition, to reinforce the structural integrity of the home on the lot. The applicant hopes to backfill the basement hole and install a crib and pad foundation this year.

As per S.13.09 of the Heritage Bylaw, applications for incentives will be assessed against a series of criteria. The relevant criteria to this project are as follows:

(b) The degree of deterioration and necessity of restoration;

The wood basement walls are being pushed in under the building. Since the house sits on a lower grade than the land around it, it receives runoff from the roadway and hill, which as degraded its foundation over time and is now causing the house to sink into the ground.

(d) Ability of the applicant to access other funding for the project;

The applicant has also applied for the YG Historic Properties Assistance Program, and is eligible to receive $10,000.

Both applications were submitted with all required information, as required by s.13.07 of the Heritage Bylaw.

ANALYSIS / DISCUSSION

Heritage Bylaw

S.13 of the Heritage Bylaw outlines 'Heritage Incentives'. As per s.13.06, "Tier I and II Heritage Incentives are granted on an annual basis to a combined maximum that is equal to half of the Heritage Reserve Fund or $20,000 per year, whichever is lesser". Both incentives applied for are for non-designated historic resources as listed on the Yukon Historic Sites Inventory (YHSI), each being eligible for up to 50% of an eligible project to a maximum of $5,000. Therefore, the combined total applied for equals $10,000, making up only ½ of the yearly maximum.

As per s.13.11 of the Heritage Bylaw, "Council shall, upon the recommendation of HAC, determine by resolution whether an application, or any part thereof, should be:

(a) Fully approved;
(b) Partially approved;
(c) Approved with additional conditions; or
(d) Denied."

On May 5, 2022, as per Resolution #22-08-11, the HAC moved to recommend that both applications in question receive full approval of $5,000 each.

Therefore, Administration respectfully recommends that Heritage Incentive Application #22-016 and #22-023 be approved in full, awarding the applicants $5,000 each for a Tier II Heritage Incentive.

OPTIONS

That Heritage Incentive Application #22-016 and #22-023 be:

1. fully approved to receive $5,000 each, equating $10,000 of the Heritage Reserve Fund,
2. partially approved,
3. approved with additional conditions, or
4. denied.

APPROVAL		
NAME:	Cory Bellmore	**SIGNATURE:** 
DATE:	May 27, 2022	

THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

HERITAGE INCENTIVE PROGRAM INTAKE FORM

APPLICATION DEADLINE: APRIL 15 OF EACH YEAR

BACKGROUND AND OBJECTIVES OF THE PROGRAM

In recognition that many of the City of Dawson's Historic Resources are privately owned, the Heritage Fund was established to assist with restoration, enhancement or renovation of Municipal Historic Sites and sites listed on the Heritage Inventory through the provision of financial assistance. The program is available to private projects.

DEFINITIONS

Historic Resource: a historic site, historic object, or any work or assembly of works of nature or human endeavor listed in the Yukon Historic Sites Inventory

Municipal Historic Site: an area or place, parcel of land, building or structure, or the exterior or interior portion of a building or structure that is by itself, or by reason of containing a historic resource, designated by Council as a Municipal Historic Site.

INCENTIVE TIERS

The program consists of two tiers of incentives:

- Tier I Incentive- Owners or lessees of a Municipal Historic Site are eligible for this tier. This incentive constitutes up to 50% of an eligible project to a maximum of $10,000.
- Tier II Incentive- Owners or lessees of a non-designated Historic Resource are eligible for this tier. This incentive constitutes up to 50% of an eligible project to a maximum of $5,000.

Receipt of an incentive through another funding opportunity does not change the eligibility of a project under this program.

ELIGIBILITY CRITERIA

Eligible restoration, enhancement or renovation costs for Tier I and II incentives include the following:

- Repair or replacement of roofs or foundations
- Stabalization and/or installation of additional bracing
- Returning the exterior to its original appearance as per photographic evidence or other research as appropriate
- Alterations that bring a structure into compliance with current bylaws in order to resolve a legal non-conforming status but do not impact the heritage values or character defining elements
- Sealing to weather
- Repair or reproduction of doors and windows
- Painting, where it can be demonstrated as a conservation activity
- Interpretive signage and/or other publicly available interpretive media
- Procurement of materials to undertake any of these projects
- Procurement of skilled labour to undertake any of these projects.

Non eligible projects include the following:

- Projects that have already commenced or are already complete
- Restoration or redevelopment that does not conform with the *Zoning Bylaw, Heritage Management Plan, Design Guidelines for Historic Dawson,* and the *Standards and Guidelines for the Conservation of Historic Places in Canada.* Exceptions may be made for structures that are legally non-conforming
- Cyclical repair such as cosmetic repainting and landscaping
- Projects on properties that have received funding under this program within the last five (5) calendar years
- Projects on properties with outstanding property tax or compliance infractions with respect to any municipal bylaw.
- Private purchase of land or structures
- Projects where the government is the applicant

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APPLICANT INFORMATION

APPLICANT NAME(S): (Robert) Bobby Caley (with assistance from Maureen Caley-Verdonk)

MAILING ADDRESS: Box 1367 **POSTAL CODE:** Y0B 1G0

EMAIL: bobbycaley97@gmail.com; mverdonk@northwestel.net **PHONE #:** 993-3840

OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)

OWNER NAME(S): (Robert) Bobby Caley

MAILING ADDRESS: Box 1367 **POSTAL CODE:** Y0B 1G0

EMAIL: bobbycaley97@gmail.com **PHONE #:** 993-3840

PROPERTY INFORMATION

CIVIC ADDRESS: 902-5th Avenue **VALUE OF DEVELOPMENT:** 22000

LEGAL DESCRIPTION: LOT(S) 1 **BLOCK** U **ESTATE** Ladue **PLAN#** 8338A

MUNICIPAL HISTORIC SITE ID # _____ **YUKON HISTORIC SITES ID #** _____

PROJECT PROPOSAL (PLEASE ATTACH ADDITIONAL INFORMATION IF REQUIRED)

PROPOSED DEVELOPMENT: Please provide a brief description of the proposed development.

The proposed development is for painting/staining of the exterior of the house. The logs were last painted in about 1993 and re-sealing to preserve the logs is a priority. Work will include sanding and staining on the walls, skirting and tin, soffits, fascia boards, trim, stairs and railings.

Two quotes are attached - one of which is more detailed.

RATIONALE: Please provide rationale for undertaking the project. Please add additional pages if necessary.

This intervention is for preservation of the log structure AND exterior aesthetics. The fact is that if the logs aren't treated and maintained, the log exterior will degrade further and need significantly more work than if addressed now.

Further deterioriation will undoubtably affect the structural integrity of the building.

This is a prominent building that sits on the heart of 5th Avenue. Many tourists and locals pass the structure everyday and its condition is on display.

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CURRENT STATE: Please describe the current state of the structure/site. Please add additional pages if necessary.

There are many areas that the existing paint (or stain) has worn through to bare wood and other areas where it is peeling. The log exterior will rot and cause further damage to the building if not addressed this season. Without treatment the whole building is potentially impacted - the roof, the foundation, the interior. Photos are attached in Appendix A to show the existing state.

(PHOTOGRAPHS FOR THIS SECTION ARE REQUIRED TO BE ATTACHED AS AN APPENDIX).

HERITAGE VALUE: How will this project advance the goals of the *Heritage Management Plan*? How will the project preserve the heritage value and/or the character defining elements of the site? Please add additional pages if necessary.

This is required to help ensure presrevation of the home and its historical significance. The Caley House is a prime example of traditional log home construction and the log construction is the major character defining element of the building.

The Caley house is in YG Heritage Collection Library - YHSI ID -116B/03/274 (Caley House YHSI is attached). This house in Dawson City was built in 1914, initially used as a boarding house, a teacherage, a temporary hospital and YCGC Residence, owned from 1963 (although the info in the YG Collection says 1970) by Robert & Joyce Caley. Title was transferred to Joyce in 1982 and was owned by her until its very recent sale and Title Transfer to Robert Caley (grandson of Joyce).

Photos attached (and included in the YHSI)

BROADER IMPACTS: How will the project extend the life of the site? How will the project provide heritage value to the broader community? Please add additional pages if necessary.

As stated in the rationale, this intervention is for preservation of the log structure AND exterior aesthetics. The fact is that if the logs aren't treated and maintained, the log exterior will degrade further and need significantly more work than if addressed now.

This is a prominent building that sits on the heart of 5th Avenue. Many tourists and locals pass the structure everyday and its condition is on display. The building is a critical piece to 5th Avenues skyline and deserves to be conserved as such.

The City of Dawson prides itself with the display and conservation of its history — both the First Nation and cultural hertiage as well as the richness of the Klondike Gold Rush. This house is a part of the Gold Rush era.

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PROJECT TIMELINE: Please describe the project timeline and anticipated workplan. Please add additional pages if necessary.

The project is most likely to start in late May or in June (depending on weather and contractor availability) and will be completed by the end of August.

PROJECT BUDGET: Please describe the project budget, including information on your ability to finance the project and details on proposed outside funding sources. Please add additional pages if necessary.

Budget:

Cost of Project: $22050.00 (includes GST)

Personal Contribution: $7050.00 *if I receive the full amount of grants requested
Heritage Incentive Program Request: $5000.00 (Tier 2)
Historic Properties Assistance Progam (HPA) Request: $10,000

ADDITIONAL REQUIREMENTS:

- ☑ Detailed drawing showing compliance with the *Zoning Bylaw, Heritage Management Plan, Design Guidelines for Historic Dawson,* and *Standards and Guidelines for the Conservation of Historic Places in Canada*
- ☑ Historic evidence of the site/structure's original use and features, such as historic photos or museum records
- ☑ Written approval from the registered owner of the site (if you are not the owner)

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DECLARATION

- I/WE hereby make application for the Heritage Incentive Program under the provisions of the City of Dawson Heritage Bylaw #2019-04 and the Reserve Fund Bylaw #93-32 and in accordance with the plans and supporting information submitted and attached which form part of this application.
- I/WE have reviewed all of the information supplied to the City of Dawson with respect to an application for the Heritage Incentive Program and it is true and accurate to the best of my/our knowledge and belief.
- I/WE understand that the City of Dawson will rely on this information in its evaluation of my/our application and that any decision made by the City of Dawson on inaccurate information may be rescinded at any time.
- I/WE hereby give my/our consent to allow Council or a person appointed by its right to enter the above land and/or building(s) with respect to this application only.

I/WE HAVE CAREFULLY READ THIS DECLARATION BEFORE SIGNING IT.

March 20/22 — DATE SIGNED
Bobby Caley Mcaley-Verdonk — SIGNATURE OF APPLICANT(S)

March 20/22 — DATE SIGNED
Bobby Caley — SIGNATURE OF OWNER(S)

ASSESSMENT CRITERIA

Applications for a heritage incentive will be assessed against the following criteria:

- Whether the application is for a Tier I or II incentive, with Tier I being the highest weighted incentive
- The degree of deterioration and necessity of restoration
- The financial and technical ability of the applicant to complete the work
- Ability of the applicant to access other funding for the project
- The clarity, accuracy, and credibility of the project proposal
- The degree of benefit to the heritage integrity of the site
- The degree of community benefit

Demonstration of commitment to using design features, materials, and styles that meet the *Design Guidelines for Historic Dawson* and the *Standards and Guidelines for the Conservation of Historic Places in Canada*

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ADDITIONAL INFORMATION

1. Applicants may, upon request to the Development Officer, speak as a delegate to HAC to explain and get feedback on their proposal prior to formal submission of an application for a Heritage Incentive.
2. Council shall, upon the recommendation of HAC, determine by resolution whether an application, or any part thereof, should be:
   (a) Fully approved;
   (b) Partially approved;
   (c) Approved with additional conditions; or
   (d) Denied.
3. Successful applications will be required to enter into a Contribution Agreement with the City of Dawson, detailing at minimum, the following conditions:
   (a) The proposed project shall not commence until the proponent has obtained a valid development permit and/or historic resources permit, as applicable.
   (b) Funds will be released upon the completion of the project based on a site visit conducted by the Development Officer to confirm that the work has been completed to the specifications detailed in the plans submitted;
   (c) Confirmation that any applicable territorial permits have been approved and closed;
   (d) The applicant must remain in compliance with all relevant municipal and territorial legislation;
   (e) The Contribution Agreement may be terminated if, in the opinion of the City of Dawson, the applicant fails to comply with any conditions of the Agreement;
   (f) Any project-specific conditions as identified by the Development Officer, HAC, or Council.

Appendix 1

Photographs

Photos: Exterior of the Caley House – 902 5th Avenue, Dawson City

Appendix 2

Estimates

BOREALIS PAINTING
Box 1526
Dawson City
Phone: 867-993-6476

Bobby Caley
Box 1367
Dawson City

Dawson City, January 25, 2022

Quote

Painting exterior of house, 902, 5th Avenue.

Walls, skirting and tin, soffits, fascia boards, trim, stairs and railings.

Walls: Sanding and 3 coats of stain.
Skirting and tin, soffits, fascia boards, trim, stairs and railings: Sanding, spot priming and 2 coats of paint.
Replacing bird's net.

Labour and paint **$ 21,000.00 +GST**

Thank you for your inquiry.

Yours sincerely,

Myrtha Schilliger

979953

Big B Contracting
P.O. Box 1572
Dawson City, Yukon Y0B 1G0
Tel (867) 993-5779
GST# 875 848 129 RT0001

DATE JAN 15/2022

TAX REG. NO

QUOTE FOR BOBBY

DATE	DETAILS	DEBIT	CREDIT	BALANCE
	COMPLETE REMOVAL OF OLD PAINT FROM LEGS & STAIN WITH SEMI TRANSPARENT (DUCK BACK)			16000 — 900 — 16900 —

Blueline DC101

STATEMENT

Appendix 3

Yukon Historic Sites – Caley House

Yukon
Tourism and Culture
Historic Sites Inventory Program

Yukon Historic Sites
CALEY HOUSE

Summary

YHSI ID
116B/03/274

Designations

CRHP Category
Building

Site Categories
Architecture

Records

☐ **Show In Register?**

Primary Name
CALEY HOUSE

Secondary Names

Name 1
3-U-1

Name 2
Downtown Transitional Character Area

Contributing Resources
Building

Historical Pattern

Historical Pattern 1
Historical Pattern
Social
Historical Pattern

Location

Community
Dawson City
Other Community

Other Locality

Physical Address
Address
902 Fifth Ave.
Province
Yukon
Country
Canada
Postal Code
Y0B 1G0

Previous Address

Context
One of the few historic residences located on Fifth Ave. in the downtown area; this building represents several eras of Dawson history. East of this lot on Princess St. are more

heritage houses, the Parks Canada Customs House, Gammies, and several other two story structures. This is an important building for Queen St. and Fifth Ave. as there are not many two story log buildings from the early twentieth century. The house has recently been stabilized, and is well located on a large lot. A white picket fence surrounds the yard behind the house, with a garden and lawn.

Latitude
64.059750414 64° 03' 35.1014" N

Longitude
-139.431024785 139° 25' 51.6892" W

UTM
07 N 576,572.2E 7,104,615.3N

Coordinate Determination
Digital Maps

NTS Map Sheet
116B/03

Area (m2)

Borden Number

Misc. Info

Dates & Condition

Dates

Date 1
Date Type
Construction

From Date

Details
1914

To Date

Construction Periods

Construction Period 1
From 1906 to 1939

Site Status
Standing

Floor Condition
Good
Wall Condition
Good
Door Condition
Good
Roof Condition
Good

Building Size
12m X 15.2m

Condition Notes

All Other Resource Types

Themes & Function

YHS Themes
Buildings/Functional/Housing
Buildings/Material/Log
Administrative/Service/Education
Administrative/Service/Health Care

Themes

Theme 1
Category / Type
Peopling the Land / Settlement

Functional Uses

Functional Use 1
Use Type
Historic
Functional Type
Residence / Group Residence

YHS Current Use
Residence

YHS Past Use
Teacherage, residence

Associations

Associations

First Nation Associations

First Nation Association 1
Association
Traditional Territory
First Nation
Trondek Hwechin
Comments

Legal & Zoning

Ownerships

Ownership 1
Category of Property
Private
Comments

Zoning

Group

Town Site Map Number

Lot
1

Site District
Ladue

Block
U

Group YHSI

Plan Number
8338

Previous Ownerships

Previous Ownership 1

Dates
30/03/1901

Numbers
Patent 3751

Names
Joseph Ladue & James Wilson, executor Harper

Previous Ownership 2

Dates
05/10/1901

Numbers
61 D

Names
Joseph Ladue & James Wilson, executor Harper

Previous Ownership 3

Dates
15/05/1902

Numbers
187 E

Names
Charles Milne

Previous Ownership 4

Dates
15/04/1904

Numbers
10 J

Names
Merrill Des Brisey & Henry Alan Bulver, merchants

Previous Ownership 5

Dates
08/08/1907

Numbers
83 N

Names
Henry Vaux O Chatterton, manager

Previous Ownership 6

Dates
23/07/1909

Numbers
246 O

Names
Andrew L Grant, gentleman

Previous Ownership 7

Dates
11/03/1924

Numbers
138 W

Names
Alexandra Maria Kirk, widow

Previous Ownership 8

Dates
13/09/1935

Numbers
39 Z

Names
The Yukon Consolidated Gold Corporation Ltd.

Previous Ownership 9

Dates
28/08/1970

Numbers
63 WW

Names
Robert George Caley

Previous Ownership 10

Dates
23/06/1980

Numbers
80Y463

Names
Joan M Veinott, public administrator for R Caley estate

Previous Ownership 11

Dates
11/02/1982

Numbers
82Y70

Names
Joyce Caley

Photos

Slide Negative Index
89.10.103.12 99.05.126.15) south west corner 16) west elevation 17) north west corner 18) north wall 19) north east corner 20) east elevation 21) south east corner 22) south elevation 99.05.111.16s) south east corner 17s) north west corner

Photo 1

Feature Name
Caley House 1999

Caption
Caley House 1999

Comments

CreditLine
Yukon Government

Location
SW corner

Edit Photo (/Ibbit/Photos/Edit/2adbb029-87a2-483b-bfe9-870b0dfe307f)

Photo 2

Feature Name
CALEY HOUSE

Caption
Photo taken September, 1973.

Comments

CreditLine
Parks Canada

Location
Dawson City

Edit Photo (/Ibbit/Photos/Edit/288debd5-e47b-4a56-aa1b-0abeac7ff56b)

Management

Revision Logs

Revision Log 1

Revision Type
Monitoring Visit

Date
1993/03/17

Revised By
B Barrett

Details

Revision Log 2

Revision Type
Monitoring Visit

Date
1999/03/11

Revised By
B Barrett

Details

Revision Log 3

Revision Type
Record Update

Date
1999/05/18

Revised By
D Dickson

Details

Revision Log 4

Revision Type
Monitoring Visit

Date

Revised By
B Hogan

Details

Revision Log 5

Revision Type
Record Update

Date
2010/03/09

Revised By
A Claxton

Details

Revision Log 6

Revision Type
Monitoring Visit

Date
2016/09/28

Revised By
R. Jansen

Details

Contacts

Contact 1

Type
Owner

First Name
Joyce

Last Name
Caley

Phone
993-5424

Email

Mailing Address
Box 57 Dawson City YT Y0B 1G0

Description

Web Links

Jurisdiction
None Selected

Recognition Date

Owner Consent
None Selected

☐ **Publicly Accessible?**

CIHB Number
3-U-1

YG Building Number

FHBRO Number

YG Reserve Number

Descriptions

Description 1
Description Type
Place Description

2 story frame simple

Description 2
Description Type
Renovation Information

Permit issued June 1993 to relocate and setup building. No final date. Old foundation was removed, filled in basement and moved back a few feet from the road.

Description 3
Description Type
Construction Style

Square notched logs with metal gable roof. Single hung windows, closed porch off west wall with a metal shed roof. Ship lap siding on stairway and platform with railings off south wall. Vertical ship lap siding on sawdust boxes. Overhang with metal shed roof off east wall, dual stairways and railings with small platform, also a small square bay with metal shed roof off east wall. Decorative trim over door on east wall. Addition with metal shed roof and ship lap siding off north wall. Double garage door of tongue and groove siding in addition, west wall.

Description 4
Description Type
Historical Sources Location

Joyce Caley, John Gould Dawson City Museum, Vena Bleakley Collection, 984.32 Dawson Municipal Records, Yukon Government, Land Titles, Public Safety

Description 5
Description Type
Cultural History

Built in 1914, altered in 1935. Used as boarding house, teacherage in early 1930's. YCGC assistant manager's residence from 1935-42. Temporary emergency hospital in 1951 when St. Mary's Hospital burned. Owned by the Caley's since August 1970. Personal Recollection - John Gould - This in 1920-30's was a rooming house for teachers operated by Miss Kirk. YCGC acquired it in mid 30's for their manager, Art Dailey. Now owned by Mrs. Robert Caley.

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HERITAGE INCENTIVE PROGRAM INTAKE FORM

APPLICATION DEADLINE: APRIL 15 OF EACH YEAR

BACKGROUND AND OBJECTIVES OF THE PROGRAM

In recognition that many of the City of Dawson's Historic Resources are privately owned, the Heritage Fund was established to assist with restoration, enhancement or renovation of Municipal Historic Sites and sites listed on the Heritage Inventory through the provision of financial assistance. The program is available to private projects.

DEFINITIONS

Historic Resource: a historic site, historic object, or any work or assembly of works of nature or human endeavor listed in the Yukon Historic Sites Inventory

Municipal Historic Site: an area or place, parcel of land, building or structure, or the exterior or interior portion of a building or structure that is by itself, or by reason of containing a historic resource, designated by Council as a Municipal Historic Site.

INCENTIVE TIERS

The program consists of two tiers of incentives:

- Tier I Incentive- Owners or lessees of a Municipal Historic Site are eligible for this tier. This incentive constitutes up to 50% of an eligible project to a maximum of $10,000.
- Tier II Incentive- Owners or lessees of a non-designated Historic Resource are eligible for this tier. This incentive constitutes up to 50% of an eligible project to a maximum of $5,000.

Receipt of an incentive through another funding opportunity does not change the eligibility of a project under this program.

ELIGIBILITY CRITERIA

Eligible restoration, enhancement or renovation costs for Tier I and II incentives include the following:

- Repair or replacement of roofs or foundations
- Stabalization and/or installation of additional bracing
- Returning the exterior to its original appearance as per photographic evidence or other research as appropriate
- Alterations that bring a structure into compliance with current bylaws in order to resolve a legal non-conforming status but do not impact the heritage values or character defining elements
- Sealing to weather
- Repair or reproduction of doors and windows
- Painting, where it can be demonstrated as a conservation activity
- Interpretive signage and/or other publicly available interpretive media
- Procurement of materials to undertake any of these projects
- Procurement of skilled labour to undertake any of these projects.

Non eligible projects include the following:

- Projects that have already commenced or are already complete
- Restoration or redevelopment that does not conform with the *Zoning Bylaw, Heritage Management Plan, Design Guidelines for Historic Dawson,* and the *Standards and Guidelines for the Conservation of Historic Places in Canada.* Exceptions may be made for structures that are legally non-conforming
- Cyclical repair such as cosmetic repainting and landscaping
- Projects on properties that have received funding under this program within the last five (5) calendar years
- Projects on properties with outstanding property tax or compliance infractions with respect to any municipal bylaw.
- Private purchase of land or structures
- Projects where the government is the applicant

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APPLICANT INFORMATION

APPLICANT NAME(S): Karen Murray

MAILING ADDRESS: Box 1299 POSTAL CODE: Y0B1G0

EMAIL: karen.d.m@hotmail.com PHONE #: 6472013204

OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)

OWNER NAME(S): _____

MAILING ADDRESS: _____ POSTAL CODE: _____

EMAIL: _____ PHONE #: _____

PROPERTY INFORMATION

CIVIC ADDRESS: 802 Seventh Ave. VALUE OF DEVELOPMENT: $103 260

LEGAL DESCRIPTION: LOT(S) 1 BLOCK H ESTATE Menzies Addition PLAN# _____

MUNICIPAL HISTORIC SITE ID # _____ YUKON HISTORIC SITES ID # Melanie Morico House 116B/03/448

PROJECT PROPOSAL (PLEASE ATTACH ADDITIONAL INFORMATION IF REQUIRED)

PROPOSED DEVELOPMENT: Please provide a brief description of the proposed development.

Move the house off the foundation, backfill the basement hole and return the house to its original position on the lot. Crib and pad foundation to code would be installed. This project would not see any change to the exterior of the home. The process would actually save the front bay window, which is currently pulling off the house and sinking into a hole in the ground. This process would see the front bay window secured, keeping it a prominent feature of the home.

RATIONALE: Please provide rationale for undertaking the project. Please add additional pages if necessary.

The wood basement walls are being aggressively pushed in under the building due to its location on a hill, as well as road vibrations from 2 sides. Since the house sits lower than the land around it, it receives a lot of water runoff from the roadway and hill, and weakening it's foundation.
Some bracing of the structure has been done in the basement, but this is an expensive temporary fix and needs to be redone and updated often.
Without a permanent solution the house will sink into itself and eventually collapse.

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CURRENT STATE: Please describe the current state of the structure/site. Please add additional pages if necessary.

Please see attached.

(PHOTOGRAPHS FOR THIS SECTION ARE REQUIRED TO BE ATTACHED AS AN APPENDIX).

HERITAGE VALUE: How will this project advance the goals of the *Heritage Management Plan*? How will the project preserve the heritage value and/or the character defining elements of the site? Please add additional pages if necessary.

The Heritage Management Plan (HMP) states that 60% of Dawson's historic buildings were lost from 1983-2008. I can recall in 2013 seeing this house looking like it was sinking into the ground. Though beams have been installed to keep it upright, without constant upkeep this historic home will also be lost. Setting this home on a proper foundation will ensure it stays standing and habitable for years to come, and fulfilling the following goals of the HMP:

-Preserve and strengthen the visual character and design intent of a nationally and internationally significant cultural landscape, as this home was built in 1902, and adds to the plan's intent to "tell the stories of the entire human history of the Klondike Valley, with particular emphasis on the Gold Rush era of 1896-1910."

- Ensuring this home remains standing will "Retain the dominant character as a Gold Rush-era cultural landscape"

- This project will also help "Create a superior quality of life for Dawson's residents" by ensuring this lot remains a viable source of housing during Dawson's housing crisis

- "Capitalize on the tourist potential of the region", by keeping a 125 year old home standing and adding to the character value of the neighourhoods, not just the downtown.

- The bay window, a character defining element of the home, will be preserved by securing it to the home, as right now it is sliding off the front wall and into a hole in the ground. This project will also ensure the entirety of the home stays in tact, preserving it in its entirety.

BROADER IMPACTS: How will the project extend the life of the site? How will the project provide heritage value to the broader community? Please add additional pages if necessary.

This home will be deemed unsafe if a permanent fix is not found for the foundation. Adding beams and bracing every few years is not a sustainable cost of upkeep for any homeowner, and will not prevent water damage and rotting of beams. The life of this site will be infinite if a proper foundation can be built for this home.
The broader community will benefit from keeping this home standing because it is an important home with many stories from so many residents who grew up in it, or spent their childhood in it. When the last owner posted on a local Facebook group asking for the history and information about the house, over 91 comments were garnered sharing past residents and memories from the home. This is a piece of Dawson history in both gold rush times, and present resident memory.

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PROJECT TIMELINE: Please describe the project timeline and anticipated workplan. Please add additional pages if necessary.

The time line will be based upon when the snow melts and the ground thaws, with a ideal time line of early-mid June. Up She Comes Construction will be taking on the project.
Workplan:
- Brace front wall
- Secure bay window
- Remove front skirting
- Install 4 steel I beams, and lift building off existing foundation
- Install I beam roller system, and roll building approximately 45' west onto 7th Ave, keeping one lane open to traffic at all times
- Excavate old foundation, and discard
- Back fill basement with drainage rock and gravel
- Compact and raise pad approximately 18' form present grade
- Return house back to existing location, and install new foundation of cribs, pads and beams.
- Level house, and remove steel I beams.
- Skirt in building

PROJECT BUDGET: Please describe the project budget, including information on your ability to finance the project and details on proposed outside funding sources. Please add additional pages if necessary.

House move, excavation and back-fill, new foundation, skirting= $65 000 + GST

I have applied for a $10 000 grant from the Yukon Historic Properties Assistance Program and awaiting confirmation.

The rest of the cost will come from my savings.

ADDITIONAL REQUIREMENTS:

- ☐ Detailed drawing showing compliance with the *Zoning Bylaw, Heritage Management Plan, Design Guidelines for Historic Dawson,* and *Standards and Guidelines for the Conservation of Historic Places in Canada*
- ☑ Historic evidence of the site/structure's original use and features, such as historic photos or museum records
- ☐ Written approval from the registered owner of the site (if you are not the owner)

N/a as There is no Zoning change or change to The exterior of The Structure

- please see additional appendexes including The quote from Up She Comes + reference letters

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DECLARATION

- I/WE hereby make application for the Heritage Incentive Program under the provisions of the City of Dawson Heritage Bylaw #2019-04 and the Reserve Fund Bylaw #93-32 and in accordance with the plans and supporting information submitted and attached which form part of this application.
- I/WE have reviewed all of the information supplied to the City of Dawson with respect to an application for the Heritage Incentive Program and it is true and accurate to the best of my/our knowledge and belief.
- I/WE understand that the City of Dawson will rely on this information in its evaluation of my/our application and that any decision made by the City of Dawson on inaccurate information may be rescinded at any time.
- I/WE hereby give my/our consent to allow Council or a person appointed by its right to enter the above land and/or building(s) with respect to this application only.

I/WE HAVE CAREFULLY READ THIS DECLARATION BEFORE SIGNING IT.

Apr. 15 /2022
DATE SIGNED

K Murray
SIGNATURE OF APPLICANT(S)

DATE SIGNED

K Murray
SIGNATURE OF OWNER(S)

ASSESSMENT CRITERIA

Applications for a heritage incentive will be assessed against the following criteria:

- Whether the application is for a Tier I or II incentive, with Tier I being the highest weighted incentive
- The degree of deterioration and necessity of restoration
- The financial and technical ability of the applicant to complete the work
- Ability of the applicant to access other funding for the project
- The clarity, accuracy, and credibility of the project proposal
- The degree of benefit to the heritage integrity of the site
- The degree of community benefit

Demonstration of commitment to using design features, materials, and styles that meet the *Design Guidelines for Historic Dawson* and the *Standards and Guidelines for the Conservation of Historic Places in Canada*

THE CITY OF DAWSON
Box 308 Dawson City, YT Y0B 1G0
PH: 867-993-7400 FAX: 867-993-7434
www.cityofdawson.ca

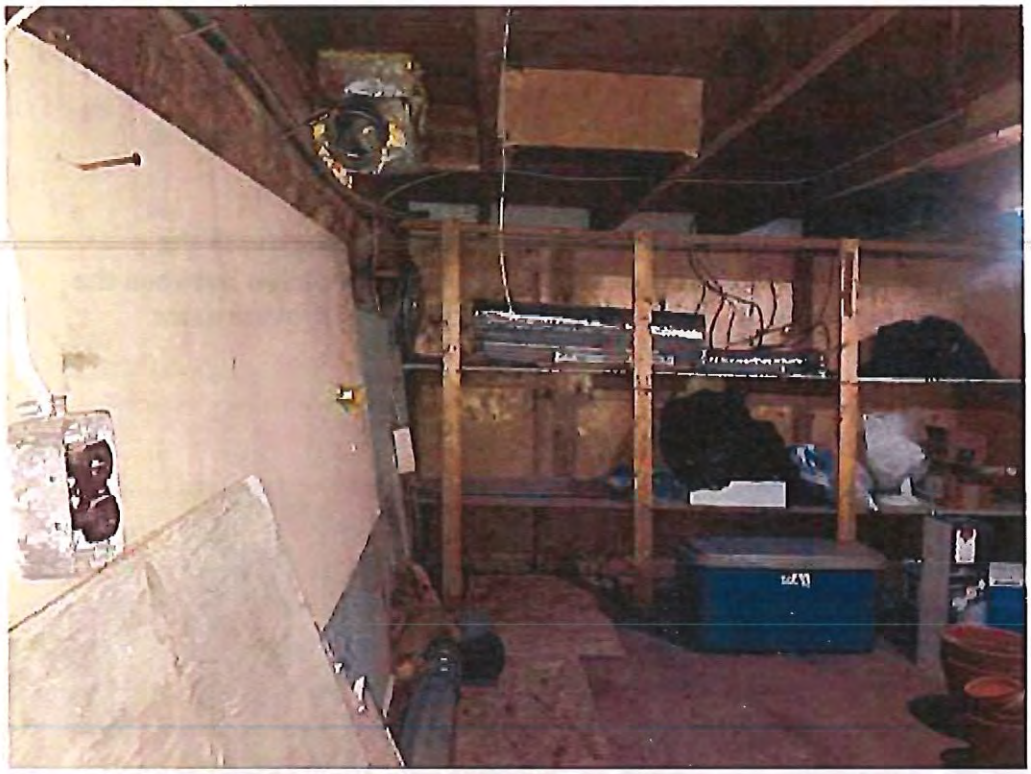
ADDITIONAL INFORMATION

1. Applicants may, upon request to the Development Officer, speak as a delegate to HAC to explain and get feedback on their proposal prior to formal submission of an application for a Heritage Incentive.
2. Council shall, upon the recommendation of HAC, determine by resolution whether an application, or any part thereof, should be:
   (a) Fully approved;
   (b) Partially approved;
   (c) Approved with additional conditions; or
   (d) Denied.
3. Successful applications will be required to enter into a Contribution Agreement with the City of Dawson, detailing at minimum, the following conditions:
   (a) The proposed project shall not commence until the proponent has obtained a valid development permit and/or historic resources permit, as applicable.
   (b) Funds will be released upon the completion of the project based on a site visit conducted by the Development Officer to confirm that the work has been completed to the specifications detailed in the plans submitted;
   (c) Confirmation that any applicable territorial permits have been approved and closed;
   (d) The applicant must remain in compliance with all relevant municipal and territorial legislation;
   (e) The Contribution Agreement may be terminated if, in the opinion of the City of Dawson, the applicant fails to comply with any conditions of the Agreement;
   (f) Any project-specific conditions as identified by the Development Officer, HAC, or Council.

Current State

Currently the home sits lower than the roadway surrounding it, as well as on a hill. Currently water runs from the hill and road directly down into the home's foundation, with a sump pump installed in the basement to pump out excessive underground water run off.

The basement is currently a dirt hole, with wood beams supporting the home on 4 sides, with the vertical beams on a noticeable angle, and the bottoms being pushed in. There is insulation between the beams. The floor is dirt, covered with plywood. There are about 4 beams placed to provide extra support to the structure, with all of them now leaning on quite an angle.



From the historic sites inventory
1972

Approx. 1955

28 February 2022

Historic Sites
Department of Tourism and Culture
Box 2703
Whitehorse, Yukon Territory
Y1A 2C6

Re: Support letter for foundation restoration 802 7th Avenue, Dawson City

To Whom It May Concern,

I am writing in support of Ms. Karen Murray's application for funding to stabilize and establish a proper house foundation, for the historic residence owner by Karen, located at 802, 7th Avenue, in Dawson, Yukon Territory.

streamlinearchitects has been active in the Yukon Territory since December of 2008, with projects in virtually every community. A branch office was established in Dawson in both 2014 and 2019, for projects throughout those years. I previously practiced in both Toronto and Vancouver. In Vancouver, I was involved in heritage restoration projects in Gastown. In the Yukon, streamlinearchitects' leads the structural stabilization and monitoring team for the Ross River School, and recently was the design team for the moving of the CBSA building across the runway at YDA (Dawson Airport). Recently, I was involved with requirements of the Heritage Advisory Committee in Dawson to establish an accessible access to the Yukon Sawmill, and currently, to renovate Riverwest Bistro on Front Street in Dawson (in the Heritage Zoning District).
Of note, is that the same mover (Mr. Donnie Flynn) that successfully moved the CBSA building, has put together a proposal to enable the stabilization of Karen's historic residence. Suffice it to say that Mr. Flynn is very capable of this task.

The house appears to retain a high integrity of historical design and materials, based on a comprehensive visit last year (2021). The historic context is also clear.
However, the condition of the foundation is in desperate need of repair, and may indeed currently be considered as "failing." It would depend on the metrics used to measure failing, however floor slopes are beyond "code" acceptable slopes for structures. This is a structural concern, in addition to liveability and historical conservation concerns.

+1 867.332.2818
c | 6098 sixth avenue | whitehorse

streamlinearchitects ltd.
DOUG MAYR ARCHITECT AIBC NCARB

Given the location of the house, the best course of action would be to lift it from the current setting, temporarily set it down (i.e., onto 7th Avenue), establish a proper foundation, and then place the house onto the new foundation.

Prior to undertaking exterior restoration, interpretation, and landscaping, it is critical that the house be stabilized, in order to respect the historic significance and integrity of the site.

Please do not hesitate to contact the undersigned for further information and discussion as required.

Sincerely,

Douglas Mayr Architect AIBC NCARB
B.A.Sc., BEDs, M.Arch.
e: doug@streamlinearchitects.ca
t.: 867.332.2818

From: Ms. Jennifer Suttis

Friend, Dawson Local

652 Harper Street,

Dawson City, YT

Y0B 1G0

February 28, 2022

To: Historic Sites

Department of Tourism and Culture

Box 2703

Whitehorse, YT

Y1A 2C6

To whom it may concern,

I am writing this letter to support Karen Murray's grant application. I believe that this grant will be beneficial in helping Karen to make her historical home safe and livable for the foreseeable future.

Karen's passion for sharing and preserving the history of our gold rush town is evident through her work in tourism. She spends her time learning, exploring and sharing her knowledge with our community and beyond. As a neighbor, I value the historical homes that make up our community and feel saddened to see the deterioration of Karen's home. This grant will help to bring new life into the home and in turn our community.

As a friend, I witnessed the excitement that filled Karen as she purchased her very first home which just so happened to be a historical home. Shortly after taking possession Karen discovered that the foundation was caving, this stressful news made her feel unsafe in her own home. Karen took the initiative to figure out how to fix this problem, after many meetings Karen came up with a plan to fix the foundation of her new home.

I am happy to offer my support to this grant application as a friend, neighbor and Dawson City resident.

Sincerely,

J. C. Suttis

Jennifer Suttis

Paul Derhak
Box 1422
Dawson City, YT
Y0B 1G0

Feb 26/22

Historic Sites
Department of Tourism and Culture
Box 2703
Whitehorse, YT
Y1A 2C6

To whom it may concern:

Please accept this letter of support for Karen Murray's application of historic restoration funding for her residence located in Dawson City at 802 7th Avenue.

I was contacted by Karen in the summer of 2021 to assess work needed to be done on the home. Based on a thorough assessment of the existing failing foundation/basement, any minor repairs would be futile until such time as the exiting basement be removed/infilled and the home be placed on a new stable foundation/pads, blocking and beams. Also given the current state of the basement/foundation, this work needs to be completed as soon as possible to avoid any further damage, deterioration or possible collapse to the existing historic structure.

Ive been a resident of Dawson since 2007 and spent most of that time as a residential and commercial builder, with over 30 years experience in the construction industry total. In 2008, I completed a restoration of my previous home which was built in 1905, so can both appreciate and support Karens desire to preserve the historic content of the community and the financial undertaking associated with that task.

Feel free to contact me anytime to discuss the matter further.

Sincerely

Paul Derhak
(867)993-3730
pderhak@gmail.com

To:
Historic Sites Department of Tourism and Culture
Box 2703
Whitehorse, YT
Y1A 2C6

Feb. 28, 2022- My name is Karen Murray, and I am the owner of the **Melanie Morico House** at 802 Seventh Ave. in Dawson City. Ever since I came to the Yukon for the first time to be a Can Can dancer at Diamond Tooth Gerties back in 2013, I have been fascinated with all the old buildings here, and dreamt of living in one. Much to my dismay when I moved here permanently, I was living in a new apartment building- it was great but just didn't feel like the "Yukon" experience.

Fast forward to last year, when I was able to fulfil my dream of home ownership- not only fully financially supported on my own, but also to my delight, a historic home built in 1902! It seemed fitting that the house was named after a woman; it's one of the things I love about it and gave me a sense of empowerment. I knew that the basement foundation looked sketchy, but with a healthy renovation budget I was hopeful to fix it up, as well as cosmetic upgrades to the kitchen and bathroom.

Fast forward to having multiple contractors come over and tell me that my home was potentially unsafe from the collapsing wood basement foundation walls due to water damage, pressure from the hill, and road vibrations. The cost to fix it was quoted around $100 000 when all is said and done- the cost of moving the house and filling the hole, redoing the plumbing and oil line, insulating the floors and getting a new subfloor, and all the repairs that comes after a house move. After many sleepless nights and many tears, I set out to make my dream home safe and livable- cosmetic interior updates will have to wait. I had 4 professionals tell me that the best and longest term solution was getting rid of the basement- after all there is a reason why most houses in Dawson don't have basements!

As a tourism professional, recently with the Klondike Visitors Association, and now in product development at Parks Canada, my passion for Dawson City and its gold rush history is prominent in the work that I do, and I adore sharing it with others. I want to see this old home standing for years to come, and to be enjoyed by both inhabitants and neighbours. Without this renovation, it will effectively sink into itself and become unlivable, and Dawson City cannot withstand another potential home or lot falling into ruin when there is a housing crisis. This project will not change the exterior of the home, in fact it will actually secure the bay window, a prominent feature currently pulling away from and off the house. The house will be moved back to it's exact location on the lot- essentially this project will just ensure that this home keeps standing for many years to come.

I am aware that I don't have all the information you are requiring right now- with Donny Flynn of Up She Comes Construction out of town for the winter, specific plans cannot be nailed down until his return in spring. I do have to apply for the City of Dawson's Demolition/Move Application but have been advised by Donny to wait until his return as he would like to go in front of the board and explain the process, as this particular move is complex. In the quote that he gave me he never broke down the cost, but I am happy to send that information in when I receive it. Please feel free to call me to discuss any further details.

When the last owner posted on a local Facebook group asking for the history and information about the house, over 91 comments were garnered sharing names of people who lived there and memories of the house. I truly hope that this project is considered for a grant as I believe that this home is important to the fabric of Dawson City, and its old buildings are part of what keeps this place so special and thriving.

Sincerely,
Karen Murray

Box 1299, Dawson City, YT Y0B 1G0

647 201 3204/Karen.d.m@hotmail.com

To whom it may concern,

I'm writing this letter in support of Karen Murray's plan to renovate the house located at 802 Seventh Ave, Dawson City. I lived in this house for three years, always with the intent to do the major renovations that the house desperately needs. Unfortunately, my plans changed with the birth of our child and we found it no longer reasonable to live in a house going through renovations with a small child.

During my stay there I did some digging around about the house. Our old Mayor, Wayne Potoroka once told me that he found a record of it being built in 1902. Very few parts of Dawson are that old. It's not a famous house but it would be a shame to lose this part of Dawson.

Karen loves this house and its history. She is someone that wants to keep the original magic of Dawson alive in this house. Unfortunately, we found that she would have to fill in the basement in order to keep this little Dawson gem livable. I fully support Karen filling in the basement and any other upgrades she wants to do to this beautiful home.

Sincerely

Ali Petersen

(250)650-0558

Hey Karen,
This would be the basics of the job. You will need to get plumbers down in your basement to figure out how to re plumb your house. You will also need electricians to do the same. You should probably get a quote from them as well.

I will have a foundation plan soon, and we will also have to find your property pins.

Maybe a lot easier in the spring, we have plenty of time to get it all together.

Thanks,

Don Flynn

Up She Comes Construction
Box 856
Dawson City, Yukon
867-993-6732 (upshecomes21@gmail.com)

November 30, 2021

HOUSE MOVE FOR KAREN MURRAY – 802 7th Avenue – LOT 1, BLOCK H, STEWART MENZIES, DAWSON CITY YUKON

JOB DESCRIPTION: House move

RATIONAL

- Basement walls are being aggressively pushed in under building.

SOLUTION

- Move house off foundation, and back fill hole.
- Return house to original position on lot, and install crib and pad foundation to code.

PROCESS

- Brace front wall.
- Secure bay window.
- Remove front skirting.
- Install 4 steel I beams, and lift building off existing foundation.
- Install I beam roller system, and roll building approximately 45' west onto 7th Avenue, keeping one lane open to traffic at all times.
- Excavate old foundation, and discard.
- Back fill basement with drainage rock and gravel.
- Compact and raise pad approximately 18" from present grade.
- Return house back to existing location, and install new foundation of cribs, pads and beams.
- Level house, and remove steel I beams.
- Skirt in building.

Owner will be responsible for all permits.
Owner will be responsible for water, sewer, electrical, and fuel tank disconnects and reconnects.

JOB DURATION: Approximately 7 days on the street, and approximately 12 days in total to completion.

JOB COSTS: House move, excavation and back-fill, new foundation, skirting $65,000.00 + GST

Thank you,

Don Flynn

THE CITY OF DAWSON

Reserves Fund Bylaw

Bylaw No. 2022-13

WHEREAS section 244 of the *Municipal Act* (2002) provides that Council may, by bylaw, establish one or more reserve funds in the name of the municipality; and

WHEREAS section 244 (2) of the *Municipal Act* (2002) provides that a bylaw to establish a reserve fund shall specify the purpose for which the reserve fund is established, whether or not the reserve fund is cash funded, the method of calculating contributions to the reserve fund, and the criteria and conditions governing withdrawals from the reserve fund;

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

1.01 This bylaw may be cited as the ***Reserves Fund Bylaw***.

2.00 Purpose

2.01 The purpose of this bylaw is to establish reserve accounts and to set out the purpose of each account and the method by which the accounts will be administered.

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act (RSY 2002, c. 125)* shall apply;

(b) “city” means the City of Dawson;

(c) “council” means the council of the City of Dawson.

PART II – APPLICATION

CAO _____ Presiding Officer _____

4.00 Establishment of Reserves

4.01 The City is hereby authorized to establish and maintain reserves for future expenditures as identified in Appendix "A" attached hereto and forming part of this bylaw.

5.00 Funding of Reserves

5.01 Each Reserve shall be funded in accordance with this Bylaw. All Reserves are to be fully funded within 30 days of the release of the annual audit.

5.02 All Reserves shall be held in a segregated account or investments. These funds may be held in a consolidated account, but must be accounted for in a manner that makes it possible at all times to determine the identity of each Reserve.

5.03 Money placed into the consolidated account to the credit of a particular Reserve shall not, except by bylaw, be expended, pledged or applied to a purpose other than that for which the Reserve was established.

5.04 A Reserve shall not accumulate funds in excess of any amount specified under the purpose of the Fund.

6.00 Utilization of Reserve Funds

6.01 The SFO shall include all anticipated reserve transfers in the City's annual budget.

6.02 The SFO shall administer all Reserves and report each year to Council on the status of each reserve.

6.03 Council shall review the status of each Reserve and determine the adequacy of the Reserve annually.

6.04 Any reserve transfers not included in the annual budget shall require a resolution of Council approving the use of these funds.

6.05 Interest earned from all Reserves shall be credited to the general revenues of the City, except for the following Reserve Funds: Parking, Load Capacity, Water and Sewer, and Facilities.

6.06 With the exception of the donated portion of any Fund, Council may, by resolution, reallocate monies from one reserve account to another.

CAO _____ Presiding Officer _____

PART III – FORCE AND EFFECT

700 Severability

7.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

8.00 Bylaw Repealed

8.01 Bylaw 11-21 and 12-14, and amendments thereto, are hereby repealed.

9.00 Enactment

9.01 This bylaw shall come into force on the day of the passing by council of the third and final reading.

10.00 Bylaw Readings

Readings	Date of Reading
FIRST	May 4, 2022
SECOND	
THIRD and FINAL	

William Kendrick, Mayor

Presiding Officer

Cory Bellmore, CAO

Chief Administrative Officer

APPENDIX 'A"

NAME	FUNDING SOURCE/LEVELS	CASH FUNDED	PURPOSE, CRITERIA, CONDITIONS OF USE
Parking Reserve	From Developers who do not wish to construct off-street parking. This reserve shall hold a balance equal to the total funds received less amounts expended for the creation of parking spaces.	Yes	To track funds taken in by the City as cash in lieu of parking requirements and reserved for the future development of parking spaces in the City.
Load Capacity Reserve	From new developments placing increased load upon the water/sewer system. The balance of this reserve shall be the total of all funds received as load capacity charges less amounts expended for the enhancement of the water and sewer system.	Yes	To track funds taken in by the City of Dawson as a load capacity charge on new developments and which are to be used for the enhancement of the City's water and sewer system.
Heritage Fund Reserve	As directed by Council or as donated to by any person.	Yes	To assist with any of the following: -Restoration, enhancement or renovation of Municipal Historic Sites;

			-Acquisition of Municipal Historic Sites by the City of Dawson; - Provision of financial assistance to owners or lessees of Municipal Historic Sites for restoration, enhancement or renovation of the site; -Increasing public awareness of heritage resources and heritage management of the City; -Other heritage purposes as specified by resolution of Council.
Land Development Reserve	As directed by Council	Yes	Funds from the Land Development Reserve may be expended for: - The acquisition of properties through the tax lien procedure; - Engineering, surveying, town planning and other related studies for any proposed municipal development; - Any development approved by Council such as building or upgrading of streets, roads, lanes, storm drains, water lines, sewer lines, water storage, sidewalks, parks, etc.
Contingency Reserve	As directed by Council Target balance for this fund shall be $500,000.	Yes	To provide funds for unbudgeted emergency purposes.
Equipment Replacement Reserve	As directed by Council	Yes	To set aside funds for the purpose of funding the City's 10-year Equipment Replacement plan.

Water and Sewer System Reserve	As directed by Council	Yes	To set aside funds to allow for repairs and/or enhancements to the water and sewer system.
Cable Television Reserve	As directed by Council The target balance of this reserve shall be $100,000.	Yes	To set aside funds for the purpose of being able to fund repair, replacement of, or upgrades to the Cable Television system.
Road Maintenance	As directed by Council	Yes	To set aside funds for the purpose of absorbing impact of major cost increases associated with unusual snow and/or ice conditions.
Waste Management Reserve	As directed by Council	Yes	To set aside funds for the purpose of undertaking work at the municipal landfill site or initiating programs associated with waste collection and waste diversion.
Facilities Reserve	Annual contribution of an amount equal to the revenue generated by a 0.1% tax rate plus interest earned.	Yes	To accumulate funds to be used for the planning, siting, or construction of new facilities.
Green Initiatives Reserve	Annual Carbon Tax payment	Yes	To set aside funds for the purpose of undertaking clean energy and/or green initiatives. Funds may be expended for Climate change projects undertaken by the City.

CAO

Presiding Officer

Reserves Balance from the 2020 Audited Financial Statements:

9. RESERVES

	2020	2019
Recreation - facility	**$ 1,393,252**	$ 1,223,844
Sewer services	**767,424**	757,717
Administration	**546,250**	462,417
Water services	**344,560**	340,202
Equipment replacement	**286,572**	266,931
Load capacity	**205,004**	202,411
Heritage	**180,057**	177,779
Road maintenance	**175,477**	173,257
Waste management	**174,593**	172,384
Protective services	**162,868**	101,567
Road replacement	**159,125**	157,112
Recreation - capital	**130,571**	121,992
Cable	**122,526**	120,976
Future land development	**115,571**	114,110
Administration equipment replacement	**104,243**	96,151
Recreation - operating	**103,503**	102,194
Council equipment replacement	**32,600**	32,188
Parking	**28,231**	27,874
Downtown Revitalization	**26,669**	26,332
Green initiatives	**12,612**	-
	$ 5,071,708	$ 4,677,438

Definition of Emergency from Procurement Policy

Emergency means a sudden, unexpected, or impending situation that may cause injury, loss of life, damage to the property and/or significant interference with the normal activities of the City and which, therefore, requires immediate attention and remedial action. This includes a situation which may endanger the health and/or safety of any City employee or member of the public; and/or a situation which may jeopardize City property and/or threaten the maintenance of essential City services.

Report to Council

[X] For Council Decision [ ] For Council Direction [ ] For Council Information

[ ] In Camera

AGENDA ITEM:	OCP Bylaw Amendment No. 7 (Bylaw #2022-07) -Designation of Klondike River Bench Direct Control District	
PREPARED BY:	Planning & Development	**ATTACHMENTS:** - Bylaw #2022-07 - YESAB recommendation YESAB File # 2020-0001 - Decision Document YESAB File # 2020-0001
DATE:	May 24, 2022	
RELEVANT BYLAWS / POLICY / LEGISLATION: Municipal Act Official Community Plan Zoning Bylaw		

RECOMMENDATION

It is respectfully recommended that Council give Second Reading to Official Community Plan (OCP) Bylaw Amendment No. 7 (Bylaw #2022-07) and not forward the Bylaw for Third Reading until the issuance of a Water License and Mining Land Use Permit and the passing of Bylaw 2022-05 OCP Amendment No. 6.

ISSUE / PURPOSE

This OCP Bylaw amendment designates the Klondike River Bench Direct Control District (DCD).

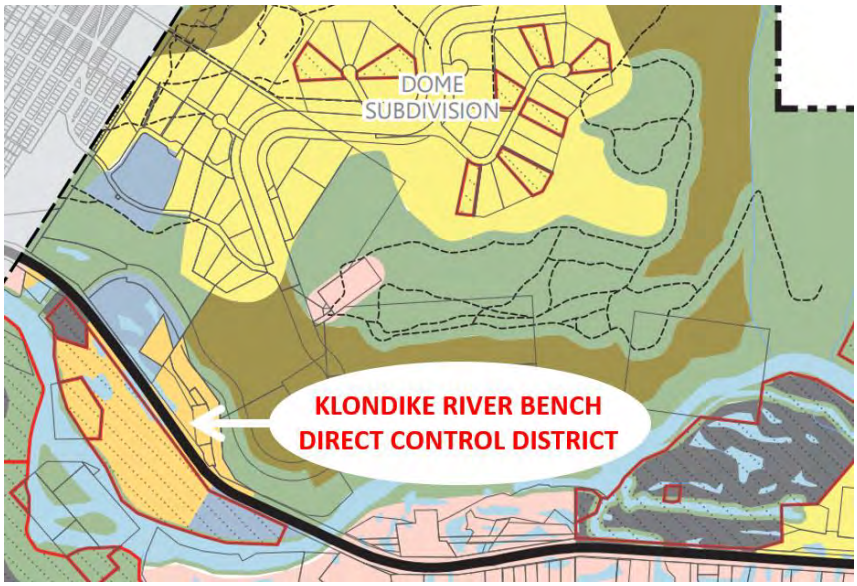
The purpose of DCDs generally, is to enable Council to directly regulate areas where “development may require a more specific, sensitive, and flexible means of land use and development control, including, but not limited to, time limited uses.”

The purpose of the designation of the Klondike River Bench DCD “is for Council to directly control land use and development within the area to enable time limited mineral extraction activity and subsequently, the intended future land development.”

BACKGOUND SUMMARY

Klondike River Bench Mining Area

This OCP amendment does not include a map amendment. The exact area of the DCD is to be depicted in a future associated Zoning Bylaw map amendment that specifically establishes the area of the DCD. This is an approximation of the general area of the Klondike River Bench:



Council Direction

The Klondike River Bench is related to Council's direction on the East Bench (reference development permit #21-025 appeal) as this area is also part of the Dome Road Master Planning work for future lot development.

> C21-18-04 Moved by Mayor Potoroka, seconded by Councilor Shore that Council denies Mr. Carey's appeal regarding Development Permit #21-025 and communicates this decision to Mr. Carey and directs administration to provide reasons for the decision.
>
> Motion Carried 3-2
>
> Excerpt from the Council decision letter on the development permit #21-025 appeal:
>
> "YG has been working on the Dome Road Master Plan for future development in the City, which does overlap claims in this section of town. It makes sense for both the landowner and claim holder to line up development so that both parties have the opportunity for maximum benefit for future settlement of this area."

This DCD has been developed in line with this Council direction.

YESAB & Yukon Government

As a brief overview of the approvals process, when a YESAB assessment is complete, the recommendation is sent to the relevant Decision Body(s), which can be federal, territorial and/or First Nation governments. In this case, YG is the Decision Body. The Decision Body(s) will then decide whether to accept, reject or vary the recommendation of YESAB and issue a Decision Document. From there, a separate process under the Water Board occurs for decision-making on a Water License and Mining Land Use Permit.

On July 29, 2020, the Dawson City Designated Office provided a recommendation to the Decision Body that the Project not be allowed to proceed. On March 4, 2022, the Yukon Government Decision Document was issued, rejecting the YESA recommendation, and recommending that the project go forward with terms and conditions. a Water License and Mining Land Use Permit have not been issued for this project at this time.

On April 13, 2022, Council raised two questions regarding the Decision Document.

In regard to the following statement under the project scope: “No transportation of material beyond claims P 36298 and P 34309”, Council questioned why claim P 34307 is not included. Council requested information on whether it is technically possible for the stockpiled material to be moved to P 34307 and then moved off site.

Council requested confirmation that the following term/condition does not specify the need for the work to occur during two *consecutive* years:

> “The proponent shall be limited to working during two operating seasons. The temporal scope of the project is limited to a term that shall not extend past December 1, 2027.”

In other words, does this technically enable the work to occur on year one and year five?

Administration also requested information on the anticipated timeline for the Yukon Water Board to issue permits.

YG Energy Mines and Resources provided the following response:

“Yukon Water Board Timelines

The usual timeline for the Yukon Water Board to process permits is around three months, if the proponent responds to any information requests in a timely fashion. Projects with overlapping interests or controversial elements may take longer. The Yukon Water Board has a public intervention process that any party can participate in, in order to provide comment on the project.

Transport of Gravel

There likely will not be a specific term or condition in the permit that speaks to gravel being moved on or off the claim. The statement “No transportation of material beyond claims P 36298 and P 34309” is part of the project scope, and not a Decision Document term and condition. If an activity is not listed in the scope, it cannot be carried out as part of the project. Mr. Carey will be allowed to move gravel from the sluicing areas (P 34307) to the other two claims for the purposes of reclamation. If Mr. Carey wanted to remove gravel from the site he would require a quarry permit in addition to his mining authorizations. I cannot speak for the Lands Branch, but I would assume since the removal of gravel was not scoped in the current mining project proposal, Mr. Carey would need to go through a new YESAB assessment to have activities related to the removal of gravel assessed prior to the issuance of a quarry permit.

Operating Seasons

The Decision Document term related to the duration of the operation allows Mr. Carey’s work to happen over a maximum of two mining seasons that do not need to be consecutive, but must be complete by the end of the mining season, 2027. The term was written this way to allow the operation to continue, even if there were permitting or other delays that prevent consecutive work seasons. This step was taken to make sure that Mr. Carey had enough time to finish his project, and that delays would not lead to unnecessary extension requests or new YESAB assessments, which would potentially extend timelines indefinitely. The end date matches the timeline that Community Services provided for estimated subdivision development.”

It is important for Council to note that a Water License and Mining Land Use Permit have not been issued for this project. As indicated above, YG EMR advised that the issuance of the decisions on these permits is estimated to be a multi-month process. These permits will outline the conditions, and may differ from the terms and conditions on the Decision Document. As such, Administration recommends that Council not pass Third Reading of this Bylaw until these permits have been received.

ANALYSIS

Recent case law examples show that municipalities have the right to enact an OCP and ZBL, and to plan areas for future development, regardless of subsurface rights that may exist. It also shows that municipalities have the right to require the permitting process for mineral extraction activities, and that this requirement is not considered expropriation.

There is no further direction from YG on the matter of mining within the municipality. As a result, the municipality is doing the best it can with limited resources and antiquated legislation to address mining applications on a one-by-one basis, given the individual complexities, in a fair and equitable way. It is believed that Direct Control Districts provide a path forward in addressing numerous mineral extraction activities in the municipality as this form of development does not fit well within the existing framework of the Zoning Bylaw.

Municipal Act

First Reading occurred April 13, 2022, and following this, Ministerial Notice was given on April 20, 2022 as per s. 280 of the Municipal Act. A public hearing was held on May 18, 2022.

S. 291 of the Municipal Act (M.A) under Division 2: 'Zoning Bylaws' provides a zoning tool that enables municipalities to create direct control districts in both the OCP and ZBL to directly regulate land use and development of selected area(s). Direct control districts are intended to provide for development that may be outside of the land uses and regulations of standard zoning. It is a short section with three clauses:

1) *The council of a municipality may designate direct control districts in its official community plan if it wants to directly control the use and development of land or buildings in the area individually rather than establish rules common to all buildings and land in the area.*
2) *If a direct control district is designated in a zoning bylaw, the council may, subject to the official community plan, regulate the use or development of land or buildings in the district in any manner it considers necessary.*
3) *In respect of a direct control district, the council may decide on a development permit application itself, or may delegate the decision to a development authority that may be created under section 191 with directions that it considers appropriate.*

Official Community Plan

Bylaw 2022-05 OCP Amendment no. 6, which has passed Second Reading, provides for the use of Direct Control Districts in the OCP and Zoning Bylaw. The passing of this Bylaw is dependent on the successful passing of Bylaw 2022-05 OCP Amendment no. 6.

OPTIONS

Council may choose to:

1. Give Second Reading to Bylaw 2022-07 OCP Amendment No. 7. and not forward the Bylaw for Third Reading until the issuance of a Water License and Mining Land Use Permit and the passing of Bylaw 2022-05 OCP Amendment No. 6.
2. Not give Second Reading to Bylaw 2022-07 OCP Amendment No. 7.

APPROVAL		
NAME:	Cory Bellmore, CAO	**SIGNATURE:** 
DATE:	May 27, 2022	

THE CITY OF DAWSON

Official Community Plan Amendment No. 7 Bylaw

Bylaw No. 2022-07

WHEREAS section 265 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council may pass bylaws for municipal purposes.

WHEREAS section 278 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that a council must, within three years of formation or alteration of municipal boundaries, adopt or amend by bylaw an official community plan.

WHEREAS section 285 of the Municipal Act, RSY 2002, c. 154, and amendments thereto, provides that an official community plan may be amended, so long as the amendment is made in accordance with the same procedure established for adoption of an official community plan.

THEREFORE, pursuant to the provisions of the *Municipal Act* of the Yukon, the council of the City of Dawson, in open meeting assembled, **ENACT AS FOLLOWS**:

PART I - INTERPRETATION

1.00 Short Title

This bylaw may be cited as the ***Official Community Plan Amendment No. 7 Bylaw***

2.00 Purpose

2.01 The purpose of this bylaw is to provide for

(a) The designation of the Klondike River Bench Direct Control District.

CAO

Presiding Officer

Table of Contents

3.00 Definitions

3.01 In this Bylaw:

(a) Unless expressly provided for elsewhere within this bylaw the provisions of the *Interpretations Act,* RSY 2002, c. 125, shall apply;

(b) "Bylaw Enforcement Officer" means a person employed by the City of Dawson to enforce bylaws;

(c) “CAO” means the Chief Administrative Officer for the City of Dawson;

(d) “city” means the City of Dawson;

(e) “council” means the Council of the City of Dawson;

PART II – APPLICATION

4.00 Amendment

4.01 Council Designates the following Direct Control District under subsection 6.3.3 as follows:

Klondike River Bench; the area with mining land use approval for mineral extraction activity on the Klondike River Bench, as designated in the Zoning Bylaw. The purpose of this Direct Control District is for Council to directly control land use and development within the area to enable time limited mineral extraction activity and subsequently, the intended future land development.”

PART III – FORCE AND EFFECT

5.00 Severability

5.01 If any section, subsection, sentence, clause or phrase of this bylaw is for any reason held to be invalid by the decision of a court of competent jurisdiction, the invalid portion shall be severed and the part that is invalid shall not affect the validity of the remainder unless the court makes an order to the contrary.

6.00 Enactment

6.01 This bylaw shall come into force on the day of the passing by Council of the third and final reading.

CAO

Presiding Officer

6.02

7.00 Bylaw Readings

Readings	Date of Reading
FIRST	**April 13, 2022**
MINISTERIAL NOTICE	**April 20, 2022**
PUBLIC HEARING	**May 18, 2022**
SECOND	
MINISTERIAL APPROVAL	
THIRD and FINAL	

Original signed by

William Kendrick, Mayor
Presiding Officer

Cory Bellmore, CAO
Chief Administrative Officer

Yukon Environmental and Socio-economic Assessment Act

Decision Document

This document meets the decision bodies' requirements as set out in the *Yukon Environmental & Socio-economic Assessment Act*.

Decision Bodies for this Project
Yukon government

Project

Project Name Class 4 Placer Mine - Klondike River Bench (JBM)

YESAB File Number 2020-0001

Proponent Name Darrell Carey

Project Description

Project Scope - Summary

The Project is the processing of previously stockpiled material and tailings on claims P 36298 and P 34309; material processing and settling facilities will occur on claim P 34307. The Project is located at the beginning of the Dome Road within Dawson City Municipal limits in the Tr'ondëk Hwëch'in Traditional Territory. The Project is across the Klondike Highway from the Tr'ondëk Hwëch'in Subdivision on Settlement Land parcel TH C-4B/D and in close proximity to Settlement Land parcels TH C-85FS/D and TH C-86FD/D. The Project is also adjacent to residences on Boutillier Road. Project activities are proposed to occur from 7:00 am to 7:00 pm, April 1 to December 1, annually, for 10 years.

Project Scope - Activities

- Water use: up to 500 m3/day
  - 100 % water recycling
- Water source: out of stream dredge ponds near Klondike River
- Out of stream settling ponds (dredge ponds)
  - Ponds will be cleaned out weekly
- Out of stream reservoir (dredge ponds)
- Material processing:
  - 5 000 m3 years 1-9
  - 2 000 m3 year 10
- Fuel storage:
  - Gasoline up to 2 L
  - Diesel up to 10 600 L
  - Refuelling will take place at least 30 m from water
  - All fuel tanks will be emptied at season end.
  - Absorbent pads absorb all and empty 45-gallon drums and 5-gallon pails will be stored on site to clean up any spills.
  - Worn seals, and/or valves and couplers will be replaced to prevent leaks.
  - Spill contingency kits will be stored at the main tank and near the tidy tank.
- Waste disposed of at landfill (hazardous and non-hazardous)
- Gold panning
- Heavy equipment use
  - Project activities will take place from 7am to 7pm
- Progressive and Final Reclamation

  - Settling pond fines will be stored for reclamation
  - Erosion of existing overburden piles will be controlled by maintaining 2:1 slope year to year
- Active mine signs are posted on site
- No transportation of material beyond claims P 36298 and P 34309
- No overburden removal
- No access construction
- No drilling
- No timber cutting
- No camp

Decision Bodies for this Project

Consolidated Decision Document Not Applicable

First Nations Consultation

A. Consultation under YESAA section 74(2) Not Applicable

B. First Nations Consultation - General

Tr'ondëk Hwëch'in (TH): Mineral Resources Branch (MRB) initiated consultation by emailing a consultation letter to TH on March 24, 2020. TH responded by letter requesting deeper consultation on March 24, 2020. Subsequently, TH submitted comments to the YESAB online registry on April 27, 2020. On August 27, 2020, MRB invited TH to begin consultation on the Evaluation Report and Decision Document. Consultation continued by email and at in-person meetings on September 14, 2020 and October 27, 2021. On December 7, 2021, MRB shared a second draft Decision Document with TH. On December 14, 2021, TH noted that they were satisfied with EMR's permitting approach with this application and effectively had no further comments.

YESAB Recommendation

Under s. 56(1)(c) of the *Yukon Environmental and Socio-economic Assessment Act*, the Dawson City Designated Office recommends to the Decision Body that the Project not be allowed to proceed, as it determined that the Project will have significant adverse environmental effects in or outside Yukon that cannot be mitigated.

Decision

Pursuant to section 75 and 80, the Yukon government has considered the assessment of this project and:

- ○ Accepts the recommendation and the terms and conditions as follows:
- ◉ Rejects the recommendation and the terms and conditions as follows for the reason(s) specified:
- ○ Varies the recommendation and the terms and conditions as follows for the reason(s) specified:

Rationale for Decision

After giving full and fair consideration to the Evaluation Report and supporting information, including the scientific information, traditional knowledge and other information provided with the recommendation contained in the Evaluation Report, the Decision Body rejects the recommendation of the Designated Office that, pursuant to section 56(1)(c) of the Yukon Environmental and Socio-economic Assessment Act, the proposed project not proceed on the basis of potentially significant effects which cannot be mitigated. The assessment concluded that the project would have socio-economic effects that could not be mitigated specifically in relation to noise disturbance effects to public health.

It is the Decision Body's view that the assessment did not adequately consider the mitigating effect of a reduced temporal scope (ten years down to two), in combination with additional noise mitigation, when

determining if effects related to noise could be mitigated or not. The Decision Body has determined that the project can proceed if additional noise mitigation is implemented in conjunction with a reduced temporal scope.

The Decision Body has imposed terms and conditions as were noted within the Evaluation Report as partially mitigating noise disturbance, most meaningfully, a significantly reduced temporal scope – both in daily timing windows and the duration of the project. Further, the proponent will be required to submit a noise mitigation plan to be approved by the Chief of Placer Land Use. The plan will need to include mitigation that will further reduce impacts.

As the Decision Body recognizes the community's land use objectives for this area, the project will be required to submit a reclamation plan that aligns project activities and project progress with development plans as planned by the Department of Community Services on behalf of the City of Dawson. As reclamation activities and objectives will be designed to facilitate the development plans for the area, a reduction in heavy equipment use during lot and infrastructure development is anticipated further reducing noise disturbance in the area.

Decision Document

Term	Term & condition	Status	Reason
1	NEW Term: The proponent shall be limited to working during two operating seasons. The temporal scope of the project is limited to a term that shall not extend past December 1, 2027.	Add	The term addresses the shorter recommended temporal scope, while still allowing flexibility for permitting timelines.
2	NEW Term: Prior to sluicing activities occurring, the proponent shall develop and submit a reclamation plan, based on guidance from Government of Yukon, Department of Community Services, for review and approval by the Chief of Placer Land Use. The progression and completion of the project shall align with surface development plans for the area as approved by the Chief in the reclamation plan.	Add	As recommended by Community Services.
3	NEW Term: The proponent shall keep all attractants, including but not limited to: food, food wastes, fuel and other garbage, stored in a bear proof container until such a time as the attractants are able to be disposed of at a government approved disposal facility.	Add	Added to address concerns that bears may get into garbage and become a nuisance or habituated.
4	NEW Term: The proponent shall report any incidents to the area's District Conservation Officer at (867-993-5492) that involve nuisance bears exhibiting food conditioning or habituation.	Add	Added to address concerns that bears may get into garbage and become a nuisance or habituated.
5	NEW Term: All waste shall be disposed of at the Dawson City landfill on a weekly basis.	Add	Added to address concerns that bears may get into garbage and become a nuisance or habituated.
6	NEW Term: Prior to sluicing activities occurring, the proponent shall develop a noise mitigation plan for review and approval by the Chief of Placer Land Use that results in noise mitigations suitable to limit effects of the operation on local residents.	Add	As recommended by the Yukon Conservation Society and to address Tr'ondëk Hwëch'in concerns on noise impacts to the Tr'ondëk subdivision located on TH C-4B/D.
7	NEW Term: The proponent shall reduce the hours of operation to 9:00am to 5:00pm on weekdays.	Add	As recommended by Tr'ondëk Hwëch'in and to address Tr'ondëk Hwëch'in concerns on noise impacts to the Tr'ondëk subdivision located on TH C-4B/D.
8	NEW Term: The proponent shall communicate plans and timing of activities to the Chief of Placer Land Use at least thirty (30) days prior to each field season. The Chief shall provide notice of activities, including timing windows to Tr'ondëk Hwëch'in, local residents and the general public.	Add	As requested by Tr'ondëk Hwëch'in to address citizen concerns regarding project activities, timing windows and community impacts.

Date

Project Recommendation Issued 2020-07-29

Yukon Environmental and Socio-economic Assessment Act

Decision Document

Recommendation Received From

Designated Office - Dawson City

Authority

By signing below, the Yukon government has exercised its authority as per YESAA section 75 to issue a decision document on this project.

Name Todd Powell

Position Director, Mineral Resources Branch

Phone 867-667-3126

Email todd.powell@gov.yk.ca

Signature [redacted]

Original signed by EMR-Mineral Resources Branch

Date March 4, 2022

Distribution

Project Proponent	Yes
Other Decision Bodies	No
Major Projects Yukon, Executive Council	Yes
YESAB Designated Office	Yes
YESAB Executive Committee	No
Yukon Surface Rights Board	No
Yukon Water Board	Yes
Land Use Planning Commission	
Independent Regulatory Agency	
Other Body/Person as Required	

YESAB
Yukon Environmental and
Socio-economic Assessment Board

Designated Office Evaluation Report

Sluicing Operation – Klondike River Bench

Project Number: 2020-0001

Proponent: Darrell Carey

Assessment Completion Date: July 29, 2020

Dawson City Designated Office

Bag 6050
Dawson City, YT Y0B 1G0
Tel: (867) 993–4040
Fax: (867) 993–4049
www.yesab.ca

Summary

The Project is the processing of previously stockpiled material and tailings on three claims. The Project is located within Dawson City Municipal Limits and Tr'ondëk Hwëch'in Traditional Territory. The Project is across the Klondike Highway from the Tr'ondëk Hwëch'in Subdivision on Settlement Land parcel TH C-4B/D and in close proximity to Settlement Land parcels TH C-85FS/D and TH C-86FD/D. The Project is also adjacent to residences on Boutillier Road. Project activities are proposed to occur from April 1 to December 1, annually, for 10 years.

The Designated Office sought views and information on the Project on from March 23 to April 28 and again from May 25 to June 8, 2020. An extended public consultation period was allotted for the March to April comment period in response to identified capacity inadequacies due to the Covid-19 pandemic. Comment submissions were received from City of Dawson, Fisheries and Oceans Canada, Yukon Conservation Society, members of the public, Klondike Active Transport and Trails Society, Tr'ondëk Hwëch'in, Government of Yukon, Environment and Climate Change Canada.

Based on comments received and other relevant considerations the Designated Office identified four valued environmental and socio-economic components that will be adversely impacted by the Project: community development and well-being, public health, bears, soils and vegetation. The Designated Office determined that the Project is likely to result in significant adverse effects to community development and well-being, public health, and bears. The Designated Office recommended terms and conditions to mitigate effects to community development and well being, and bears. However, the Designated Office determined that effects to public health from noise disturbance cannot be mitigated.

The Decision Body, Government of Yukon, will review the Recommendation and the accompanying reasons described in this Evaluation Report. The Decision Body will issue a Decision Document that will either a) accept the recommendation, b) vary the recommendation, or c) reject the recommendation.

Assessment Outcome

Under s. 56(1)(c) of the Yukon Environmental and Socio-economic Assessment Act, the Dawson City Designated Office recommends to the Decision Body that the Project not be allowed to proceed, as it determined that the Project is likely to have significant adverse socio-economic effects in or outside Yukon that cannot be mitigated.

For more information, please contact:

Dawson City Designated Office

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PART A. BACKGROUND

Part A provides the context and background information required for the assessment of the Sluicing Operation – Klondike River Bench (the Project). Section 1.0 identifies the requirement for an assessment under the Yukon Environmental and Socio-economic Assessment Act, while Sections 2.0, 3.0 and 4.0 provide information and baseline data for relating to the Project and project area. Section 5.0 identifies the scope of the assessment, including matters that were considered in evaluating the significance of potential effects of the Project.

1.0 REQUIREMENT FOR AN ASSESSMENT

The purpose of the proposed project is the processing of previously stockpiled material and tailings. While several activities are likely to be undertaken in conjunction with the Project, under s. 47 of the *Yukon Environmental and Socio-economic Assessment Act,* the Project is subject to an assessment by the Dawson City Designated Office due to the following circumstances:

- The proposed activity is listed in column 1 of Schedule 1 of the *Assessable Activities, Exceptions and Executive Committee Projects Regulations* (Activity Regulations) and not listed in column 2 as excepted. The proponent proposes to undertake activities listed in Part 1, item 2 of the Activity Regulations. The specific activity is listed as:

  On other than an Indian reserve, placer mining, or other activity in relation to placer mining on a placer grant

- Is proposed to be undertaken in Yukon; and
- An authorization or the grant of an interest in land by a government agency, independent regulatory agency, municipal government, or First Nation is required for the activity to be undertaken.

Table 1: The Decision Body
Decision Body and the triggering authorizations required for the Project. This information is based on the project proposal and other information submitted to the Designated Office during the assessment.

Decision Body	Authorization Required	Act or Regulation
Government of Yukon	Class 4 Mining Land Use Permit	*Placer Mining Act*
	Water Licence	*Waters Act*

2.0 PROJECT DESCRIPTION

2.1 Proponent Information

The Proponent for the Project is Darrell Carey. Contact information for the Proponent is available on the YESAB Online Registry (YOR) (YOR 2020-0002-0001).

2.2 Geographical Context

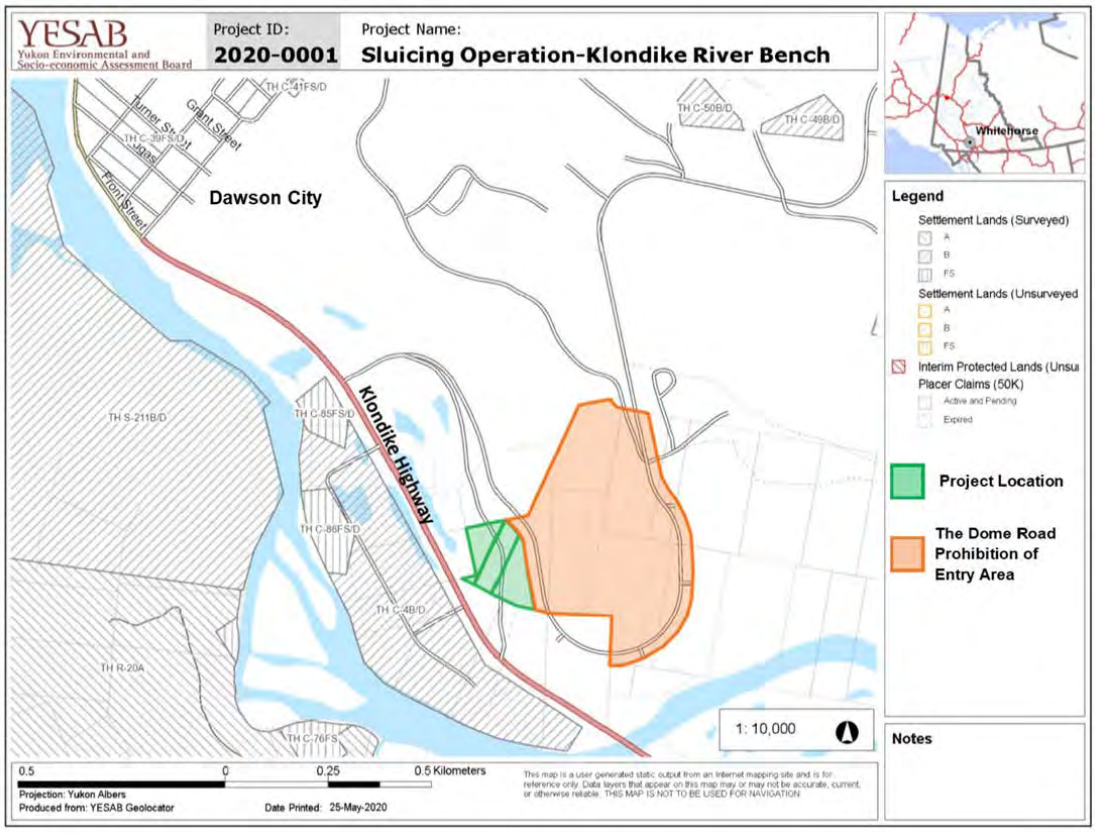

Figure 1: Project location.

Table 2: Project Location, Coordinates and Geographical Parameters

Project Coordinates: Map Sheet: 116-B	Decimal Degrees NW 64.04699˚ N 139.41914˚ W NE 64.04735˚ N 139.41663˚ W SW 64.04537˚ N 139.41475˚ W SE 64.04588˚ N 139.41888˚ W
First Nation Traditional Territories Involved:	Tr'ondëk Hwëch'in

Drainage Region:	Major Drainage Area: *Yukon Drainage* Sub Drainage Area: *Central Yukon* Sub-sub Drainage Area: *Klondike*
Nearby Watercourses or Waterbodies:	Klondike River

2.3 Project History

The claims within and around the project area were first staked in the late 1980's. The Proponent acquired the claims in 1998 (YOR 2016-0118-098-1). The Designated Office has assessed four iterations of this project since 2009. A description of past assessments and outcomes is provided in the following sections.

2.3.1 Past Assessments

2009-0125 Slinky Placer Mine – Dome Road

Project 2009-0125 was the continued operation of a placer mine on 19 claims along the Klondike River East Bench, known as the Midnight Dome. Project activities were proposed to occur from April to October, annually, for ten years.

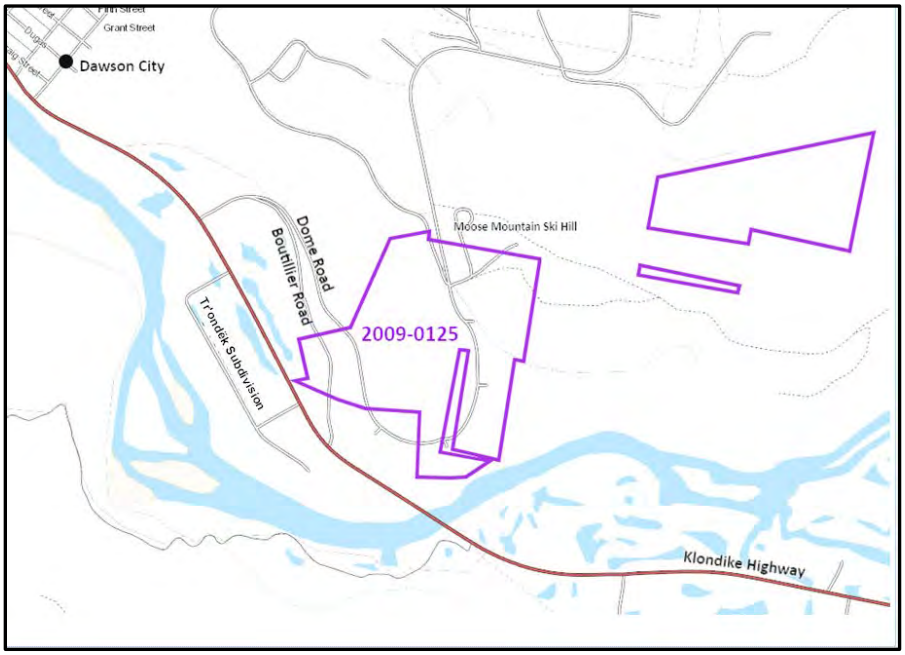

Figure 2: 2009-0125 Project Location Map (GeoYukon)

The Designated Office identified six valued environmental or socio-economic components (VESEC) that would be adversely affected by the Project: environmental quality, aquatic resources, public health & safety, wildlife & wildlife habitat, heritage resources, and community value, interest and quality. The Designated Office concluded that the Project would result in significant adverse effects on community value, interests and quality and that these effects could not be mitigated. As such, the Project was recommended not to proceed. The Decision Body, Government of Yukon rejected the recommendation by the Designated Office and recommended that the Project proceed subject to terms and conditions.

The project was subsequently issued a mining land use approval and water licence and activities were undertaken at the project location.

2014-0164 Placer Mine – Klondike River Bench

Project 2014-0164 was the continued operation of a placer mine on 13 claims along the Klondike River East Bench, known as the Midnight Dome. Project activities were proposed to occur from April 1 to October 31 for five years.

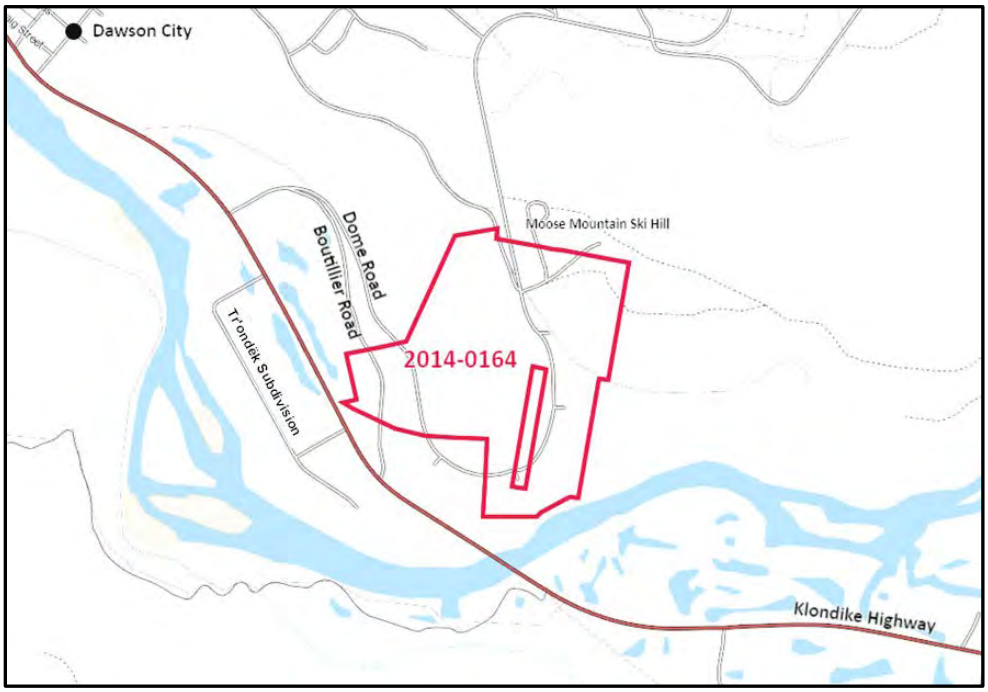

Figure 3: 2014-0164 Project Location Map (GeoYukon)

The Designated Office identified four VESECs that would be adversely affected by the project: environmental quality, health and safety, and community value, interest and quality. The Designated Office determined that the project would result in significant adverse effects to environmental quality, and community value, interest and quality. The Designated Office recommended that the project proceed subject to terms and conditions. The Decision Body, Government of Yukon varied four of the recommended terms and conditions. The project was subsequently issued a mining land use approval and water licence and activities were undertaken at the project location.

2016-0118 Placer Mine – Klondike River East Bench, the Dome

Project 2016-0118 was the operation of a placer mine on 34 claims on the Klondike River East Bench, known as the Midnight Dome. Project activities were proposed to occur from April 1 to October 31 for ten years.

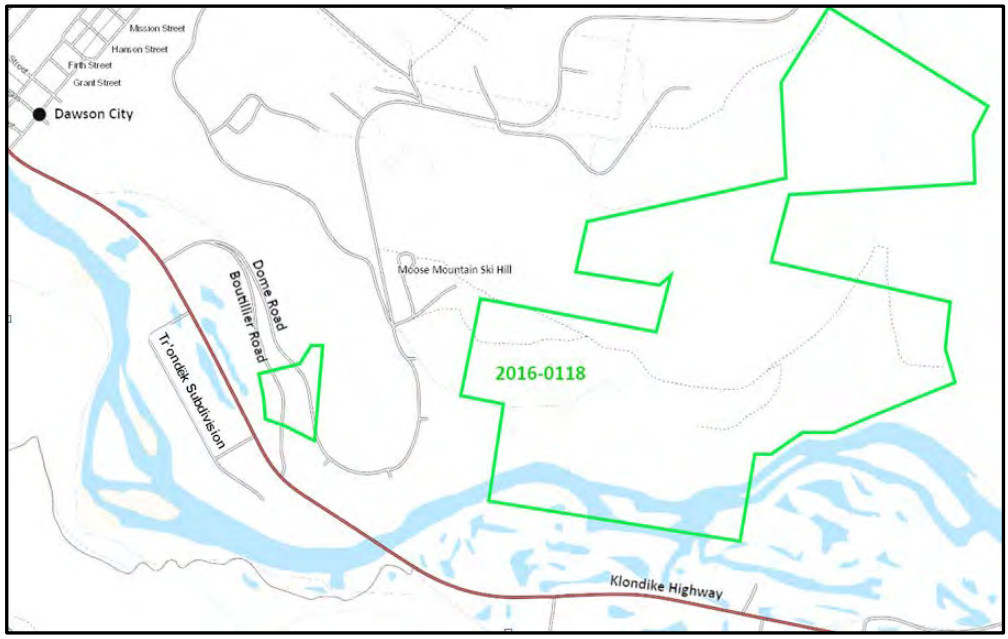

Figure 4: 2016-0118 Project Location Map (GeoYukon)

The Designated Office identified five VESECs that would be adversely affected by the project: community trails, public health and safety, vegetation and soils, wildlife and wildlife habitat, and heritage resources. The Designated Office determined that the project would result in significant adverse effects to all identified VESEC. The Designated Office concluded that effects to all VESEC but community trails could be mitigated. Given that effects to community trails could not be mitigated, the project was recommended not to proceed. Government of Yukon accepted the recommendation issued by the Designated Office stating

> it is the Decision Body's view that, the proposed project – as proposed by the proponent – is likely to have significant adverse socioeconomic effects that cannot be mitigated acceptance of the recommendation by the Decision Body does not mean that mining activity cannot occur in the area, provided suitable mitigation can be identified and incorporated in the project design, such that the project would not result in significant adverse effects on community trails (as well as other identified VESEC's). (YOR 2016-0118-099-1)

2017-0206 Klondike East Bench, the Dome

Project 2017-0206 was the operation of a placer mine on 34 claims on the Midnight Dome. Project activities were proposed to occur from April 1 to October 31, for ten years. This project was virtually identical to the 2016-0118 project, save for one critical detail: the Proponent committed to avoiding most of the community trails. This change of scope from the 2016-0118 project was sufficient to warrant a new assessment of the project under the *Yukon Environmental and Socio-economic Assessment Act*.

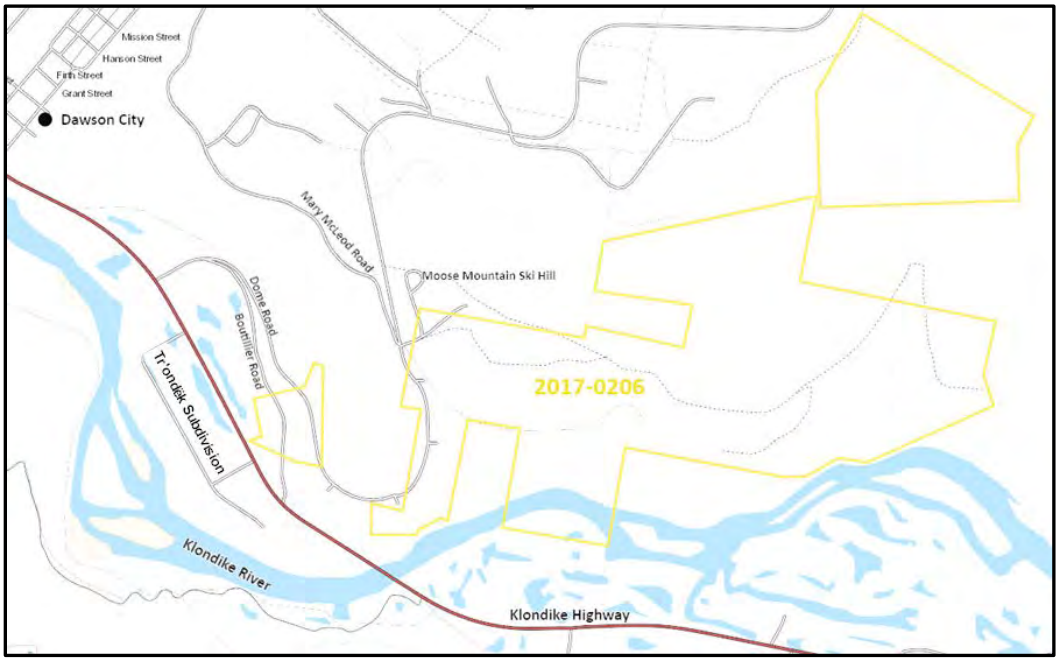

Figure 5: 2017-0206 Project Location Map (GeoYukon)

The Designated Office identified six VESECs that would be adversely affected by the project: community trails, Tr'ondëk Hwëch'in land use, public health and safety, vegetation and soils, wildlife and wildlife habitat and heritage resources. The Designated Office determined that the project would result in significant adverse effects to all VESEC and recommended that the project proceed subject to terms and conditions. In total 21 terms and conditions were recommended. Of those terms and conditions, two are notable for their relevance to the project currently under review:

- The Proponent shall establish a 150 metre buffer from all surveyed land parcels that shall remain undisturbed
- The Project shall be limited to a 5-year term (YOR 2017-0206-077-1)

As the Decision Body for project 2017-0206, Government of Yukon varied the recommendation. However, the above mentioned terms and conditions were both accepted and carried forward into the Proponent's water licence and mining land use approval (YOR 2017-0206-078-2; Yukon Water Board 2019). The operation was issued a mining land use approval and water licence for five years, which will expire June 2024. No activities are authorized to occur at the location for the proposed project because of their proximity to surveyed land parcels.

2.3.2 Past Development Permits

According to the City of Dawson, the two most recent approved development permits issued for the abovementioned projects are DP #18-043 and DP #19-083.

> Development Permit #18-043 was approved to facilitate the agreement dated May 17, 2018 between the Proponent and Yukon Government. The City of Dawson was party to previous agreements, but was not party to this final extension because it did not agree with the issuance of a further extension for this project. This permit was issued in good faith in order to not frustrate the efforts of those who were interested in seeing the project culminated in a timely manner. The

permit was issued on May 23, 2018, and expired on August 31, 2018, and it was explicitly stated in the permit conditions that no extensions would be granted on the permit. (YOR 2020-0001-0026)

Development Permit #19-083 was issued based on verbal assurances from the proponent that only one more season of sluicing was needed to complete the project (YOR 2020-0001-0026). The City of Dawson allowed sluicing for a final season as a culmination to the project (YOR 2020-0001-0026).

2.4 Project Details

The details from this section have been taken from the project proposal, specifically documents:

- Water Licence and Mining Land Use Approval Form (YOR 2020-0001-0006)
- DFO Worksheets (2020-0001-0003)
- Emergency Spill Contingency Plan (YOR 2020-0001-0002)
- Environmental Health Services Work Camp Assessment (YOR 2020-0001-0008)
- Information Request Responses (YOR 2020-0001-0009 0013, 0016)

The Dawson DO has described aspects of the proposed mine plan below, and has assessed the Project with the understanding that the mine plan will be carried out accordingly.

2.4.1 Temporal Scope

The Proponent has indicated that the temporal scope for the project is set to ten years because there is enough gold at the project location and material that it could take ten years or more to process.

2.4.2 Overview

The Project involves processing previously stocked piled material and tailings, on claims P 36298 and P 34307 (Figure 6). Project activities will be undertaken from 7:00 am to 7:00 pm from April 1 to December 1, annually, for ten years.

Figure 6: Tailings and Pay Gravels Map provided by Proponent (YOR 2020-0001-0061)

2.4.3 Water Use, Reservoirs, Material Processing, Settling Facilities

The Project involves the use of up to 500 m^3/day of water. Water will be withdrawn from an existing dredge pond at the project location. The Project proposes 100% water will be recycling. Water intakes will be screened.

An existing dredge pond will be used as an out-of-stream reservoir for the life of the Project. The reservoir is 100 m long, 10.5 m wide, and 2 m deep with a 1 m freeboard.

An excavator will feed material to the sluice box located on claim P 34307 for processing. A loader will fill a dump truck with water material to be stored for reclamation. A small area will be setup for gold panning. A bulldozer will be used to smooth piles as part of reclamation, once material processing is complete.

Material will be settled in existing dredge ponds at the project location on claim P 34307 (Figure 6). Water from the reservoir will be conducted to the sluice plan by pump and hose/pipeline. Settling ponds will be cleaned out weekly with fines stored in piles for reclamation.

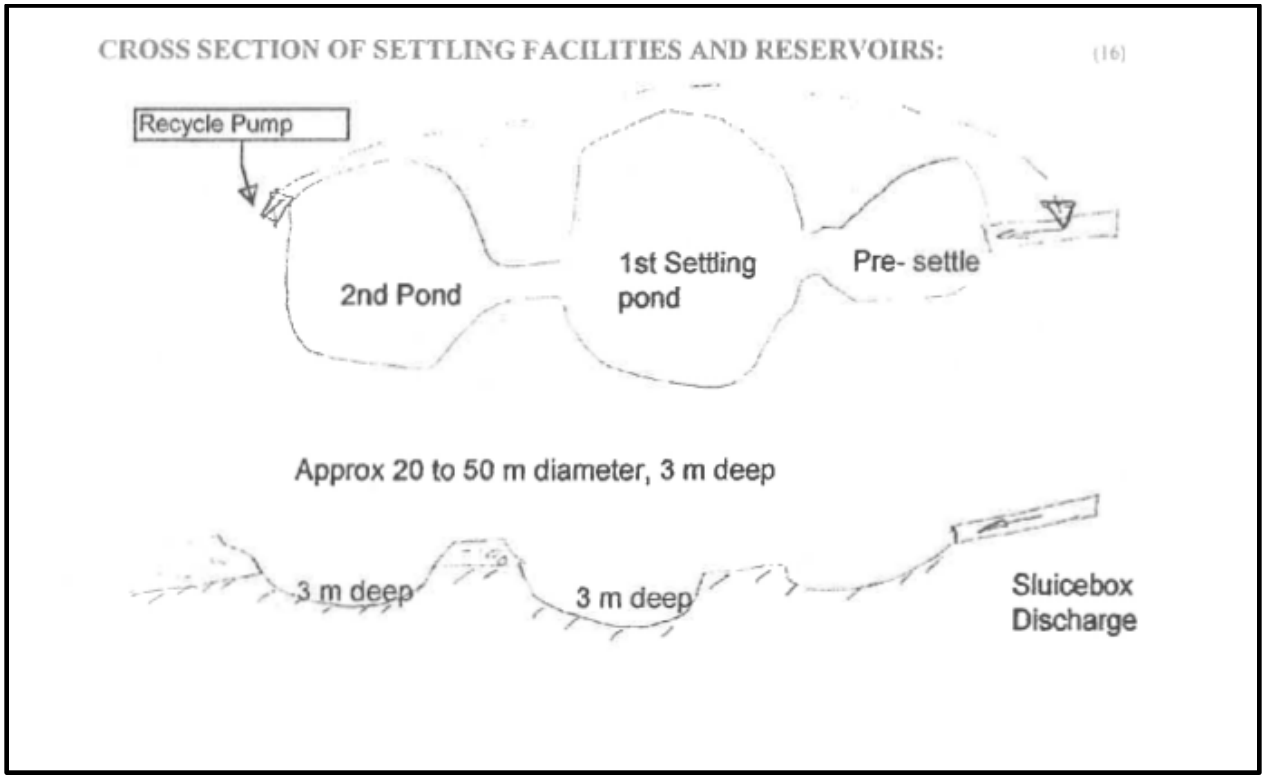

Figure 7: Cross Section of Settling Facilities provided by Proponent (YOR 2020-0001-0006; MLUA)

2.4.4 Fuel Storage

The Project involves the storage of up to 2 L of gasoline and 10 600 L of diesel. Gas will be stored in cans while diesel will be stored in a tidy tank or fuel tanker and truck. All fuel will be stored 200 m from the Klondike River. There is no indication of where fuel will be stored in relation to the dredge ponds on site. All fuel tanks will be emptied at season end. Refueling will take place at least 30 m from any streams and after fuel tanks, valves and hoses are checked for leaks. Absorbent pads absorb all and empty 45 gallon drums and 5 gallon pails will be stored on site to clean up any spills. Worn seals, and/or valves and couplers will be replaced to prevent leaks. Spill contingency kits will be stored at the main tank and near the tidy tank.

2.4.5 Overburden storage

Overburden is currently stockpiled on site in 3 m piles, 200 m from a watercourse, for reclamation. The Proponent is not proposing to remove additional overburden. However, as material is removed from the existing stockpiles and tailing piles the Proponent has indicated that stabilization will occur. Erosion of existing overburden piles will be controlled by maintaining a 2:1 slope from year to year.

2.4.6 Waste Management

Non-hazardous waste will be disposed of at the Dawson City landfill. No waste will be stored within 30 m of a watercourse. No hazardous waste will be stored on site. All hazardous waste will be disposed of at the Dawson City landfill

2.4.7 Reclamation

Reclamation activities will involve backfilling mining cuts, removing equipment, re-contouring tailing piles and overburden piles, removing fuel storage tanks and fuel and removing all waste. The Proponent does not intend to reclaim the existing dredge ponds.

3.0 PROJECT SCOPE

The project scope defines the project to be assessed and includes all activities described in the project proposal and any subsequent information provided by the Proponent. The project scope includes project activities and project design features that prevent, control or reduce adverse project effects (Section 3.2).

The Project is the processing of previously stockpiled material and tailings on claims P 36298 and P 34309; material processing and settling facilities will occur on claim P 34307. The Project is located at the beginning of the Dome Road within Dawson City Municipal limits in the Tr'ondëk Hwëch'in Traditional Territory. The Project is across the Klondike Highway from the Tr'ondëk Hwëch'in Subdivision on Settlement Land parcel TH C-4B/D and in close proximity to Settlement Land parcels TH C-85FS/D and TH C-86FD/D. The Project is also adjacent to residences on Boutillier Road. Project activities are proposed to occur from 7:00 am to 7:00 pm, April 1 to December 1, annually, for 10 years.

3.1 Project Activities

- Water use: up to 500 m^3/day
    - 100 % water recycling
- Water source: out of stream dredge ponds near Klondike River
- Out of stream settling ponds (dredge ponds)
    - Ponds will be cleaned out weekly
- Out of stream reservoir (dredge ponds)
- Material processing:
    - 5 000 m^3 years 1-9
    - 2 000 m^3 year 10
- Fuel storage:
    - Gasoline up to 2 L
    - Diesel up to 10 600 L
    - Refuelling will take place at least 30 m from water
    - All fuel tanks will be emptied at season end.

    - Absorbent pads absorb all and empty 45-gallon drums and 5-gallon pails will be stored on site to clean up any spills.
    - Worn seals, and/or valves and couplers will be replaced to prevent leaks.
    - Spill contingency kits will be stored at the main tank and near the tidy tank.
- Waste disposed of at landfill (hazardous and non-hazardous)
- Gold panning
- Heavy equipment use
    - Project activities will take place from 7am to 7pm
- Progressive and Final Reclamation
    - Settling pond fines will be stored for reclamation
    - Erosion of existing overburden piles will be controlled by maintaining 2:1 slope year to year
- Active mine signs are posted on site
- No transportation of material beyond claims P 36298 and P 34309
- No overburden removal
- No access construction
- No drilling
- No timber cutting
- No camp

4.0 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

4.1 Physical Environment

The proposed project is located within the Klondike Valley floor (320m el) at the base of the Midnight Dome (the Dome) between Boutillier Road and the Klondike Highway. The Midnight Dome rises steeply with surface gradient averaging 10-20 % to the bench. The Klondike River flows along the base of the Dome then moves away from the hill as it approaches the bench. The linear travel distance from the edge of the proposed project and the edge of Klondike River itself is located approximately 280m; the Klondike River being downstream of the Project.

The Project location has been previously mined and is composed of tailings with a moderate level of regrowth. There is no overburden or black muck at the site.

4.2 Biological Environment

4.2.1 Wildlife

The project location is fully exposed, and is considered a migratory corridor for a variety of mammals between vegetated areas along the bench between the Dome Road and Crocus Bluff. Moose, mule deer, bears, furbearers and migratory birds have all been noted in the area.

Mule Deer are a specially protected and considered at risk in the Yukon under the Yukon *Wildlife Act*. Preferred habitat is essentially boreal riparian areas during spring and summer months fall time is often the time that moose move to higher, drier ground.

Bears can easily become accustomed to human activities in a populated area, such as neighbourhoods in the Dome subdivision. This can occur as easily as a remote area and once realizing human activities are not a threat, are not deterred due to routine activities and noise. Like the ungulates, bears have been reported and documented by those residing and recreating in the area.

4.2.2 Vegetation

The project area consists of willow, scrub brush as well as disturbed areas, all previously mined. There is an extremely limited amount of vegetation within the project area. Due to the historical and current use of the site, the return growth is willow, young poplar and low-lying shrubs. Invasive species are present in the Dawson area and have been documented in Downtown (Cooley 2008). Disturbed areas are common bases for invasive species to establish themselves.

Surrounding the project site spruce, poplar, birch and willow are predominately along the northern and western limits. Past mining activities deposited tailings over the edge of the bench to the west and south of the project area, leaving a rocky (west) or sandy (south) terrain that cannot support growth. To the south, as the terrain drops, poplar trees, grasses, and low-lying berry shrubs are visible as the project area is entered upon. The project area is vegetated from lower Dome Road, along Boutillier Road then is barren beyond the tailing berm towards the Klondike Highway (YOR 2014-0164-043-1)

4.2.3 Fish and Fish Habitat

The project location contains a dredge pond from which the Proponent intends to withdraw water for material processing and settle process water. The dredge pond has been used for settling over the past 30 years (YOR 2020-0001-0061). According to the Proponent the dredge pond is not fish bearing and is not suitable fish habitat; this was confirmed by Fisheries and Oceans Canada (YOR 2020-0001-0061; 2020-0001-0066). Furthermore, the Proponent notes that the dredge pond “has no surface inflow and likely has never been connected to the Klondike River. At times the pond is almost dry” (YOR 2020-0001-0061). To the Designated Office’s knowledge, no studies to determine connectivity of the pond to the Klondike River have been undertaken.

4.2.3.1 Klondike River Watershed

The dredge pond at the project location “is not classified under the Yukon Placer Fish Habitat Suitability Map and as such the use of this pond for water acquisition and settling is not authorized by the *Fisheries Act Watershed Authorization for Works or Undertakings Affecting Fish Habitat for Specified Streams in the Yukon Territory*” (YOR 2020-0001-0031).

The project area is approximately 311 m from the Klondike River (GeoYukon 2020) and upstream from the Dawson City town water supply. The Klondike River supports Chinook and chum salmon including the River providing salmonid spawning habitat suitability. The Klondike River is classified as “High (Chinook Salmon Production) Suitability Habitat”, with a Category A watershed sensitivity classification. This is an area within the watercourse that is likely suitable for rearing juvenile Chinook salmon. Given its “Category A” status, this watershed contains an ecosystem that is more susceptible to the effects of placer mining activities; this is based on a cumulative ranking of selected biological and physical indicators (Yukon Placer Secretariat 2010).

The area of the claims along the Klondike River is an “Area of Special Consideration - Cultural”, that is, a stream that contains culturally important fisheries or aquatic resources. Watercourses assigned this designation may include habitats for rare or locally significant species and or areas which directly support subsistence, traditional, commercial, or sport fisheries.

4.3 Socio-economic Environment

The City of Dawson is located roughly 535 km northwest of Whitehorse, at the end of the North Klondike Highway. The bulk of the local economic activity in Dawson is comprised of tourism and placer mining. The Federal and Territorial Governments are the largest single employers. According to the Bureau of Statistics, Dawson had a resident population of 2 323 in June 2018 with a median age of 39.5 (Government of Yukon 2018).

Dawson City draws tens of thousands of tourists from around the world each year. Local attractions include, preserved buildings and historic town-site, activities related to the Klondike Gold Rush (e.g. gold panning) and wilderness adventure.

Dawson City is located within the Tr’ondëk Hwëch’in Traditional Territory. There is a citizenship of approximately 1 100 descendants of the Hän-speaking people. The Tr’ondëk Hwëch’in began negotiating their individual land claim in the 1990’s with a final agreement signed in 1998.

4.3.1 Proximal Land Uses

Land parcels surrounding the project areas include those for residential, commercial and placer mining in addition to recreational activities (Figure 8). The Project is adjacent to four residential properties along Boutillier Road. Boutillier intersects all three of the mining claims.

Figure 8: Proximal Land Uses (GeoYukon)

Settlement Land

The Tr'ondëk Subdivision is located directly across the Klondike Highway from project claims P 34309 and P 36294. This subdivision consists of Settlement Land parcels C-4B/D, C-85FS/D, and C-86FS/D (YOR 2020-0001-0047). These parcels currently contain residential and commercial uses. There are 36 occupied units on C-4B/D in both single-family dwellings and duplexes, and there are approximately 106 people living in the subdivision (YOR 2020-0001-0048). "The development of the subdivision represented an important first for TH and a key way to address the housing shortage in our community" (Tr'ondëk Hwëch'in 2020, YOR 2020-0001-0048).

TH has invested extensive resources in preparing additional lots on C-4B/D for an expansion of the Tr'ondëk Subdivision. This lot development is for an innovative Tr'ondëk Subdivision Homeownership Program (TSHP), wherein TH will be leasing lots and providing TH-backed loans for citizens to build their own homes (YOR 2020-0001-0048). The TSHP offers TH citizens the opportunity to build a home on a developed lot. The lot will be leased to TH citizens for 50 years at no cost; houses will belong to the individual awarded the lot lease. In June 2020, a lottery was undertaken for the newly developed lots. There were nine applicants for the 24 lots; all applicants were awarded a lot for residential development through the THSP (YOR 2020-0001-0048).

Highway Use

The Project runs adjacent to the North Klondike Highway. This is the main transportation corridor to and from Dawson and is one of the connecting highways between Yukon and Alaska in the summer. The vehicular traffic increases exponentially with tourism, mining and contractors during the summer months (May-Sept). Walkers, joggers, cyclists and all terrain vehicles also use the Highway on a daily basis.

Recreational Use

Dawson recreational activities are most prominent within the Dome area due to the natural environment, favourable landscape and proximity to the town core. The Project is located in close proximity to a community baseball and soccer field (~700 m) and walking trails coming down from Crocus Bluff. From May to September, the baseball and soccer fields are used by community members of all ages. On Crocus Bluff (overlooking the sports fields), there is a network of walking and hiking trails as well as mountain biking routes that access the Dome Road close to the project. Community members and visitors use these trails year-round. These trails are valued in the community for their wildlife habitat, recreational opportunities and the green space they provide close to town.

The Dome Road and Mary McLeod Road comprise a well used walking and biking loop for Dawson residents. Pedestrians, cyclists and vehicular traffic use the road year-round and simultaneously.

4.3.2 Community Planning

The project location is currently zoned as Single Detached/Duplex Residential and Future Planning by the City of Dawson. Similarly, the area where processing is proposed to occur on Claims P 36298 and P 34309 may overlap with reserves registered by Government of Yukon, Community Services (Dispositions 2019-5700 and 116B03-066) (YOR 2020-0001-0049). The purpose of these reserves are residential, in-line with City of Dawson zoning. If the project is allowed to proceed, the timing of the proposed placer mining operations will likely overlap with land development activities for the subdivision (ibid).

4.3.2.1 Official Community Plan

The City of Dawson's Official Community Plan (OCP) was developed as a result of broad public engagement and adopted to achieve purposes set out in the *Municipal Act* to achieve the safe, healthy, and orderly development and use of land (YOR 2020-0001-0047).

The project location is designated in the OCP as UR: Urban Residential. According to the City of Dawson, mineral development is not a permitted use at the proposed location (YOR 2020-0001-0026). The only land use designation in the Official Community Plan that permits mining is Industrial.

4.3.3 Zoning

Similar to the OCP, the land use zones for the Project align with the Single Detached/Duplex Residential and Future Planning designations. As with the OCP, mineral development is not a permitted use in either of these zones (YOR 2020-0001-0026). City of Dawson explains that mineral development can occur Future Planning zones, however only under very specific circumstances, which have not been met by this Project. Thus, the Project, as currently proposed at the current location is not in accordance with the OCP or Zoning By-Law (ibid).

4.3.4 Residential Development

Dawson City is facing a housing shortage (YOR 2020-0001-0029). The City of Dawson, with support from Government of Yukon, has been leading community planning work for future residential development at the project location. In December 2019, a Visioning Charrette was held with the public with the goal of working and collaborating with the public to develop a neighbourhood vision and broad objectives for the future neighbourhood. The charrette, guided by the City of Dawson Official Community Plan, resulted in a draft vision, guiding principles, and design elements for the future neighbourhood (YOR 2020-0001-

0029). Areas A, C, D and F of figure 7 are identified as the next major residential neighbourhood in Dawson (ibid). Area D overlaps with the Project.

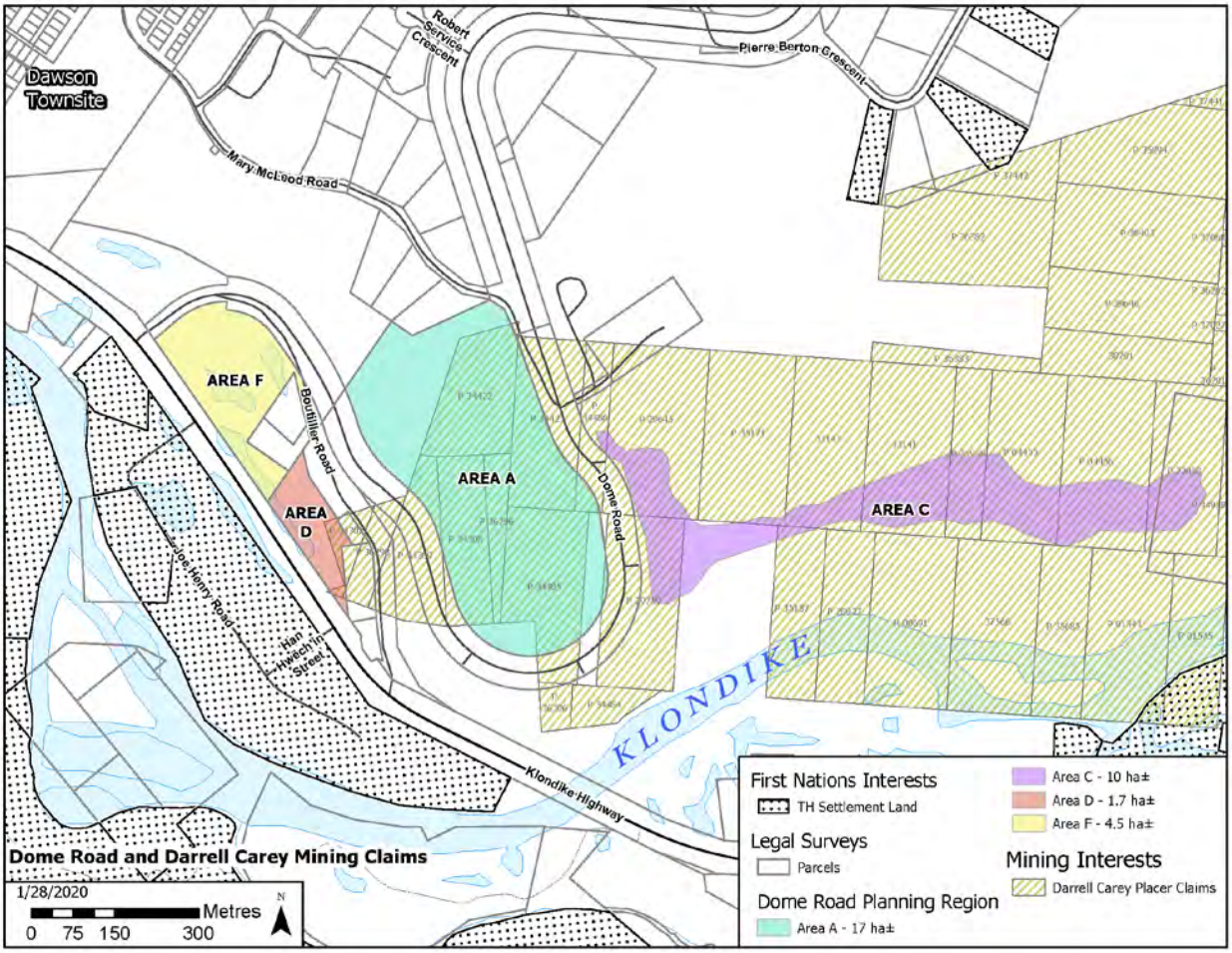

Figure 9: Map of Land Use (YG Community Services YOR 2020-0001-0050)

4.3.5 Dawson Regional Land Use Plan

The Project falls within the Dawson Land Use Planning Region. The Government of Yukon and Tr'ondëk Hwëch'in have formed the new Dawson Regional Land Use Planning Commission. The new Commission will develop a plan for future land use in the region with assistance from the Yukon Land Use Planning Council. More information can be found at dawson.playukon.ca.

5.0 SCOPE OF THE ASSESSMENT

The scope of the assessment identifies the matters considered in an assessment. It is determined by considering the activities described in the scope of the Project (identified in Section 3.0) and, based on consideration of the matters set out in s. 42(1) of YESAA, identifying the valued environmental and socio-economic components (VESECs) that may be affected by project activities. Views and information submitted during the assessment help to identify VESECs and potential effects of the Project to these VESECs.

5.1 Views and Information Submitted

The Dawson Designated Office solicited views and information on the Project, from March 23 to April 28, 2020. The period of soliciting view and information was extended to 35 days in response to identified capacity inadequacies due to the Covid-19 pandemic. The Dawson Designated Office solicited views and information on the Project for a second time from May 25 to June 8, 2020. This second solicitation of views and information was undertaken because the Proponent provided supplementary information that, in the opinion of the Designated Office, the public, interested parties and others should have additional time to consider.

Comment submissions were received from City of Dawson (COD; YOR 2020-001-0026), Government of Yukon (YG; YOR 2020-0001-0029, 0049), Fisheries and Oceans Canada (DFO, YOR 2020-0001-0030, 0065), Yukon Conservation Society (YCS; YOR 2020-0001-0033), members of the public (YOR 2020-0001-0035, 0041, 0043, 0069,0071), Klondike Active Transport and Trails Society (KATTS; YOR 2020-0001-0045), Tr'ondëk Hwëch'in (TH; YOR 2020-0001-0047, 0067), Environment and Climate Change Canada (ECCC; YOR 2020-0001-0051), City of Dawson Council (CDC; YOR 2020-0001-0053). The Designated Office has identified the following relevant concerns, interests and project effects from comments submitted and included key regulator requirements, best management practices or any other information submitted that is relevant to the assessment.

5.1.1 Tri-Partite Agreement: Government of Yukon, City of Dawson, the Proponent

- The Project undermines a 2014 tri-partite agreement signed between Government of Yukon, City of Dawson and the Proponent (CDC)
- The proposal has resulted in questions about the value taxpayers received from the 2017 tri-partite agreement, which included an outlay of taxpayer money (approximately $1.5 million) to relocate the Dome road, as well as the integrity of agreements signed between government and proponents. (CDC)

5.1.2 Project Proposal

- The proposal is unclear and incomplete (public, KATTS, YCS)
- Persons who desire to utilize public lands should be held to a much higher standard when submitting proposals (KATTS)

5.1.3 Project Timing

- The permit associated with this project should be for a maximum of two years (KATTS, YCS)
- Ten years seems to be a very long time for processing such a modest amount of material (YCS)
- No support for 10 year operation (COD)
- It is against OCP policy (section 8.1) to allow the project to continue for another 10 years, especially given that the extraction portion of the Project is complete (COD)

5.1.4 Public Health and Safety

- Mining-related traffic in Dawson City can adversely affect public health and safety and should be mitigated (CDC)

- Project activities are proposed to occur in proximity to area residents (CDC)
- During the life of the license, dangerous areas must be marked or barricaded for public safety, including in the off season (YG)
- The proponent shall provide notification to users of the Dome Road and Boutillier Road in the event that heavy equipment will be crossing or using the roadway. Notice shall be in the form of public notices and signage visible from the intersection of the Klondike Highway and Dome Road and Boutillier Road.(YG)
- Equipment, camp and fuel storage add an element of danger to the Dome subdivision during forest fire season (public)

5.1.5 Settlement Land/Tr'ondëk Subdivision

- The Project may adversely affect Settlement Land and residential areas through increased noise, dust, industrial traffic and ongoing disturbance to the viewscape (TH)
- Continuing to permit industrial activities within the City of Dawson and adjacent to TH's Settlement Land parcel reduces the value of these lots and compromises TH's efforts to develop novel housing opportunities for citizens. (TH)
- There is a history of placer-related legal activity involving parcel C-4B/D. The continued threat of such actions created instability for TH citizens that can also negatively impact the future economic prospects of TH Settlement Land for lease, and for housing development, purchases and sales. (TH)
- The Project represents another impact to the ability of TH and its citizens to peacefully use and enjoy the Tr'ondëk Subdivision and to invest resources in the development of housing on the parcel. (TH)
- Placer mining is having a cumulative effect on the Tr'ondëk Subdivision as residential area. (TH)
- Operating hours should be reduced from 9am to 5pm (TH)
- Temporal scope should be reduced to two years to minimize the ongoing noise, traffic and dust impacts to local residents (TH)
- Machinery noise (rocks on metal, pumps, heavy equipment and beeping) is a disturbance of peace and quiet and change the tone and atmosphere of the area (public)
- The proposed activities are not conducive to community living or community building (public)

5.1.6 Community Development

- Material processing could be undertaken at another location which does not conflict with future land use development at the proposed location (CDC, COD)
- Proposed camp location is unclear (CDC, KATTS)
- Sluicing at the proposed location does not conform with zoning for that particular area (CDC, TH)

- The Project is proposed to occur in an area zoned Future Planning (CDC)
- The Project fronts City of Dawson piped-and-sewer infrastructure; there are only a few land parcels in Dawson that do so (CDC).
- City of Dawson, with support from YG, has been leading community planning work for future residential development at the project location (YG)
- The project location is identified as one of the next major residential neighbourhoods in Dawson, portions of which have been reserved by YG for residential development (YG)
- The timing of the Project, as proposed, will likely overlap with land development activities for the subdivision at the same location (YG)
- Claim locations are based on the location of claim posts and baseline for each creek or river. The claim maps provided by Government of Yukon are known to contain errors. (YG, COD)
- The Project could be out at a location that doesn't conflict with the OCP and more compatible for a long-term project (COD)
- The project location is easily serviceable (COD)
- Due to the site's close proximity to the town site, developing in this location before requiring service extensions further down the Klondike Highway is an efficient use of existing infrastructure (COD)
- Residential development at the project location is an economically, environmentally, and socially responsible decision due to the various known impacts of sprawling, inefficient land use and development patterns. (COD)
- The best use of existing infrastructure would be to continue with the development plans for residential use at the project location (COD)
- City of Dawson is committed to development patterns that serve the best interests of the community overall (COD)
- The project location is earmarked for residential development in the OCP and Zoning By-law (COD)
- The project location is within a current planning area for a residential development that was initiated based on the expiry of the project (COD)
- The Project would stall the City of Dawson's intentions for residential development, resulting in inefficient use of municipal infrastructure and in development patterns that are not continuous and compact (COD)
- City of Dawson would approve a development permit application for a sluicing operation in a location that was compatible with the OCP and the policies laid out therein (COD)
- Tr'ondëk Hwëch'in citizen and elder has a vested interest in the Project (public)
- The project has $1.4 million investment with very little return (public)

- The Project can result in dropping of nearby property values (public)

5.1.7 Community Well-Being

- Socio-economic impacts of prioritizing the proposed land use over residential-lot development for a town YG projects will continue growing for the foreseeable future should be understood before this project proceeds. (CDC)
- The Project conflicts with broader public interest (TH)
- Mitigations regarding fuel storage, dust mitigation, camp use, traffic management and future use of the area were recommended (TH)
- The Project could impact development timelines or the final use of the land through mining operations and excavation activities (YG)
- Government of Yukon recognizes there may be issues with respect to mineral staking and development activities within community boundaries (YG)
- Mining is not conducive to active community living (public)
- Noise, destruction and disruption from earlier phases of the project have been experienced for well over a decade (public)
- Mining activities on the dome have changed how residents use the trails and road and has changed the peaceful enjoyment of private property (public)
- Mining and industrial noise travels up hill like a loud speaker and is a disturbance on Mary McLeod Road and on Crocus Bluff side trails (public)
- Noise generated at the project location, such as equipment starting, gravel dumping and sluicing, can be heard on Mary McLeod Road (public)
- There have been many demonstrations of disregard for rules and disrespect for the community by the Proponent. This erodes community trust. (public)
- The project location could better serve as a new sub-division for the growing community of Dawson (public)
- Noise and disruption for even one more year of operations is not acceptable and another ten years cannot be endured (public)
- Evenings and weekends free of noise and disruption is more important than completing mining work as quickly as possible (public)
- The timing and duration of the project cannot be considered socially acceptable, especially in a residential neighbourhood (public)
- It is unreasonable and disrespectful to allow mining operations to continue when residents and their families can reasonably be expected to be home (public)

- If the project is unable to provide affected residents peaceful enjoyment of their homes the operation should be moved elsewhere (KATTS)
- The Project is located in a residential area; there is potential for disturbance of residents during what are ordinarily quiet times. The operation should be limited to 7am to 7pm (YCS)
- The Project has significant economic, environmental and social impact on the community (COD)
- The Project has been a source of major conflict in the community for many years due to the close proximity to established residential and recreational uses (COD)
- The Project is demonstrated to be a high-risk for conflict with adjacent residential and recreational uses and contrary to economic development reduce such conflicts (COD)

5.1.8 Community Cohesion

- The Proponent's mining operation has turned Dawson into a "fence-line community"[1], the social impacts of which are well documented.[2] (public)
- Social cohesion is important for the community of Dawson City (public)
- The Project has the potential to further divide a community, which for too long has been grappling with the impacts of placer mining within municipal boundaries – not only the environmental and social impacts, but the emotional impacts as well (public)
- The Project forces friends and neighbours to choose between support or dissent, which creates a divisive effects and has the potential to destabilize many community run-institutions that make Dawson City a wonderful place to live (public)

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[1] Browne, A. L., Stehlik, D., & Buckley, A. (2011). Social licences to operate: for better not for worse; for richer not for poorer? The impacts of unplanned mining closure for "fence line" residential communities. *Local environment*, *16*(7), 707-725.

[2] Petrova, S., & Marinova, D. (2013). Social impacts of mining: Changes within the local social landscape. *Rural Society*, *22*(2), 153-165.

Ivanova, G., Rolfe, J., Lockie, S., & Timmer, V. (2007). Assessing social and economic impacts associated with changes in the coal mining industry in the Bowen Basin, Queensland, Australia. *Management of Environmental Quality: An International Journal*.

Keeling, A., & Sandlos, J. (2015). *Mining and communities in Northern Canada: History, politics, and memory* (Vol. 3). University of Calgary Press.

Kemp, D., Owen, J. R., Gotzmann, N., & Bond, C. J. (2011). Just relations and company–community conflict in mining. *Journal of Business Ethics*, *101*(1), 93-109.

Storm, Anna. 2014. *Post-Industrial Landscape Scars*. London: Palgrave Macmillan.

- City of Dawson has rallied the community against the Project (public)

5.1.9 Housing

- YG has not developed water-and-sewer-piped residential lots in Dawson City for nearly 25 years. This has resulted in extreme housing pressures for a growing Dawson City. (CDC)
- The Project will aggravate the current housing problem by limiting future development (CDC, YCS)
- Subdivision development should be prioritized in Dawson and the proposed project location could satisfy that need (CDC)
- The Project will negatively affect broader community interests around access to land and housing (TH)
- This project creates land-use conflict by seeking to locate industrial use activities in a residential area and by encumbering central and easily-serviced land that could be used to meet the considerable need for residential lots in the City of Dawson (TH)

5.1.10 Ski Trails

- The Project poses a threat to recreational ski trails in the area (KATTS)

5.1.11 Environmental Contamination

- The Project is located directly above Dawson City's potable-water well. Spills could threaten the community's water supply (CDC, public)
- Relevant legislation regarding effects from the release of deleterious substances was discussed (ECCC)
- Fuel malfunctions are a danger to nearby and downstream users (public)

5.1.12 Reclamation

- Requirement for increased standards for reclamation, developed in conjunction with the City of Dawson and TH (TH)

5.1.13 Erosion and Sedimentation

- Stripping of vegetation may result in erosion of soils and sedimentation of downstream waters. Activities associated with vegetation removal may cause disturbance to active layer, slope instability, drainage impediment, sedimentation of water bodies, and erosion. (YG)
- The Proponent should ensure effective temporary and permanent erosion and sediment control measures are implemented on disturbed areas during and after activities to prevent erosion and sedimentation. (YG)

5.1.14 Wildlife

- Mining activities on the Dome have changed the shape of the mountain, the way animals travel and access the Klondike River, the amount of nesting and access for birds (public)

Migratory Birds

- The Project is located in Nesting Zone B8 and migratory birds may be found nesting from the beginning of May until late-August (ECCC)
- If nests containing eggs or young of migratory birds are located or discovered during operations, all disruptive activities in the nesting area should be halted until nesting is completed (ECCC)
- Food, domestic wastes and petroleum-based chemicals can attract predators of migratory birds and can have significant negative effects on the local bird population (ECCC)
- Particular care should be taken in selecting erosion prevention and control measures if migratory birds are found nesting in stockpiles of overburden (ECCC)
- During the breeding season it is important that nests not be disturbed by erosion prevention and control measures or by excavation and construction or reclamation activities (ECCC)
- Recommendations for avoiding the creation of nesting habitat for Bank Swallow and Common Nighthawk, listed as Threatened on Schedule 1 of SARA, were provided (ECCC)

Bears

- The project area is frequented by black bears (YG)
- Conservation Officers in Dawson regularly deal with conflict bears in the nearby residential and industrial areas (YG)
- Any food, garbage and fuels at the site will inevitably attract bears leading to potential human-bear conflicts, which could ultimately end in bear mortalities if appropriate mitigation is not in place. (YG)

5.1.15 Aquatic Resources

- The existing pond proposed to be used for water acquisition and settling is not classified on the Yukon Placer Fish Habitat Suitability Map and use of this pond for water acquisition is and settling is not authorized by the *Fisheries Act Watershed Authorization for Works or Undertakings Affecting Fish Habitat for Specified Streams in the Yukon Territory* (DFO)
- The Project is not located in or near fish habitat (DFO)

5.1.16 Official Community Plan

- The Project is in conflict with the City of Dawson's Official Community Plan (TH)
- TH supports the community vision in the OCP and does not support non-confirming placer mining activities within municipal boundaries. (TH)

5.1.17 Heritage Resources

- There are no known heritage resources in the project area. However, the project location has not been fully inventoried for sites to dates and undocumented heritage resources may be present within the project area. (YG)
- Portions of the project location have been subject to a heritage resources impact assessment. This assessment and a desktop review of the project area indicates that the project location has low potential for the presence of archaeological or historic sites. (YG)

5.1.18 Regulatory

- A City of Dawson development permit is required to undertake project activities (CDC, TH)
- City of Dawson has not been contacted about the Project (CDC)
- According to the *Municipal Act*, City of Dawson has jurisdiction over zoning within the municipal limits and administers land within the municipality through the Official Community Plan and the Zoning Bylaw. The proponent must submit an application to amend the Official Community Plan and Zoning Bylaw before any activity proceeds. (CDC, TH)
- The Project would only be allowed to proceed, if approved by City of Dawson Development Permit prior to third reading of the Zoning Bylaw (May 13, 2019).
- Quarrying is not a permitted mining activity (CDC)
- A discussion of species at risk in the general area was provided (ECCC)
- It is the responsibility of the proponent to ensure that the boundary to all lots is clearly identified and that no work occurs on titled property. Should this operation result in any loss or damage to legally owned or occupied properties, pursuant to section 19 of the *Placer Mining Act*, the proponent will be responsible for compensation. (YG)
- Government of Yukon, Department of Community Services should be a Decision Body (public)
- The Proponent should be required to post sufficient security to address any environmental and socio-economic effects (KATTS)
- The proposed project would violate the conditions of water licence PM17-086 (YCS)
- City of Dawson will not issue a development permit for the Project to be undertaken (public)
- The process of changing the OCP to bring this project into conformity will take approximately 4 years which limit the ability of the Project to be undertaken (public)
- The Project should be allowed to proceed. The only reason it hasn't been completed to date is because of the red tape the Proponent has had to go through (public)

5.2 Determination of Significance

In order to mitigate a potential adverse effect, the Designated Office must first find significance. In addressing what may constitute a “significant” adverse effect, the Designated Office considered the following factors:

Magnitude: The intensity of an effect or extent of change, where "effect" is defined as the change from baseline conditions resulting from an activity.

Probability: The likelihood that an adverse effect will occur.

Geographic Extent: The geographic extent of project effects (e.g. the distance from the project and/or the area in which effects are detectable). The geographic extent of effects can be local or regional.

Duration and Frequency: The length of time the effect lasts and how often the effect occurs. The duration of an effect can be short term or long term. The frequency of an effect can be frequent or infrequent.

Reversibility: The degree to which the effect is reversible. Effects can be reversible or permanent. Reversible effects may have lower impacts than irreversible or permanent effects.

Context: The particular environmental and/or socio-economic context within which the project occurs. Context is related to the importance of valued environmental and socio-economic components, their resiliency to potential effects and the extent to which those valued components may successfully adapt to change.

5.2.1 Consideration of Cumulative Effects

With regards to cumulative effects, subsection 42(1)(d) of the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) instructs Designated Offices to consider:

42(1)(d) the significance of any adverse cumulative environmental or socio-economic effects that have occurred or might occur in connection with the project or existing project in combination with the effects of other projects for which proposals have been submitted under subsection 50(1) or any activities that have been carried out, are being carried out or are likely to be carried out in or outside Yukon;

(d)(1) any studies or research undertaken under subsection 112(1) that are relevant to the project or existing project;

(d)(2) the need for effects monitoring.

The consideration of cumulative effects is a key contextual factor in determining the significance of potential project effects.

5.3 Other Matters Considered

5.3.1 Global Health Considerations

At the time of issuance of this Evaluation Report, the World Health Organization has declared a pandemic regarding the novel corona virus COVID-19. Various levels of government, including the Government of Yukon, have enacted measures and are likely to enact additional measures to limit the spread of the COVID-19 virus. The situation is fluid and it is impossible to predict outcomes or what the situation may

be like at the time the Project is proposed to be carried out. The determinations and recommendations made in this Evaluation Report are made with the expectation that proponents will follow all recommended measures by Yukon's Chief Medical Officer of Health and/or other relevant regulatory regimes, guidelines and/or advisories in response to COVID-19. Consequently, COVID-19, its possible effects, and responses to it are not addressed further in this Evaluation Report.

5.4 Valued Environmental and Socio-economic Components

The Designated Office has identified the following VESECs as being adversely affected by the Project:

- Community Development and Well-Being (This VESEC will be further discussed in Section 6.0 of this report.)

  The Project is proposed to occur in an area that is intended for a future residential development subdivision. The Project in conjunction with past projects will result in delayed residential development, reduced community cohesion, and reduced property values.

- Public Health (This VESEC will be further discussed in Section 7.0 of this report.)

  Heavy equipment use and material processing in close proximity to residential properties other users will adversely affect public health by resulting noise disturbance.

- Bears (This VESEC will be further discussed in Section 8.0 of this report.)

  Waste and fuel storage can attract bears to the project location and result in human-bear conflict leading to bear mortality.

- Soils and Vegetation (This VESEC will be further discussed in Section 9.0 of this report.)

  Heavy equipment use, vegetation clearing and material processing can result in erosion.

5.4.2 Concerns and Interests Considered but not Assessed Further

The Designated Office considered the following concerns and interests, but determined there are no known pathways of effects. The following section(s) further explains how the Designated Office considered identified concerns project design features and relevant legislation that eliminate pathways of adverse effects.

5.4.1.1 Impacts to Investors

The Dawson Designated Office acknowledges that the Project is a collaborative venture with invested interests from parties other than the Proponent, such as a Tr'ondëk Hwëch'in elder and life-long Dawson City resident (YOR 2020-0001-0070). In accordance with the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) this report will evaluate adverse effects of the Project to the VESECs identified in Part B of this report. This assessment will not consider impacts that could occur if the Project were not to proceed. The responsibility of the Dawson Designated Office lies with identifying effects of the Project and does not contemplate effects from the absence of the Project. Such considerations are beyond the scope of the assessment.

5.4.2.1 Camp Location

Comments submissions from City of Dawson Council, KATTS and members of the public identified lack of clarity about proposed camp location and questioned the need for a new camp. In response to these comments, the Designated Office sought clarity on details of the proposed camp (YOR 2020-0001-0058). In their response to the aforementioned information request, the Proponent indicated that no camp would

be proposed for this Project. As such, comments regarding the originally proposed camp are not considered further in this report.

5.4.1.2 Effects to Ski Trails

The comment from KATTS expressed concern over potential effects to ski trails from the Project. As discussed above, the proposed camp, which was originally proposed to occur in proximity to the moose mountain cross-country ski trails, is no longer proposed as part of this project. The Project is located away from all ski trails and does not involve activities that could result in direct or indirect impacts to the ski trails. With no pathway to effects, impacts to ski trails have not been considered further in this report.

5.4.1.3 Quarrying

City of Dawson Council noted in their comment submission concerns about quarrying at the project location. Quarrying is not proposed as part of this project and therefore not considered further in this report. Concerns with quarrying occurring at the project location are regulatory in nature and do not fall within the scope of this assessment.

5.4.1.4 Aquatic Resources and Water Quality

Comments from members of the public, City of Dawson Council and DFO indicated that the Project could adversely affect water quality and aquatic resources from the release of deleterious substances. The *Placer Mining Regulations* require fuel to be stored no less than 30 m from the ordinary high water mark of any waterbody. The *Fisheries Act* also includes provisions to prevent adverse effects to fish and fish habitat. In consideration of the project design and relevant legislation, the pathway of effects to aquatic resources and water quality is limited to an accident or malfunction. In consideration of the project location, which is approximately 300 m away from the Klondike River, and relevant legislation effects to aquatic resources and water quality will not be further considered in this report.

5.4.1.5 Migratory Birds

Comments from Environment and Climate Change Canada suggested that project activities could adversely affect migratory birds. The Project as proposed will not involve clearing, overburden removal or access construction. Activities are limited to material processing of material stored on-site and tailings. In consideration of the project design, migratory birds have not been identified as a valued component and will not be discussed further in this report.

5.4.1.6 Community Services as Decision Body for the Project

Comments from the public suggested that Government of Yukon, Department of Community Services should be the decision body for the Project. The Dawson Designated Office notes that Government of Yukon as been identified as the Decision Body for this Project; the specific department has not been identified. Government of Yukon delegates its decision-making authority to various departments based criteria they have established. This delegation is beyond the scope of the assessment.

5.4.1.7 Human Injury

Comments from Government of Yukon, City of Dawson, and the public indicated that project activities could result in human injury from heavy equipment use and use of the Dome Road. The project location contains signage advising the public of the nature of work occurring on site. Furthermore, “if the public approaches, they are greeted with a smile, their questions are welcomed, answers and they are informed

on any possible adverse effects to their health and safety. They are advised on being safe and alerted to pay attention that this is a work area to prevent and eliminate any adverse effects to their health and safety" (YOR 2020-0001-0012). Regarding safety concerns related to use of the Dome Road, the project is not likely to result in increased mining traffic because all activities are now proposed to occur on three contiguous claims. Traffic will be limited to mobilizing equipment to and from the site. In consideration of the project design, human injury from project activities is unlikely. Human injury from project activities is not considered further in this report.

5.4.1.8 Project Alternatives

Comments from City of Dawson and KATTS spoke to the potential for project effects to be mitigated by undertaking project activities at an alternate location. As part of information request #4 the Designated Office inquired about the potential for the Project to be relocated to an area zoned for industrial activity. The Proponent responded by saying that the infrastructure required to undertake the Project is already in place at the project location (YOR 2020-0001-0033-1). No alternate location was proposed. The Dawson Designated Office is bound to assessing the Project as proposed. Given that alternate locations have not been proposed, project effects from undertaking activities at an alternate location are not considered in this assessment.

PART B. ASSESSMENT AND REASONS FOR RECOMMENDATION

Part B of this evaluation report presents the effects assessment of the Project on VESECs identified in Section 5.0. For each VESEC identified, an overview is provided followed by a discussion on relevant contextual factors, an effects characterization analysis and a determination of significance. Where adverse project effects are determined to be significant, terms and conditions are recommended.

6.0 COMMUNITY DEVELOPMENT AND WELL-BEING

6.1 Overview

The Project is located in an area currently selected for future residential development by City of Dawson, with support from Government of Yukon. This subdivision is intended to address the long-standing housing shortage in the community and foster community development. The Project is also located adjacent to private residences on Boutillier Road and across the Klondike Highway from the Tr'ondëk Subdivision, which houses approximately 106 individuals in a combination of single family dwellings and duplexes (Figure 7).

The Project could adversely affect community development and well-being from delayed development of a subdivision, reduced property values and reduced community cohesion. Project effects will be discussed in more detail in section 6.6.

The title of this VESEC aims to acknowledge the interconnections between community development and well-being. In consideration of the definitions provided below, it is the Dawson Designated Office's view that community development cannot occur, without ensuring its well-being and therefore separating the two concepts in this report would be inappropriate.

The Designated Office has determined that the Project will result in significant adverse effects to community development and well-being. Recommended terms and conditions will mitigate significant adverse effects to community development and well-being.

6.1.1 Definition of Key Terms

Community

Community is not limited to the municipality of Dawson City itself. The definition of community in this report is adapted from Theodori (2005). In this report, community refers to interrelated actions undertaken in a given place through which members of a local population express a shared sense of identity while engaging in the common concerns of life. This definition of community, views social interaction as the substantive element of community (Theodori, 2005). According to Theodori (2005), social interaction:

- delineates an area as shared territory
- contributes to the wholeness of local life
- gives structure and direction to collective actions, and
- is the source of mutual identity

Theodori (2005) suggests that community occurs in places and is place oriented, but the place itself is not the community. The place serves as the setting in which social interaction occurs (Theodori 2005). In other words, Dawson City is not "the community" in this report. Dawson City is the location of the community, which may be adversely affected by the Project. This impacted community consists of residents of the Tr'ondëk subdivision, Boutillier Road and Mary McLeod Road and extends to individuals emotionally impacted by mining at the project location even if they are not experiencing direct impacts from the Project activities.

Community Development

Community development is often defined as improving the social, economic and environmental quality of life for residents of a community (Theodori 2005). This definition fails to acknowledge the emotional component of a community, which the Dawson Designated Office considers to be an integral part of development. Emotion informs the nature and shape of development in an area. Thus, community development in this report is broadened and defined as a process of building and strengthening the community (Theodori 2005). Community development is achieved by working together toward a common goal (Theodori 2005).

Well-Being

Well-being in this report is defined as a general state of wellness influenced by environmental, psychosocial and economic characteristics. Well-being can be influenced by political and social levers of action.

> Political levers of action are those that are controlled by local governments or large organizations and include implementation of local policies or programs or promoting change in culture… Social levers of action are characteristics describing the readiness of community members to drive change in their community. (Roy et al. 2018)

6.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to community development and well-being.

- *Municipal Act*
  - Section 178 each member of a council has a duty to

    (a) Consider the well-being and interests of the municipality as a whole and to bring to the council's attention anything that would promote the well-being or interest of the municipality

  - Section 277 The purposes of this Part and the bylaws under this Part are to provide a means whereby official community plans and related matters may be prepared and adopted to

    (a) achieve the safe, healthy, and orderly development and use of land and patterns of human activities in municipalities;

    (b) maintain and improve the quality, compatibility, and use of the physical and natural environment in which the patterns of human activities are situated in municipalities; and

    (c) consider the use and development of land and other resources in adjacent areas

without infringing on the rights of individuals, except to the extent that is necessary for the overall greater public interest.

- Section 283(2) No person shall carry out any development that is contrary to or at variance with an official community plan.

- Section 283(3) Despite subsection (2), council is not empowered to impair the rights and privileges to which an owner of land is otherwise lawfully entitled

- Section 284 If, in an area that has been consolidated into a municipality, any existing zoning bylaw, or regulation under the *Area Development Act*, is at variance with the provisions of an official community plan, the provisions of the official community plan shall supersede the provisions of the bylaw or regulation.

- Section 285 An official community plan may be amended, but any such amendment shall be made in accordance with the procedure and subject to the same approvals as established in this Division [Division 1 Official Community Plan] for the preparation and adoption of an official community plan.

- Section 288 When an official community plan is adopted or amended, the council shall within two years adopt or amend, if necessary, a zoning bylaw applicable to the land affected by the official community plan or amendment

- Section 290(1): Without restricting the generality of section 289, a zoning bylaw may establish districts, areas, or zones in the municipality and regulate any one or more of the following matters in any or all of the districts, areas, or zones

  (a) the use of land, buildings, or other structures for business, industry, residences, or any other purpose after the passing of the bylaw;

  (l) the removal from the ground of soil, gravel, sand, silt, aggregate, or other surface materials

- Section 301(1) If the lawful use of land or of a building or other structure existing at the date of the adoption of an official community plan or zoning bylaw or amendments does not conform to the official community plan or bylaw, that use may be continued, but if the non-conforming use is discontinued for a period of 12 months, or any longer period as council may by bylaw allow, any subsequent use of the land or building or other structure must conform with the official community plan and zoning bylaw then in effect.

- Section 307(1) A person may apply to the board of variance for a variance or exemption from an official community plan or zoning bylaw if there are practical difficulties or unnecessary hardships in meeting the requirements of the official community plan or zoning bylaw because of the exceptional narrowness, shortness, shape, topographic features, or any other unusual condition of the property.

  (2) The board of variance shall not approve an application for a variance if

  (c) the variance or exemption would be contrary to the purposes and intent of the official community plan or zoning bylaw and would injuriously affect the neighbouring properties; or

(d) the variance or exemption would allow a change to a use that is not similar to a permissible use in the area.

- City of Dawson Official Community Plan Bylaw 2018-18

  The City of Dawson's Official Community Plan (OCP) was developed as a result of broad public engagement and adopted to achieve purposes set out in the *Municipal Act* to achieve the safe, healthy, and orderly development and use of land.

  - 7.0 Housing

    - Housing is a critical issue in Dawson as there is an ongoing need for permanent long-term and short-term accommodations. It is widely understood that there is a small stock of existing housing in the community and a limited amount of developable residential land available. Although there is still a fair amount of privately owned serviced land in the historic town site that is either undeveloped or contains vacant and underutilized buildings, housing needs are not being met.

    - 7.1 Long-term goals

      - Meet the full spectrum of housing needs in the community.

      - Provide sufficient land available for residential development

    - 7.2 Implementation approaches

      - Investigate the suitability of the Slinky Mine [project location] and Dredge Pond areas for new residential development.

  - 8.0 Economic Development

    Section 8.0 of the OCP explains "[e]conomic development involves supporting new or existing economic sectors, attracting new businesses, and creating an environment where different economic interests are balanced…Maintaining a liveable and vibrant community is vital to attracting and keeping the labour force required for local businesses to succeed" (p. 24).

    - 8.1 Long-term goals

      - Conflicts between industrial uses and other uses are avoided or minimized.

  - 14.0 Municipal Infrastructure

    - 14.1 Long-term goal

      - Develop and provide municipal infrastructure that is effective, safe and efficient.

    - 14.2 Implementation approaches

      - Promote the development of continuous and compact development in order to reduce the infrastructure required and its associated costs.

    - Prioritize the development of vacant or underutilized lands in the Historic Town site over extending services into new areas in order to utilize existing infrastructure in a more efficient manner

- City of Dawson Zoning By-law
    - The Project location is zoned for Future Planning (FP). According to the zoning by-law

      > The purpose of the FP zone is to preserve land as open space until such time as the land is required for development, and to identify potential future growth areas in the community. These areas may be suitable for one or more different land use designations. To determine the suitability of the areas for future development, additional planning must be completed.

      City of Dawson explain in their comment submission that mineral development is not a permitted use at the project location. The Industrial zone is the only zone in which an applicant can lawfully engage in mineral development, without needing to meet extra criteria. Mineral developments can occur in Future Planning zones, however only under very specific circumstances.

    - 15.2.1.6 permitted M1 Zone (Industrial) uses, if approved by an approved development permit prior to third and final reading of this bylaw

      City of Dawson noted in their comment submission that the Project does not meet the criteria for an extension because the Proponent has not engaged with the City on an extension of their operation at the project location and because of the conditions under which the Proponent's past two development permits were issued (YOR 2020-0001-0026).

- Tr'ondëk Hwëch'in Final Agreement
    - Under TH's Self-Government Agreement, Settlement Land parcel C-4B/D is a parcel for which TH has limited its self-governing powers in relation to local bylaw issues. TH made this sacrifice to reduce land use and other conflicts between centrally located settlement land parcels and the broader Dawson community. As such, TH expects that municipal bylaws regarding land use controls are enforced and respected. (YOR 2020-0001-0048, p. 2)

6.3 Spatial and Temporal Scope

The spatial scope for effects to community development and well-being extends to the entirety of the broader Dawson City area, from Henderson Corner to Sunnydale and West Dawson (Figure 9). This area was selected because emotional effects from the Project are not bound to a physical location. However, the Dawson Designated Office recognizes the need to specify a region for characterizing project effects to community development and well-being. Even so, it is understood that impacts to community development and well-being may be experienced beyond the spatial scope identified.

The temporal scope for the assessment of effects to community development and well-being is 10 years because this represents the length of the Project. However, the Dawson Designated Office acknowledges that effects to community development and well-being, particularly psychosocial effects may be experienced beyond the life of the Project.

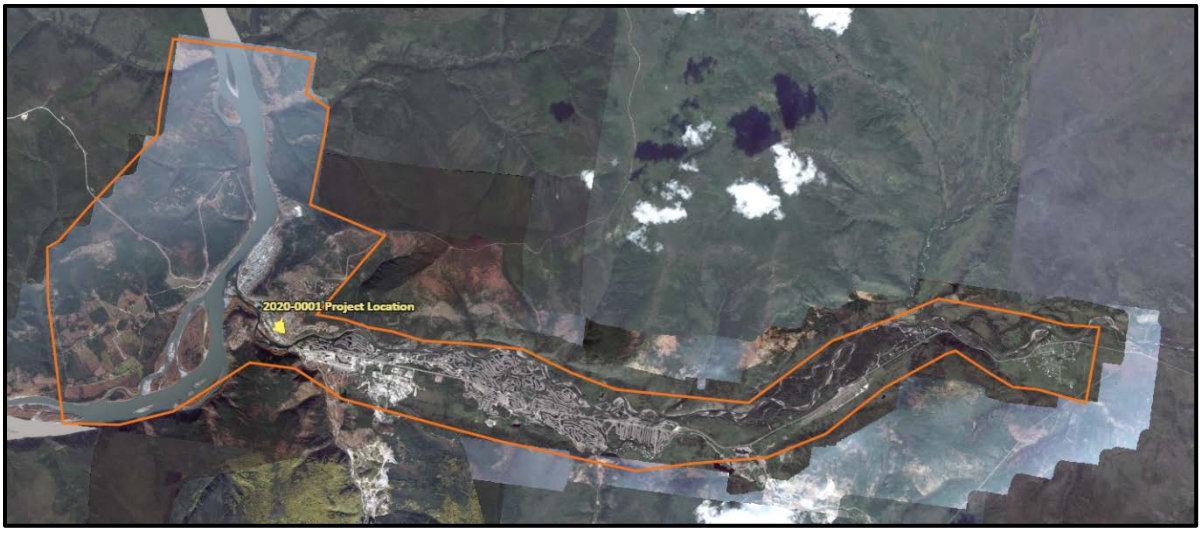

Figure 10: Spatial Scope for Effects to Community Development and Well-Being

6.4 Context

6.4.1 Project Claim Status and the Dome Prohibition Area of Entry

Several comment submissions referred to agreements between the Proponent, Government of Yukon and City of Dawson regarding use of the project location for mining. The following section clarifies the current status of the project claims. The information below was obtained from the City of Dawson Council comment and a letter provided by Government of Yukon to the Designated Office (YOR 2020-0001-0053, 0057).

In 2014, a Tri-Partite agreement between Government of Yukon, City of Dawson and the Proponent was signed. The agreement states that it was established with the understanding that Government of Yukon "wishes to assist Carey [the Proponent] and [City of] Dawson in their respective efforts of mining the Claims and facilitating safe public access to the Dome Road and any existing and future development in the area of the claims" (YOR 2020-0001-0053). This agreement stated that mining and reclamation would be completed by December 31, 2017 (ibid).

In accordance with the 2014 agreement, the Proponent surrendered a number of placer mining claims in 2018. In the same year, Government of Yukon established Order in Council 2018/160, which prohibits entry to the "Dome Road Prohibition of Entry Area" for the purpose of placer mining, which encompasses the U-shape section identified in Figure 1. Claims P 34309 and 36298 fall partially within the Dome Road Prohibition of Entry Area. As such, while the claims may be valid, the Proponent cannot lawfully carry out mining activity on those parts of the claims within the Dome Road Prohibition of Entry Area. Conversely, there are no restrictions to the Proponent carrying out activities on the portions of the claims outside of the Dome Road Prohibition of Entry Area. Thus, despite suggestions in some comment submissions that the Project cannot occur lawfully at the proposed location, the project location as illustrated in Figure 1 does not contravene the 2014 agreement.

The 2014 agreement was replaced by another agreement executed in 2018 between Government of Yukon and the Proponent. City of Dawson chose not to be a party to the 2018 Agreement. According to Government of Yukon, who is party to both agreements, the 2014 and 2018 agreements "were strictly about mining activity and mineral claims that fall within the boundaries of the U-shaped section of Dome

Road. The current application involves placer claims that extend beyond this U-shape section" (YOR 2020-0001-0057).

6.4.2 Klondike East Bench Project Report

Following the assessment of project 2016-0118: Placer Mine – Klondike River East Bench, the Dome Government of Yukon, Department of Energy, Mines and Resources hired a B. McIntyre (the Consultant) as to gather information and to explore ideas that could resolve divergent land use interests relating to the Klondike East Bench Project (McIntyre, 2017). The Consultant's report notes that "longer term planning and management of the phased and planned developments can support the access and extraction of valuable resources (gravel, gold), facilitate proper reclamation of disturbed areas for future use, and result in development of trails, recreation areas and residential properties that meet the long term goals of the community" (McIntyre, 2017, p, 23). McIntyre (2017) notes that successful implementation of recommendations requires that a number of criteria are observed. The report suggests that effective and clear communication across all parties is instrumental to the successful implementation of the report's recommendations (McIntyre, 2017).

As noted in comments from City of Dawson and City of Dawson Council, communication between the Proponent and City of Dawson is limited and has proven ineffective, of late. This is exemplified in the City's comment submission where they describe the process for future residential planning at the project location and the lack of engagement by the Proponent in the process despite being made aware of the planning process (YOR 2020-0001-0026). Thus, while the report developed for Government of Yukon identifies recommendations to allow for continued mining at the project location in a manner, which could foster community development and well-being, the criteria necessary to implement those recommendations have not been established and the willingness to do so has not been demonstrated by the parties, as a collective, to date. The Dawson Designated Office has no information to suggest that an agreed upon approach to address the concerns of the Proponent, City of Dawson and Government of Yukon while allowing mining to proceed at the project location has been established.

6.4.3 Future Development: City of Dawson Subdivision

Government of Yukon, Department of Community Services has registered land reserves on portions of the project claims. According to Community Services, the purpose of these reserves are residential. "If the project is allowed to proceed, the timing of the proposed placer mining operations will likely overlap with land development activities for the subdivision" (YOR 2020-0001-0050).

As discussed in section 4.3.4, the City of Dawson, with support from Government of Yukon, has been leading community planning work for future residential development at the project location (Figure 8). The planning work that has been undertaken to date is aligned with the goals and policies outlined in the OCP (YOR 2020-0001-0026). City of Dawson expressed that the municipality is in great need of developed land for current and future residents (ibid). According to City of Dawson, from the outset of the planning for future development

> all potential stakeholders were informed of the proposed work, were invited to participate in the visioning exercises, were invited to submit comments, questions and concerns, and to place their name on a circulation list for future correspondence and communications of the project. The proponent, as a claim holder in the area, was included in the stakeholder communications. The proponent requested to stay informed through future communications, but did not submit any comments during the visioning process, nor did the City receive any correspondence that the proponent had plans to continue mineral operations at this location. (YOR 2020-0001-0026)

Because of the planning process undertaken to date, the project location is now identified as one of four areas for the next major residential neighbourhood in Dawson City. The project location is identified as optimal for development because it is in close proximity to municipal infrastructure, which would allow for the continued development of a new residential area in line with section 14.1 and 14.2 of the OCP. Specifically, development of a subdivision at the project would promote the development of continuous and compact development to reduce the amount of infrastructure required and associated costs. The other proposed locations are not adjacent to infrastructure in the same way. Development at the project location would also serve to prioritize development of vacant or underutilized land instead of extending services to new areas, thereby utilizing existing infrastructure in a more efficient manner (YOR 2020-0001-0026).

6.5 Consideration of Past, Present, and Likely Activities

The following sections will identify past, present and likely projects that have informed the Designated Office's understanding of project effects to community development and well-being. The activities identified are not meant to be an exhaustive list of all activities that have, are or will occur at or within the project location.

6.5.1 Previous Assessments for the Project Location

As discussed in section 2.3, the Designated Office has assessed four iterations of the Proponent's placer mining operation, all of which included some, or all, of the Project claims (YESAB Project 2009-0125, 2014-0164, 2016-0118, 2017-0206). Comments submitted for these previous projects identified emotional effects from the projects, specifically as they related to the peaceful enjoyment of land and effects to recreational ski trails. Comments from the public also indicate that past placer mining projects at the project location and associated claims have changed how residents use the recreational trails and Dome Road (YOR 2020-0001-0043). Further, these projects have changed the peaceful enjoyment of private property (YOR 2020-0001-0043).

The Proponent's previous authorization to undertake activities at the project location expired in March 2020. While the Proponent is currently authorized to undertake activities on some of their claims further up the Dome Road, as per their most recent mining land use approval, the Proponent is not currently authorized to undertake activities at the project location (Yukon Water Board 2019).

6.5.2 Findings from 2017-0206 Assessment: Adverse Effects to Community Relations

The Designated Office's 2017 assessment of this project determined that the operation to that point had had an impact on community relations and, at that time, the addition of the 2017 project would result in cumulative effects to community relations. Effects were evidenced through the multiple assessments undertaken by the Designated Office for this project.

> The past community meeting held by YESAB was a key demonstration of the controversial nature of this proposed project (and the work of the project proponent in the past), as there were many people upset, frustrated, and some who were rather belligerent. Media coverage and personal communication further demonstrates the stress caused by this proposal. If this project were allowed to proceed, such stress and ill feelings would only intensify...These emotional and social impacts of this project must be taken into account, as such development frequently creates rifts within small, tightly-knit communities, which are never properly healed and for decades continue to aggravate relationships between neighbours, co-workers, and community members, forever

> marring the delicate social fabric of a small community, where members need to work together in order for it to thrive (YOR 2017-0206-052-1).

The Project currently under review is the Proponent's fifth proposal for a placer mining operation in the area. The complex socio-economic impacts incurred through these proposals have led to a road realignment, a report by Government of Yukon, extensive media coverage and active community debate. The comments submitted for the past projects provide a compelling narrative of the socio-economic effects incurred by the community. The Project is contributing to an adverse cumulative effect on community development and well-being through the ever-present prospect of placer mining in this area. The 2017 assessment recommended that the temporal scope of the project be reduced from ten years to five years.

> By reducing the timeline of the Project, the cumulative effects to public health are moderately reduced. While this will not prevent the Proponent from subsequent applications, it will provide the opportunity for stakeholders to further input the manner in which those activities are proposed. Conversely, allowing the Project to remain operational for 10 years without further assessment will compound the effects to the community described herein. (YOR 2017-0206-077-1).

The Designated Office's assessment of project 2017-0206 recommended a reduced temporal scope so the Proponent and stakeholders could work together to address the impacts to community relations and allow a recovery from the emotional impacts of the previous projects in order to mitigate adverse effects of that project. Comment submissions submitted for the current project suggest that this objective was not achieved. Comments for the Project reiterate concerns related to community well-being and the adverse effect the Project, in combination with past projects at the same location, are having on community cohesion.

6.5.3 Tr'ondëk Subdivision and Expansion

As discussed in section 4.3, across the Klondike Highway from the Project is the Tr'ondëk Subdivision on, which is located on multiple Settlement Land parcels. The subdivision currently houses approximately 106 individuals in single-family dwellings and duplexes. The development of the Tr'ondëk Subdivision was an effort by TH to address the housing shortage in Dawson City for their community. In recent years, TH has invested in the development of 24 additional lots to expand the subdivision and provide homeownership opportunities for TH citizens. TH commented that the Project will reduce the value of the new lots and compromise their efforts to develop new housing opportunities for citizens (YOR 2020-0001-048).

While not related to the Project, TH noted that a history of placer-related legal activity involving Settlement Land C-4B/D creates instability for TH citizens that can also negatively impact the future economic prospects of TH Settlement Land for lease, and for housing development, purchases and sales (YOR 2020-0001-048). The Project, in conjunction with historical legal activity relating to the Tr'ondëk Subdivision is likely to contribute to emotional impacts for subdivision residents.

6.6 Characterization of Project Effects

6.6.1 Project Effect: Delayed Residential Development

As discussed in section 6.4.3 the Project is proposed to occur in a location identified for future residential development by City of Dawson and Government of Yukon. Project activities are proposed to occur from

April 1 to December 1 for ten years. The Project is likely to impact development timelines and the final use of land as a residential subdivision (YOR 2020-0001-0029).

While the timing of future residential development at the project location has not been communicated. However, the Designated Office notes that the Project will limit City of Dawson and Government of Yukon's ability to develop a subdivision at the project location. According to the City of Dawson, the Project will stall intentions for residential development, resulting in efficient use of municipal infrastructure and in development patterns that are not continuous and compact, as intended by the OCP (YOR 2020-0001-0026).

> development in community without development of community and task accomplishment without structure building are likely to produce, at best, transitory results in a community. In many rural resource-based localities, pressing needs exist for job creation, increased incomes, economic growth, modernization, improved service delivery, business retention, expansion, and recruitment, and other developments in community. However, solely focusing on such developments and engaging merely in task accomplishment activities ignores the essential contribution that development of community and structure-building activities make to local social, economic, and ecological well-being. (Theodori 2005, 667)

Development of a new subdivision at the project location will conflict with the activities proposed to occur at the same location. Furthermore, the Project could negatively affect community interests and aggravate the current housing shortage by limiting future development (YOR 2020-0001-0034, 0048, 0054). In order for the Project to go ahead, development of a subdivision at the project location would need to be placed on hold until activities are complete, thereby delaying the development of new housing opportunities for the community. By limiting the development of a subdivision at the project location, the Project is likely to give rise to feelings of uncertainty over when the project location will become available for development and result in feelings of frustration and resentment among the community of individuals seeking housing opportunities within the municipality. Feelings of uncertainty and frustration among the community is likely to adversely affect community development and well-being.

The Proponent notes, "Active mining activity makes any consideration of a new residential subdivision at the same location unreasonable. It is my intent to fully restore the site when I am finished with my mining activities. It would then be available for other uses such as a residential subdivision" (YOR 2020-0001-0061). The Proponent's commitment to restoring the site could, if coordinated with City of Dawson and Government of Yukon, support the initial ground preparation for development of a subdivision at the site. In contrast, if reclamation is not undertaken in a manner conducive to future development, the location may become more expensive to develop into a subdivision.

While the temporal scope of the Project is 10 years, there is nothing to preclude the Proponent from applying for a new authorization once the 10-year period is complete. The potential for the Proponent to continue to apply for authorizations at the project location will further delay residential development and perpetuates feelings of uncertainty regarding when development at the project location could in fact occur. Feelings of uncertainty can be reversed only when it is clear that placer mining activities at the project location will under no circumstances be authorized by Government of Yukon.

6.6.2 Project Effect: Reduced Community Cohesion

Land use conflict can result in divisions within the community and lead to reduced community cohesion. The Project will result in land use conflict by undertaking industrial activities in a residential area and by

encumbering central and easily-serviced land that could be used to meet the considerable need for residential lots in the City of Dawson (YOR 2020-0001-0026).

According to City of Dawson, the Project has been a source of conflict in the community for many years due its close proximity to established residential and recreational uses (YOR 2020-0001-0026). Comments from TH, City of Dawson, City of Dawson Council and the public indicate that the Project is in conflict with broader public interest as it relates to community living or community building. Community living and building appears as a trend in the comment submissions. In contrast, comments from the public also suggest that City of Dawson has rallied the community against the Project and indicate that the Proponent should be allowed to proceed instead of navigating the “red tape” the Proponent has been subject to (YOR 2020-0001-0041, 0069). The polarizing views in these comments demonstrate the division of perspectives regarding the Project, which continue to this day.

Public comment indicates that the Project, in conjunction with its earlier iterations have turned Dawson City into a “fence-line” community, one which lives on the edge of a mine and is subject to the ebbs and flows of the placer mining operation (YOR 2020-0001-0071). The legacy of the Project has resulted in impacts to community cohesion, which are likely to be perpetuated by the Project. “For a small, diverse community such as Dawson City, which relies on folks from all walks of life working together to thrive, social cohesion is incredibly important” (YOR 2020-0001-0071).

Effects to community cohesion can result in adverse emotional impacts to individuals as well as community. The long-standing nature of the land use conflict this Project represents is having a high magnitude effect, as evidenced by people continuing to comment on every iteration of this project in a rather forceful way. Reversibility of effects to community cohesion is difficult in the short-term but can likely be achieved in the long-term, if acknowledged and addressed by regulator’s and land managers. Effects to community cohesion will be experienced for the duration of the Project.

6.6.3 Project Effect: Reduced Property Values

The Project is in close proximity to residential properties. Noise disturbance from heavy equipment use and material processing will adversely affect property values of nearby residences. Effects from noise disturbance are discussed in section 6.0 as it relates to public health. This section considers the impacts of noise disturbance on residential property values within proximity to the Project.

Comments submitted by TH and the public express concern about reduced property values due to the industrial nature of activities in proximity to residential properties. Furthermore, TH expressed that continuation of the Project is compromising TH’s efforts to develop novel housing opportunities for citizens (YOR 2020-0001-0048). In essence, the lots TH developed for their housing initiative are considered less desirable when located in close proximity to heavy equipment use and material processing proposed for the Project (YOR 2020-0001-0048).

A study of the effects of rock mining on local residential property values found statistically and economically significant property-value-suppressing effects of being located near an operational rock mine (Malikov et al. 2018). Malikov et al. (2018) found that, other things equal, a house located a mile closer to a rock mine is priced, on average, at about 2.3-5.1% discount, with more expensive properties being subject to larger markdowns. While the Project proposes activities related to placer mining and not hard-rock mining, the study does demonstrate property values decreasing in proximity to noise disturbances caused by mining activity. As such, the Project is considered likely to result in reduced property values for nearby residences. Reduced property values limit the potential for economic

prosperity from property sales, which can adversely affect community development and well-being. Reduced desirability of residential land within the project area is reversible once project activities cease.

6.7 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse socio-economic effects on community development and well-being. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

1. Government of Yukon, Chief of Placer Land Use, in consultation with City of Dawson and Government of Yukon, Department of Community Services, shall reduce the temporal scope of the Project to a period that shall not delay the development of a subdivision at the project location.

2. Government of Yukon shall engage the Proponent in an agreement, which extinguish rights to undertake placer mining activities at the proposed location upon completion of the Project, as per the reduced temporal scope established from term 1.

3. Government of Yukon, Chief of Placer Land Use, in consultation with City of Dawson and Government of Yukon, Department of Community Services, shall establish a reclamation plan with the Proponent, which facilitates development of the project location into a subdivision upon completion of the Project, as per the reduced temporal scope established from term 1.

6.7.1 Delayed Residential Development

The OCP identifies housing as a critical issue in Dawson City, where there is an ongoing need for permanent long-term and short-term accommodations. The project location is specifically identified in the OCP as a potential for residential development, this is affirmed by Government of Yukon land reserves at the project location for residential development. City of Dawson and Government of Yukon have undertaken visioning events to inform development of a residential subdivision at the project location. The Proponent was informed of the planning process. The Proponent did not participate actively in the public process, nor did they communicate their intentions to continue placer mining at the proposed location. Ineffective communication leads to uncertainty about when the operation will in fact cease and when City of Dawson and Government of Yukon will gain access to the project location to offer new residential opportunities to the community in order to foster community development and enhance community well-being.

The Designated Office acknowledges that reducing the temporal scope of the Project would allow the Proponent to extract gold from the site while planning for a residential subdivision is underway. However, the continuation of the Project and the continued possibility of a licence renewal presents considerable uncertainty for developers and stakeholders and does not mitigate adverse effects to community well-being from the Project. This could be addressed by assuring stakeholders that placer mining activities will no longer be permissible at the project location upon completion of the Project.

Failure to address the potential for mining activities to occur at the project location into the future will perpetuate the socio-economic effects of the Project and further delay the development of a residential subdivision at the project location for years to come. Delayed residential development because of uncertainty caused by the regulatory process and/or Proponent’s intentions could lead to the development of a residential subdivision at a sub-optimal location and at a greater expense to taxpayers.

In consideration of the project design, contextual factors, relevant legislation, the Official Community Plan, Zoning By-law, housing shortage in Dawson City, and the proximity of the Project to existing infrastructure, delayed residential development at the project location is considered a significant adverse effect to community development and well-being. Recommended terms and conditions will mitigate adverse effects to community development and well-being from delayed residential development at the project location.

6.7.2 Reduced Property Values

Reduced property values will be experienced as long as project activities are being undertaken in proximity to residential properties such that noise disturbance is experienced. The proposed ten-year length of the Project will thus adversely affect for ten years. In consideration of the length of time placer mining activities have taken place in close proximity to residences, property value for affected properties will have been impacted for over 20 years and more if another authorizing is sought for the project location in the future. Impacts to community development and well-being from reduced property values are considered significant. Recommended terms and conditions will mitigate adverse effects to property values from the Project in the long-term.

6.7.3 Reduced Community Cohesion

Placer mining previously undertaken by the Proponent at the same location have resulted in land use conflict, which has reduced community cohesion for the past 10 years. Reduced community cohesion is demonstrated by:

- the establishment of the Dome Prohibition Area of Entry
- the Klondike East Bench report and recommendations
- the assessment and outcomes of YESAB projects 2017-0206, 2016-0118, 2014-0164, 2009-0125
- comments for past projects, and comments submitted for the current assessment.

The Project, in conjunction with past projects at the same location, is likely to result in reduced community cohesion, which will adversely community development and well-being by affecting the community's ability to move beyond the land use conflicts that have arisen from the Project. These adverse effects are considered significant because of the division they create within the community and the emotional impacts such a division can have on community well-being. In consideration of the project design and relevant legislation, the Designated Office has determined that effects to community cohesion can be mitigated by the recommended terms and conditions.

7.0 PUBLIC HEALTH

7.1 Overview

The Project involves activities that can adversely affect public health from noise disturbance. Specifically, heavy equipment use and material processing can result in noise levels above natural ambient levels and the generation of dust at and beyond the project location. The Project is adjacent to residences on Boutillier Road, and in close proximity to the Tr'ondëk Subdivision, outdoor recreational facilities, and recreational trails.

The Designated Office has determined that the Project is likely to result in significant adverse effects to public health. Effects from noise disturbance to public health cannot be mitigated.

7.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to Public Health.

- City of Dawson Property Maintenance & Nuisance Abatement By-Law 07-03
    - 11(2) Construction equipment, light work equipment including tractors, lawnmowers, shall not be operated between the hours of eleven o'clock at night and seven o'clock in the morning (11:00 p.m. to 7:00 a.m.) in residential areas except with the permission of the Bylaw Officer.
- *Municipal Act*
    - Section 178 each member of a council has a duty to

      (a) Consider the well-being and interests of the municipality as a whole and to bring to the council's attention anything that would promote the well-being or interest of the municipality
    - Section 277 The purposes of this Part and the bylaws under this Part are to provide a means whereby official community plans and related matters may be prepared and adopted to

      (a) achieve the safe, healthy, and orderly development and use of land and patterns of human activities in municipalities;

      (b) maintain and improve the quality, compatibility, and use of the physical and natural environment in which the patterns of human activities are situated in municipalities; and

      (c) consider the use and development of land and other resources in adjacent areas

      without infringing on the rights of individuals, except to the extent that is necessary for the overall greater public interest.
    - Section 283(2) No person shall carry out any development that is contrary to or at variance with an official community plan.
- Tr'ondëk Hwëch'in Final Agreement
    - Under TH's Self-Government Agreement, Settlement Land parcel C-4B/D is a parcel for which TH has limited its self-governing powers in relation to local bylaw issues. TH made this sacrifice to reduce land use and other conflicts between centrally located settlement land parcels and the broader Dawson community. As such, TH expects that municipal bylaws regarding land use controls are enforced and respected. (YOR 2020-0001-0048, p. 2)
- City of Dawson Official Community Plan Bylaw 2018-18

7.3 Consideration of Past, Present, and Likely Activities

The spatial scope for effects from noise disturbance is identified in Figure 11 and includes: Boutillier Road residences, Tr'ondëk Subdivision, Mary McLeod Road, and Crocus Bluff recreation facilities. The temporal scope of project effects to public safety is 10 years, which is the proposed length of the Project and therefore the length of time the Project can interact with the Project.

Figure 11: Spatial Scope for Effects from Noise Disturbance

The Project is located at the base of the Dome Road adjacent to residential properties on Boutillier Road and across the Klondike Highway from Tr'ondëk Subdivision, there are approximately 140 residents within the zone of influence. Furthermore, Twenty-four additional lots have been prepared for development at the Tr'ondëk Subdivision, with nine of those lots likely to be developed within the proposed lifespan of the Project (YOR 2020-0001-0068).

As discussed in section 6.4.2, placer mining has previously occurred at the project location. Past iterations of this project have resulted in noise disturbance to residents within the identified spatial scope. Comment submissions from the public suggest a cumulative effect from noise disturbance has occurred over time (YOR 2020-0001-0039, 0043). The Project is likely to contribute to additional noise disturbance

to an already exacerbated group of impacted residents. One comment in particular stated that noise and disruption for even one more year of operation is not acceptable and another ten years cannot be endured (YOR 2020-0001-0043). Comments such as this demonstrate impacts to public health from past projects, which will be amplified by the Project.

7.3.1 Findings from 2017-0206 Assessment: Noise Disturbance

In the assessment for project 2017-0206, the Dawson Designated Office concluded that the project would result in significant adverse effects to public health and safety from noise due to the proximity of the Project to residences (YOR 2017-0206-077-1). To mitigate significant adverse effects to public health and safety, the Designated Office recommended that the Proponent establish a 150 m buffer from all surveyed land parcels and that that area remain undisturbed. This term was accepted by Government of Yukon and carried forward into the mining land use approval (Yukon Water Board 2019). Government of Yukon's acceptance of the term demonstrates a lack of social acceptability for noise disturbance to affected residents from project activities. However, the Designated Office notes that acceptance of the aforementioned term does not preclude a rejection of the same term in the future.

7.4 Characterization of Project Effects

7.4.1 Project Effect: Noise Disturbance

The Project will result in increased noise in close proximity to private residences. The Project involves processing material and heavy equipment use from 7:00 am to 7:00 pm, April 1 to December 1, for ten years. Material processing and heavy equipment use will generate noise above natural ambient levels. Noise generated at the project location, such as equipment starting, gravel dumping and sluicing can be heard on Mary McLeod Road as well as Crocus Bluff trails (2020-0001-0043). This noise represents a disturbance to peace and quiet on residential properties, which can change the tone and atmosphere of the surrounding area (2020-0001-0043).

Effects from noise disturbance can result in the following acute or chronic impacts to public health:

- annoyance
- sleep disturbance
- disruption of normal functions (e.g. communication and interaction, activities)
- distraction and reduced task performance
- anxiety and stress
- startle reflex (e.g. reactions ranging from mild surprise to severe shock)
- physiological changes (e.g. blood pressure, heart beat, constriction of blood vessels); and
- physiological effects (e.g. nausea, headache, insomnia, loss of appetite, hypertension, heart disease, tinnitus, hearing damage, noise-induced hearing loss). (Singal 2000).

As noted above, continued noise disturbance can result in chronic health conditions, which could adversely affect the health of nearby residents; the probability of which is high considering the frequency and duration of project activities. While effects such as annoyance and sleep disturbance can be reversed

when project activities cease, anxiety, stress, physiological changes and physiological effects may not be reversible depending on the extent of their impact. In consideration of comment submissions, effects to public health from noise are likely to be experienced by residents on Boutillier Road, Tr'ondëk Subdivision and Mary McLeod Road.

As noted in section 4.3, the project location is zoned as Future Planning under City of Dawson's Zoning By-law and Urban Residential in the City of Dawson Official Community Plan (OCP). In consideration of the noise abatement by-law, zoning and land designation under the OCP, it is reasonable for residents in the area to expect noise from residential uses from 7:00 am to 11:00 pm. However, noise from heavy equipment use and material processing in a residential area for the proposed duration of the Project is above what would likely be expected in an area zoned for residential use.

According to the Proponent, "noise is protected by naturally occurring windrows of gravel from previous mining and old, existing dredge piles so there is minimal to no disturbance to other users in the area" (YOR 2020-0001-0010). Furthermore, the Proponent explains that the water pump "is down low and completely surrounded by old, historic, dredge tailings that make a sound buffing windrow and hills of gravel to buffer any noise" (YOR 2020-0001-0010). While it appears that the project design could mitigate adverse effects to other users from noise disturbance, comment submissions suggest that despite the natural windrows, noise disturbance has been experienced from the project location to date and therefore can be expected from the Project (YOR 2020-0001-0043-1). Given there have been no changes to the project site since previous projects at the same location, the probability of noise disturbance to nearby residents is considered high.

7.5 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse socio-economic project effects on public health. It was further determined that these effects cannot be adequately mitigated.

The Project, which involves material processing and heavy equipment use, will subject nearby residents to noise disturbance from 7:00 am to 7:00 pm, April 1 to December 1 for ten years. The Designated Office acknowledges that the project design is more stringent than the City of Dawson by-law, which states that heavy equipment shall not occur from 11:00 pm to 7:00 am. Even with the proposed hours, project activities are still likely to overlap with sleeping hours for nearby residents for a considerably portion of the year and for up to 10 years.

Noise disturbance can result in chronic or acute health effects as well as reduced enjoyment of private property, all of which can adversely effect public health. Adverse effects will be experienced on a daily basis for the length of the operating year for 10 years. While some effects may be reversible, the physiological effects that may develop from noise disturbance are considered high magnitude. Effects from noise disturbance to public health are considered significant.

KATTS and YCS suggested that a reduction of the project's temporal scope could mitigate potential project effects. However, comments submitted for the Project indicate that nearby residents have been experiencing noise disturbance from mining related activity for the past decade and that tolerance for such disturbances are low (YOR 2020-0001-0039, 0043). The Project in conjunction with past operations is likely to result in cumulative effects to public health from noise disturbance. A reduction in temporal scope is not likely to mitigate the adverse health effects caused by noise disturbance related to mining activities in proximity to residential properties.

Yukon Conservation Society commented that effects from noise disturbance could be mitigated with the construction of a 4-metre high noise buffer, composed of overburden and organic materials between nearby residences (YOR 2020-0001-0033). The effectiveness of such a mitigation has not been demonstrated and is unlikely to mitigate adverse effects to all impacted residents. For this reason, a buffer is not considered effective for mitigating effects from noise.

Other comments suggested that effects from noise disturbance could be mitigated by reducing the hours of operation to 9:00 am to 5:00 pm and limiting activities to weekdays (YOR 2020-0001-0039, 0067). Modifying the project design to include a break in activities after the regular business day would reduce impacts to those nearby residents following the regular business week. However, limiting activities to the business week does not mitigate effects to shift and part-time workers from noise disturbance. In consideration of the 10-year duration of the Project, reducing the working hours is still likely to result in significant adverse effects to nearby residents.

In consideration of the project design, frequency and duration of noise exposure to nearby residents, as well as the severity of effects to public health from noise disturbance, the Designated Office has determined that effects from noise disturbance cannot be mitigated.

8.0 BEARS

8.1 Overview

Grizzly and black bears inhabit the project area and have intrinsic environmental and social value, playing important roles in maintaining healthy ecosystem functions and generally providing opportunities for wildlife viewing and hunting. While black bear populations in Yukon are stable, grizzly bears are listed as a species of conservation concern under COSEWIC.

The Project involves the storage of fuel and generation of waste, which can attract bears to the project location and lead to human-bear conflicts. The Dawson Designated Office has determined that the Project will result in significant adverse effects to bears such that further mitigation is recommended. The following sections provide a rationale for this determination

8.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to bears.

- Yukon *Wildlife Act*
    - s. 93 (2) No person shall encourage any wildlife to become a public nuisances.
    - s. 93 (3) Subject to subsection (4), a person shall be deemed to have encouraged dangerous wildlife to become a public nuisance if the person feeds it or leaves food or garbage in a place where dangerous wildlife may have access to it and he or she does not take reasonable precautions to prevent dangerous wildlife from having access to it or being attracted to the area by it.
    - s. 88 (1) Report of emergency killing
- *Environment Act*

- *Solid Waste Regulations*
- *Special Waste Regulations*
- *Spills Regulations*

8.3 Consideration of Past, Present, and Likely Activities

The spatial scope for effects to bears is the 224 Game Management Area in which the Project is located. The temporal scope for effects to bears is 10 years, which is the length of the Project. However, the Dawson Designated Office acknowledges that effects to bears could extend beyond the life of the Project if effects are experienced on a population level.

Department of Environment's data on wildlife incidents in the broader Dawson region for 2018 include the following bear incidents: 4 mortalities, 15 moved (bear moved out of an area where there is potential for conflict with humans), and 2 re-located (Conservation Officers physically relocated the bears to a new location). Ten of the 2018 bear incidents were associated with mining activities. There is potential that many bear incidents have not been reported. Evidently, many of the conflicts have been related to mining activities. According to YG, Department of Environment's comments, any food, garbage and fuels at the site will inevitably attract bears leading to human-bear conflicts (YOR 2020-0001-0029). Human-bear conflicts are difficult to manage once bears have been accustomed to accessing rewards from non-natural sources.

8.4 Characterization of Project Effects

8.4.1 Project Effect: Human-Bear Conflict leading to Bear Mortality

According to Government of Yukon, Department of Environment, the project location is frequented by bears and Conservation Officers in Dawson regularly deal with conflict bears in the nearby residential and industrial areas (YOR 2020-0001-0050).

The Project will result in the generation of hazardous and non-hazardous waste and the storage of fuel 10 600 L of diesel and 2 L of gasoline. Waste and fuel, if improperly managed on site, can attract bears to the project location. Bear visitation to the site can result in human-bear interactions leading to bear mortality. The Proponent has indicated that waste will be disposed of at the Dawson City landfill; the frequency of disposal has not been provided. Furthermore, waste storage methods on-site have not been specified.

A rise in human-bear conflicts imposes safety risks onto nearby residents and recreational users, and increases the likelihood that such conflicts will lead to direct mortality to bears. If a bear regularly visits a claim block, it will likely be shot and killed. While black bear populations in Yukon are stable, grizzly bears have a low reproduction rate. Given their status as a species of special concern, adverse effects to bears, grizzlies in particular, are not only irreversible, but can represent an important change from baseline if population numbers are affected. Because bears can have far-reaching ranges, project effects are predicted to occur beyond the project claim block. T

Adverse effects to bears from improper attractant management is considered a preventable and high magnitude effect. The frequency of effects to bears is dependent on waste storage methods and regular disposal, neither of which have been identified in the project proposal.

8.5 Significance Determination

The Dawson City Designated Office has determined that the Project is likely to have significant adverse environmental effects on bears. These effects can be eliminated, reduced or controlled by the application of the following terms and conditions:

4. All waste shall be stored in bear-proof containers until final disposal.

5. The Proponent shall contact Dawson Conservation Officers immediately if a bear approaches or investigates the project location. The Conversation Officers can then help to deter the bear before it comes a nuisance.

6. All waste shall be disposed of at the Dawson City landfill on a weekly basis.

The Project is located in close proximity to residential and recreational areas within the municipal limits of Dawson City. Proposed waste storage methods on site have not been specified in the proposal, nor has the frequency of final disposal at the Dawson City landfill been identified. Human-bear conflicts can result in bear mortality, which is considered to be a significant adverse effect. In consideration of the project design, the high use of the area and the regular presence of bears in the area, the likelihood of human-bear conflicts is high. Proper attractant management is recommend to mitigate significant adverse effects to bears from the Project.

9.0 SOILS AND VEGETATION

9.1 Overview

Project activities such as vegetation clearing, heavy equipment use and fuel use may result in contamination or erosion. Vegetation removal and heavy equipment use can result in erosion if the stability of existing stockpiles is not maintained and from the removal of tailings for processing. Contamination can occur through an accident or malfunction.

The Designated Office has determined that the Project will not result in significant adverse effects to soils and vegetation.

8.1.1 Contamination

The Designated Office considered contamination to soils and vegetation from fuel spills due to an accident or malfunction. The Proponent has committed to ensure all fuel tanks are emptied at season's end and that spill kits and absorbent pads will be stored on-site. Given the project design, specifically the fuel spill contingency plan, and the application of relevant legislation the Designated Office has determined that the pathway of effects to an accident or malfunction is limited. Relevant legislation, including the *Placer Mining Act*, *Placer Mining Land Use Regulation*, *Environment Act*, and *Spills Regulations* preclude the Proponent from intentionally releasing deleterious substances to the receiving environment. The Designated Office considers the effects of the Project to soils and vegetation by way of contamination to be of low likelihood and magnitude. Environmental contamination is not further considered in this report.

9.2 Relevant Legislation

The Designated Office considered the following legislative requirements. This list is not exhaustive; rather, the Designated Office reviewed this specific legislation because of its direct relevance to soils and vegetation.

- *Placer Mining Act*
- *Placer Mining Land Use Regulation*, Schedule 1 Operating Conditions as these apply to the Project state:
    - A.1. If the vegetative mat must be removed to carry out an operation, it must be removed so as to protect the seed and root stock contained within the mat and be stored separately from any overburden or bedrock removed for use in re-establishing the vegetative mat when the operation ceases.
    - B.2. (1) All vegetated areas disturbed by operation activities, including fuel and waste storage areas, clearings, corridors, camps and supporting infrastructure, and trenches and drill sites, must be left in a condition conducive to re-vegetation by native plant species or other species adaptable to the local environment to encourage re-vegetation comparable to similar, naturally occurring, environments in the area.
    - B.2. (2) Conditions conducive to re-vegetation include provision of an adequate soil layer with moisture retaining ability, no soil contamination by hydrocarbons or other hazardous substances, provision of adequate seed or root stock and contoured or otherwise stable slopes
    - B.3. If adequate seed stock or root stock is not naturally available, re-seeding or transplanting of vegetation is required. Only non-invasive species may be used for reseeding or transplanting.
    - C.4. All areas disturbed during an operation must be re-sloped, contoured or otherwise stabilized to prevent long-term soil erosion, slumping and subsidence
    - C. 5. All operations must be carried out to avoid or minimize damage to and loss of permafrost.
- *Environment Act* (Yukon)
- *Solid Waste Regulations*
- *Special Waste Regulations*
- *Spills Regulations*

9.3 Consideration of Past, Present, and Likely Activities

The Designated Office has considered whether the potential effects of the Project may interact with effects from past, present and/or future projects or activities to form a significant cumulative effect on soils and vegetation. The spatial scope for effects to soils and vegetation is the project location, Klondike

Highway, Boutillier Road and surrounding area. The temporal scope of effects to soils and vegetation is 10 years, as this is the length of time erosion will be experienced until re-vegetation begins to take hold.

Ground disturbing activities have the potential to cause significant adverse effects to soils and vegetation. Activities in the area include placer mining, highway use and maintenance, infrastructure maintenance and residential lot development. These activities involve vary in size and scale and can involve stripping and clearing soils and vegetation, excavation, and material processing.

9.4 Characterization of Project Effects

Project activities such as vegetation removal and earthworks can result in soil erosion. The Proponent indicated in their proposal that no clearing is proposed, however they also note that vegetation existing on-site will be removed. Given the discrepancy in the proposal, the Designated Office assumes that vegetation will be removed, however it is understood that no timber exists on site and as such timber removal is not assessed (YOR 2020-0001-0010). In their comment, Government of Yukon, Department of Environment shared concerns about stripping of vegetation leading to erosion and sedimentation of downstream waters (YOR 2020-0001-0050). “Activities associated with vegetation removal may cause disturbance to active layer, slope instability, drainage impediment, sedimentation of water bodies, and erosion” (YOR 2020-0001-0050).

While soil disturbance is inevitable, the likelihood of adverse effects occurring from erosion is considered low when considering the small size of the project, the low volume of material and the Proponent’s commitment to maintain a 2:1 slope of stockpiled material. Additionally, there is relevant legislation pertaining to reclamation and the requirement for disturbed areas to be left in a state conducive to re-vegetation, along with provisions for an adequate soil layer, seed and rootstock, and re-contouring (Schedule 1 of the *Placer Mining Land Use Regulation*).

9.5 Significance Determination

The Dawson Designated Office has determined that the Project will not have significant adverse environmental effects to soils and vegetation.

The Dawson City Designated Office has determined that the Project will not have significant adverse environmental effects to soils and vegetation. The Project is of small size and produces a low volume of material. Additionally, the project design involves maintaining a 2:1 slope of stockpiled material. The project design in combination with relevant legislation will effectively mitigate effects to soils and vegetation from erosion and sedimentation.

10.0 CONCLUSION OF THE ASSESSMENT

Under s. 56(1)(c) of the Yukon Environmental and Socio-economic Assessment Act, the Dawson City Designated Office recommends to the Decision Body that the Project not be allowed to proceed, as it determined that the Project is likely to have significant adverse socio-economic effects in or outside Yukon that cannot be mitigated.

10.1 Authorization of Recommendation / Referral

The undersigned is authorized pursuant to s. 23(2) of YESAA to make this Recommendation:

Amélie Morin

July 29, 2020

Manager, Dawson City DO

Name & Position *Date*

Appendix A REFERENCES

All references to documents on the YESAB Online Registry (YOR) can be found by searching for the Project and document number on the YOR at https://www.yesabregistry.ca.

City of Dawson. n.d. "Zoning Bylaw No. 2018-19." Accessed July 14 2020. https://www.cityofdawson.ca/Home/DownloadDocument?docId=5d3bf864-2537-4470-90f7-59f151480fab.

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Committee Minutes

THURSDAY 3rd FEBRUARY 2022
19:00

Meeting Type: Regular Heritage Advisory Committee (via Zoom) **Meeting:** # HAC 22-03
Facilitator: Stephani McPhee, PDA
Attendees: Eve Dewald (chair), Angharad Wenz, Megan Gamble
Regrets: Jim Williams, Charlotte Luscombe, Rebecca Jansen
Meeting Called to order at 7:03 PM.

Minutes

Agenda Item: **Agenda Adoption** **Presenter:** Eve Dewald
Resolution: 22-03-01 **Seconder:** Angharad Wenz

THAT the Agenda for Heritage Advisory Committee Meeting 22-03 be adopted as presented.

Discussion: None.

Votes For: 3 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Conflict of Interest **Presenter:** Eve Dewald
Resolution: 22-03-02 **Seconder:** Megan Gamble
None.

Agenda Item: Committee of the Whole **Presenter:** Eve Dewald
Resolution: 22-03-03 **Seconder:** Angharad Wenz

THAT the Heritage Advisory Committee move into the Committee of the Whole.

Discussion: None
Votes For: 3 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Revert to Heritage Advisory Committee **Presenter:** Eve Dewald
Resolution: 22-03-04 **Seconder:** Megan Gamble

THAT the Committee of the Whole revert to the Heritage Advisory Committee.

Discussion: None.

Votes For: 3 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Adoption of the Minutes **Presenter:** Eve Dewald
Resolution: 22-03-05 **Seconder:** Angharad Wenz

THAT the Minutes for HAC meeting 22-02 are accepted as amended.

Discussion:

- Under 'Joint meeting with Council – agenda item brainstorm' amend Enforcement to specify that incentives can be a method of enforcing quality heritage design, however, can also be done separately (not as a method of enforcement, but rather incentive for quality heritage-compliant development)

Votes For: 3 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from the Minutes **Presenter:** Eve Dewald
Resolution: 22-03-06 **Seconder:** Megan Gamble

Discussion:

- The HAC asked whether there was a date set for the Council and HAC joint meeting. It is intended to take place on February 17th at the next regularly scheduled HAC meeting.

Votes For: 3 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Unfinished Business **Presenter:** Angharad Wenz
Resolution: 22-03-07 **Seconder:** Eve Dewald

THAT the Heritage Advisory Committee PROVIDE ADVICE on the 'Commercial and Residential Mixed Use' definition amendment, as directed by Council

Discussion:

- As directed by Council, Administration brought forward an information request to the HAC re: potential heritage concerns that may arise if the 'commercial and residential mixed use' definition were to be amended to the following: "'COMMERCIAL AND RESIDENTIAL MIXED USE' means a building that has commercial uses located on the ground floor and residential dwelling units located on the upper floors or on the ground floor behind the commercial uses or the residential use is beside and secondary to the commercial use in that it occupies less than 35% of lot frontage compared to the commercial use".

<u>Disclaimer</u>

- The committee stated that they try not to regulate *use* when it is not necessary because the needs of the community are ever changing, and the need for housing is currently prevalent. The HAC's mandate is to assess design and streetscaping. However, the HAC stated that typically when commercial and residential are mixed, the two uses are often split by top and bottom floor – usually the residential uses are upstairs and the commercial uses are downstairs.
    - As a note: there has not been precedent for a specific situation like the Riverwest addition, where the residential use occurs at the front of the building in a structurally separate, accessory building addition. Historically, real estate in the downtown core was expensive and would not have been used for housing on a commercial streetscape. The HAC approved the design of the Riverwest micro-unit because aesthetically it passes as a commercial style accessory structure by design, despite its intended use as a residential unit.

<u>Controls over domestic uses</u>

- The HAC raised concern about the limited controls that exist to regulate the type of uses that will transpire on the boardwalk. Paying some thought to the domestic types of uses that would take place is critical to understand how private uses could alter public perception of the streetscape. Using the Riverwest micro-unit as an example for study, some potential impacts to the streetscape and activities could possibly include:
    - Domestic activities: Tenants hosting parties/ barbecues on the boardwalk
    - Storage overflow into the public realm: wood storage, bicycle, and stroller parking. The HAC noted that generally, outdoor storage might not have sufficient space to be contained in a way that does not flow onto the street.
    - Impacts on parking in the commercial core: Fronting the boardwalk and Front St., tenants will expectedly park directly on Front St., despite on-site parking provided in the rear of the building.
    - Parking in relation to accessibility concerns: the micro-unit (accessible suite) would require parking directly on Front St. to be genuinely an accessible unit. Allowing parking on Front St. will set precedent that might have impacts on street parking if it widely becomes a phenomenon.
- The HAC brought up the Monte Carlo as a successful example of a split commercial and residential use in the front of the building, attributing its success to the entrance to the apartment unit being in the rear of the

building. Requiring entrance in the rear could potentially limit the impacts addressed re: the domestic use of public spaces.

35% in relation to building size

- Confusion was noted about the choice of 35%, or roughly 1/3rd of a building's frontage. This percentage could become potentially problematic if a building were much larger than the Riverwest, as it would be much more impactful on the streetscape.
- Perhaps if the proposed percentage decreased, the definition could be successful in promoting small annex additions, which would be more likely to be historically compliant.
- The HAC commented that if this definition were to be implemented, it might be best to require residential units to be self-contained and in a visually separate unit or addition from the main commercial use (i.e. be visually distinct from the main commercial use) and to be permitted to a smaller percentage than 35% residential.

Correspondence

Note: The committee members accepted the feedback via email and phone as information. All correspondence provided was discussed with among members who were present.

Via phone, Jan 2

- Decisions by the HAC are to be made on design, but also on the economy and population changes: there is a collective understanding that decisions must be flexible to keep the city viable. "Dawson is not a museum; it is growing and is alive". The Committee does not tell people what is behind the doors of a building, but rather looks at the façade and adheres to the streetscape as best as they can.
- Additionally, the Committee already set precedent of allowing residential uses along a commercially zoned streetscape when approving the design of the residential building across from the Post Office on 3rd Ave (KDO apartments). The building design features residential uses located on the lower level at the front of the building because they were not viable at the rear, due to building code access requirements. Although this building could in theory be converted to a commercial façade with a storefront, that is not the current use of the building.

Via email, Jan 3

- A HAC member submitted photos that illustrate historic examples of similar smaller buildings of similar style to the Riverwest micro-unit. These buildings are not on Front Street; however they are similar in scale and commercial streetscape style (see Appendix 1).
- To elaborate, the HAC commented that an important aspect displayed in the photos is how the buildings relate to one another. The buildings all have similar setbacks, they are close together and have complementary design. If proposed changes to the bylaw are approved, the onus would be on the HAC to ensure that infill designs meet the recommendations of the heritage management plan and Dawson style, *regardless of use*.
    - To supplement, the issue with the Riverwest micro-unit was that it was proposed to have a different setback from nearby buildings and didn't have a typical front street design.
- Another comment from the HAC is that the 'feel' on the street should emulate the assembly ('hodgepodge') of the buildings, similarly to how is illustrated in the historic photos (Appendix 1). Something to consider, however, is the minimum dwelling unit size requirement within the Zoning Bylaw, which is 256ft^2. This could limit what is possibly integrated as infill, given the 35% definition. If the intention is to encourage more infill that matches the images provided, the HAC is keen to understand what the average sizes of these specific historic buildings would have typically been.

Agenda Item: Adjournment **Presenter:** Eve Dewald
Resolution: 22-03-08 **Seconder:** Angharad Wenz

That Heritage Advisory Committee meeting HAC 22-03 be adjourned at 7:53 pm on February 3rd, 2022.

Minutes accepted on: February 17, 2022 (HAC Meeting #22-04)

Appendix 1. Historic examples of similar smaller buildings of similar style to the Riverwest micro-unit


PIONEER
PAINTERS
SIGNS
PAPER HANGIN
SIGNS
LL PAPER
AURORA
BROPS.
5 DAYS
BARGE


THE NEW YORK
Tailor Made
Suit Co
REPAIRING
CIGAR


GEO. NOBLE
MANAGER
DAWSON Y.T.


FAIR PLAY MINE EXCHANGE
S. SELMAN MGR.
SEATTLE


SCHUSTER'S STAND
MIN NG BROKERS.

Committee Minutes

THURSDAY 17th FEBRUARY 2022
19:00

Meeting Type: Regular Heritage Advisory Committee **Meeting:** # HAC 22-04
Facilitator: Stephani McPhee, PDA, Stephanie Pawluk, CDO
Attendees: Eve Dewald (chair), Angharad Wenz, Megan Gamble, Jim Williams, Charlotte Luscombe, Rebecca Jansen
Regrets: None
Meeting Called to order at 6:32 PM.

Minutes

Agenda Item: **Agenda Adoption** **Presenter:** Eve Dewald
Resolution: 22-04-01 **Seconder:**

THAT the Agenda for Heritage Advisory Committee Meeting 22-04 be adopted as presented.

Discussion: None.

Votes For: 5 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Conflict of Interest **Presenter:** Eve Dewald
Resolution: 22-04-02 **Seconder:** Charlotte Luscombe

None.

Agenda Item: Adoption of the Minutes **Presenter:** Eve Dewald
Resolution: 22-04-03 **Seconder:** Angharad Wenz

THAT the Minutes for HAC meeting 22-03 are accepted as amended.

Discussion:
Administration proposed the following amendments to HAC meeting #22-03 minutes for increased clarity:

- Remove the resolutions without content/discussion: 22-03-04, 22-03-08, 22-03-09.
- Insert a resolution statement for 22-03-10 to provide direction: "THAT the Heritage Advisory Committee PROVIDE ADVICE on the 'commercial and residential mixed use' definition amendment, as directed by Council".
- Provide clarity on email and phone correspondence (i.e clarify what was discussed at the meeting).

Votes For: 5 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from the Minutes **Presenter:** Eve Dewald
Resolution: 22-04-04 **Seconder:** Charlotte Luscombe

THAT the Heritage Advisory Committee accept administrative notes re: the 'Commercial and Residential Mixed Use' definition review as information

Discussion:
Administration provided clarity on Resolution #22-03-10 S. 'Correspondence':

- The residential facades mentioned (KDO apartments, and the Eliza building) that were claimed to be precedent setting are technically not for this proposed definition amendment, specifically because they were approved under different use classifications.

- The buildings were not approved under the 'commercial and residential mixed use' definition, rather the KDO Apartments were approved under the 'multi-unit residential' definition, as per the Zoning's permitted use, and the Eliza building was approved under the 'mixed use development' definition. Neither of these definitions specify where commercial and residential uses must be sited. Also, the Eliza building does not have a horizontal split between commercial and residential uses on the ground floor: the residential uses are above, and the commercial uses are below. This means that if they were approved using the 'Commercial and Residential Mixed Use' definition, they would still comply.

The HAC commented on Administration's clarification:

- A HAC member mentioned that historically buildings would feature a main entrance on the building's façade and would often feature additional, ornate entrances on either the left or right side of the building. These would typically be a utilitarian feature, used as service doors. These historic examples serve as an indication of what the streetscapes could practically look like, keeping in mind that side entrances are meant to be secondary to the main entrance.
- The HAC also commented that utilitarian side entrances are only practical when there is a pathway/side yard large enough to accommodate egress and ingress.
- A HAC member noted that residential uses in the commercial core would serve to liven the streetscape and would promote walkability.
- Administration clarified that the proposed 35% residential amendment originated at Council as a conversation starter. The number was drawn from an approximation of a third of the building being allocated as residential frontage. A HAC member posed the minimum permitted dwelling size (256sqft) as a potential barrier to promoting this in practice.

Votes For: 5 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: New Business **Presenter:** Eve Dewald
Resolution: 22-04-05 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee accept Information Report titled 'Proposed Zoning Bylaw Amendments – HAC Review' as information for discussion

Discussion:

Heritage Board Variance Process

- Administration clarified the intent of creating a process whereby Council or the Heritage Advisory Committee makes decisions on compliance concerns that arise through the development permitting process on registered historic structures. To promote the upkeep of heritage structures in town, a board decision process offers equitability and transparency being a public process. Administration recommends that the HAC be the decision-making body, given their mandate and area of expertise.
- The HAC accepted the information on the proposed HAC board decision process and agrees that it would be a beneficial process, and that their area of expertise provides them with potentially the best background to make up the decision board.
- A HAC member noted that the Registered historic sites Inventory should be made public to ensure equitability. It was also noted that making the Inventory public is in progress, however, is facing complications due to privacy and ownership concerns.

Proposed 2ft Building to Building Setback

- Administration requested any concerns that the HAC might have regarding the proposed amended non-dwelling to non-dwelling, and dwelling to non-dwelling building setbacks in the R1 and R2 zone, from 10ft to 2ft.
- A HAC member stated that there should be consideration and monitoring paid to the impact that snow load could have on adjacent buildings. There is a chance that snow could become a threat to the structural integrity of adjacent buildings.

- The HAC discussed snow as a potential threat to historic structures, however noted that the pros of this proposed amendment perhaps outweigh the cons. For example, the HAC stated that there is a benefit to the amendment, given that historic buildings were often crowded and built without setbacks (or with very small setbacks), meaning that the current 10ft setback makes many of them non-compliant. A 2ft setback between buildings aligns with historic siting of buildings and structures.
- Administration asked what the best setback might be to meet both of these goals. The HAC responded that the ideal setback depends on the roof overhang and what the impact of snow load would be, and suggested that a maintenance bylaw reflect this, instead of the ZBL.

Agenda Item: Adjournment **Presenter:** Eve Dewald
Resolution: 22-04-06 **Seconder:** Angharad Wenz

That Heritage Advisory Committee meeting HAC 22-04 be adjourned at 6:58 pm on February 17th, 2022.

Minutes accepted on: March 17 (Meeting #22-06)

Committee Minutes

THURSDAY MARCH 3rd 2021
19:00

Meeting Type: Regular **Meeting:** # HAC 22-05
Facilitators: Stephani McPhee, PDA
Attendees: Jim Williams (chair), Angharad Wenz, Megan Gamble
Regrets: Charlotte Luscombe, Eve Dewald, Rebecca Jansen
Meeting Called to order at 7:12 PM.

Minutes

Agenda Item: **Agenda Adoption**
Resolution: 22-05-01

THAT the Agenda for Heritage Advisory Committee Meeting 22-05 has been adopted as presented.

Discussion: None.

Votes For: 3 Votes Against: 0 Abstained: 0
CARRIED

Agenda Item: Conflict of Interest
Resolution: 22-05-02

Discussion: None.

Agenda Item: Committee of the Whole
Resolution: 22-05-03

THAT the Heritage Advisory Committee move into the Committee of the Whole.

Discussion: None
Votes For: 3 Votes Against: 0 Abstained: 0
CARRIED

Agenda Item: Delegations
Resolution: 22-05-04

Clarissa & Tyler – replacement of temporary staircase

Discussion:

- Clarissa and Tyler brought their application to replace the temporary set of construction stairs on the North face of their home, as they are nearing the end of their life cycle. The North side of the house is seen as the front, due to the orientation of their home.
- The staircase features a typical 1x3 spindle rail design
- The applicants faced issues with siting because the topography to the east is steep, leaving the North side as the only option for the stairs.
- Due to the required rise and run on the stairs, they cannot be replaced in their exact condition, which go straight out toward the road.
- The HAC asked whether the stairs are projecting toward the river. The applicant confirmed.
- The HAC confirmed that the design is heritage compliant.

- The applicants brought a second option (drawing 4) as a backup in case the vertical height of the stairs is too tight within the 12ft margin provided. If option 1 does not work, the landing at the bottom of the stairs will be added, as shown in drawing 4.
- HAC commented that the visual appeal of the landing is nice and preferable in drawing 4, however confirmed that both designs are compliant historically.
- The applicant clarified that since the timeline for construction is tight, option 2 adds more technicality and time to build, which is why option 1 is preferred at this time.

Agenda Item: Revert to Heritage Advisory Committee
Resolution: 22-05-05

THAT the Committee of the Whole revert to the Heritage Advisory Committee.

Discussion: None.

Votes For: 3 Votes Against: 0 Abstained: 0
CARRIED

Agenda Item: Applications
Resolution: 22-05-06

THAT the Heritage Advisory Committee APPROVE the staircase design for development permit application #22-011 as submitted.

Discussion:

- The HAC summarized the development: there will be a small landing at the top, the stairs will be straight run and pointed toward the river. Option 2 has a small 90-degree landing at the bottom of the staircase, but is otherwise the same as Option 1, which is the preferred option. The material use and scaling are appropriate to the Heritage Design Guidelines.

Votes For: 3 Votes Against: 0 Abstained: 0
CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-05-07 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to APPROVE the sandwich board sign design for development permit application #22-010 as submitted.

Discussion:

- The HAC clarified that there is a subtle difference between historic vs modern signage, and that the design proposed is slightly more modern than would typically be seen in historic Dawson. When tourists look at the facades of the commercial streetscape, the hope is that the design of signs and buildings will effectively "lull the viewer into the 19th century". The use of symbols is legitimate historically, however the spirit of this design is modern in comparison.
- Despite this, in the past this type of imagery has been permitted on signs.
- The lettering proposed is heritage compliant. The concept and layout are also compliant historically.

Votes For: 3 Votes Against: 0 Abstained: 0
CARRIED

Agenda Item: Adjournment **Presenter:** Angharad Wenz
Resolution: 22-05-08 **Seconder:** Jim Williams

That Heritage Advisory Committee meeting HAC 22-05 be adjourned at 7:38pm on March 3rd, 2022.

Minutes accepted on: March 17 (Meeting #22-06)

Committee Minutes

THURSDAY MARCH 17th 2021
19:00

Meeting Type: Regular **Meeting:** # HAC 22-06
Facilitators: Stephani McPhee, PDA
Attendees: Eve Dewald (chair), Angharad Wenz, Megan Gamble, Jim Williams.
Regrets: Charlotte Luscombe, Rebecca Jansen
Meeting Called to order at 7:09 PM.

Minutes

Agenda Item: **Agenda Adoption**
Resolution: 22-06-01

THAT the Agenda for Heritage Advisory Committee Meeting 22-06 has been adopted as presented.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Conflict of Interest
Resolution: n/a

Discussion: None.

Agenda Item: Committee of the Whole
Resolution: 22-06-02

THAT the Heritage Advisory Committee move into the Committee of the Whole.

Discussion: None
Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Delegations
Resolution: n/a

Lindsay Justin Baker – DP 22-002

Discussion:

- Lindsay of Aspire Custom Designs brought forward plans for 6 small homes located at lots 5,6,7, Block R, Ladue on behalf of LeFevre Housing Inc.
- The HAC commented that Dawson historically had many small homes, and many were very similar to what is shown in the plans provided.
- The HAC raised the point that in the Gold Rush Era, development would have occurred in a sporadic progression, which typically resulted in design with more variation in sizes and building siting. The HAC posed a request to the applicant re: whether it would be possible to provide more variation in the designs to mimic the natural progression of development that would have happened historically. The HAC provided two suggestions to remedy this concern:
  1. That the roof pitch be varied on a few of the homes. The applicant noted that the intention of the uniformity was to reduce costs, but it would not be an issue to change the roof pitch.
  2. That a couple of homes be a storey and a half – making the height of a few of the structures 12ft rather than 8ft (utilizing the upper half storey for a loft). The HAC stated that this would be beneficial to add

some variation to the streetscape. It would be ideal to have one of the 1.5 storey homes located on the corner lot, as corner lots historically featured buildings with grandeur.

- The HAC asked why parking was chosen in front of the homes, as opposed to the rear. The applicant stated that there is no access on the laneway, as it is closed.
- The HAC asked what cladding material would be used. The applicant responded that natural wood materials will be used on all four walls, featuring simple horizontal and vertical cladding that is informed by what is typically used in town historically. The roofing material will be corrugated metal and snow stops have also been added to the roofs.
- The HAC appreciates the variation of the facades, as the window and door layouts are slightly different on each home.
- The HAC provided insight to what types of windows are allowed in the Townsite, as the proposed plans indicate the use of awning windows. The three types of historically compliant windows are:
  1. Fixed
  2. Vertical sliding windows
  3. Casement windows (with cross hatching of mullions and muttons)
     - The HAC asked if the applicant would also be open to exploring their suggestion of incorporating different types of windows across the streetscape in efforts to play into the unique and varied facades.

Agenda Item: Delegations
Resolution: n/a

Evelyn Pollock – KDO 5Plex (pending application)

Discussion:

- Evelyn brought designs for the KDO 5plex for the Committee's review and comments, prior to submitting a formal application.
- The delegate clarified that they are yet to decide on a location. The HAC suggested that if they decide on a Commercial lot located in the Core that they consider having a commercial use in the front of the building, such as offices, to retain a cohesive commercial streetscape.
- The HAC asked for clarification on the doors on the bottom floor. The delegate responded that there is an alcove with doors on the 45-degree angle.
- The HAC commented that the orientation of the building on the lot is typical of historic building siting and that it would be great to set a benchmark like this for future development.
- The delegate mentioned that they are still in the process of finalizing the design and that the upper storey is currently shorter than planned (not stretched to the same extent horizontally as the lower storey). The HAC confirmed that there would not be an issue historically with the two stories being the same length. The HAC commented that they like the design and that it will be good for Dawson's housing inventory.
- The delegate asked if the building should be situated directly adjacent to the boardwalk/lot line, to which the HAC confirmed.
- Materials: The delegate noted that cove siding will be used, possibly except for in the rear of the building, and either double hung, sliding windows or casement windows will be used.

Agenda Item: Revert to Heritage Advisory Committee
Resolution: 22-06-03

THAT the Committee of the Whole revert to the Heritage Advisory Committee.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from Delegations

Resolution: n/a

Discussion: None

Agenda Item: Adoption of Meeting Minutes
Resolution: 22-06-04

THAT the Heritage Advisory Committee APPROVE the minutes from meeting #22-04 as presented.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Adoption of Meeting Minutes
Resolution: 22-06-05

THAT the Heritage Advisory Committee APPROVE the minutes from meeting #22-05 as presented.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from the Minutes
Resolution: n/a

Discussion: None.

Agenda Item: Applications
Resolution: 22-06-06

THAT the Heritage Advisory Committee ADVISE development permit #22-002 as submitted.

Discussion:

- The HAC proposed a few variations to the proposed design that would help add some variety to the streetscape, making the development pattern more characteristic of what would have occurred historically.
    - That a couple of the roof pitches be varied.
    - That a couple of the homes are made 1.5 storeys.
    - Window type should be one of the 3 permitted types: fixed, vertical sliding, casement windows with cross hatching of mullions and muttons.
    - Material: corrugated metal would be preferred over standing seam for a residential building.
- One of the lots is on the corner (would recommend that a house with slightly more grandeur than the rest be put on the corner). For example, one of the 1.5 storey homes proposed by the HAC could be located on the corner to make it seem slightly more imposing.
- The HAC commented that if possible, it would be ideal for parking access to be located in the rear.
- If parking is not possible in the rear, the streetscape design would possibly look better if every 2 driveways were side by side to provide some front yard space to be used more efficiently.
- The HAC asked whether it would be possible to bring the homes slightly closer to the front of the property almost in line with the 4plex. Ideally, they could be staggered very slightly for variety and to make the development pattern look more organic.
- The HAC would like to see revised designs.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-06-07 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to ADVISE development permit #21-123 as submitted.

Discussion:

- The HAC advised on the Youth Centre sign application in the delegate's absence and are open to further discussion if any clarification is needed.
- The HAC noted that perhaps a larger conversation re: TH's branding would be beneficial so that the Committee can be made aware on how to advise the design of TH sign permits in the future. The HAC wonders if the delegate is open to suggestions on how this branding can be implemented to reach a common ground in terms of design.
- The HAC noted that if the sign were made significantly larger, the massing and proportion of the sign relative to the façade would be improved.
- The HAC wonders if the delegate would be open to having this branding (logo and text) painted directly on the building, and whether they would consider changing the font to capital letters. If unwilling to consider these suggestions, the HAC suggests that they make the sign significantly larger and framing it with wood framing.
- The HAC wishes to see a mock-up of any potential changes prior to implementation.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: New Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Charlotte Luscombe

The Heritage Advisory Committee discussed the Municipal Historic Sites designation

Discussion:

- S.5.0.1d of the Heritage Bylaw states that HAC shall provide a list of proposed heritage related projects to Council. As per Council direction, a list of possible Municipal Historic Sites should be completed yearly. Administration is now requesting that the HAC compile a list of sites that are worth designating.
- The HAC stated that the buildings more at risk might be worth designating as a priority. Privately owned houses and buildings, rather than Parks and KVA buildings for example. The HAC mentioned that the truly historic buildings are the most vital to their endeavours, rather than the Dawson style buildings. The materials that make up the Town's heritage are critical.
- HAC member, Jim Williams has compiled a list of houses in town and commercial buildings that would be beneficial to be added to the Municipal Historic Sites designation. He will bring this list to the next scheduled meeting.

Agenda Item: New Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Charlotte Luscombe

THAT the Heritage Advisory Committee add the following to a list of required training items for the Committee.

1. Architectural description basics

Discussion:

- As per Council's direction from the joint HAC/Council meeting on February 17, 2022, Administration will be creating a proposal to provide to YG Heritage requesting an information session, based on a list of training priorities to be drafted by the HAC. Administration is now requesting that the Committee compile a list of training items that will be required for new and current HAC members.

- The HAC stated that it is unclear whether there is a program out there for Dawson's specific context. General skills might be useful to the Committee's general understanding of development; however, the truly useful training may not actually be available, given Dawson's unique context.
- The HAC discussed that it would be beneficial to have a historic architect (from Parks Canada, for example) come and give a few sessions about the structural nature of buildings behind their façade (both commercial and residential). The HAC noted that a holistic knowledge of construction makes it difficult to recognize historic anomalies at times. For example, sometimes buildings have all the right elements and historic features but can still look inherently wrong. The HAC hopes to be better equipped in the future to identify what makes a building work in this context and what does not.
- The expectation for heritage knowledge among Committee members should not be left to extracurricular learning, rather should be supported by tools and experts that may be available.
    - For example, ideally someone could come and have a class or workshop on the Parks Canada book: *The Standards & Guidelines for the Conservation of Historic Places in Canada*
- The HAC suggested a walking tour around Dawson to discuss and look at elements that make buildings historic, what elements of design are favourable over others, etc. A couple of these tours could be conducted with different themes, and they could possibly be made public through advertisement to the whole municipality.
- The HAC over time would like to compile a handbook of items to consider when people propose to develop in the Historic Townsite. This would include elements like siting, windows, doors, proportions, to possibly save applications from having to bring back numerous revisions to the committee.

Agenda Item: Unfinished Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Eve Dewald

3 Examples Policy Presentation

Discussion:

- As per Council's direction from the joint HAC/Council meeting on February 17, 2022, Administration brought forward a slideshow for the HAC's comments about the **perceived value** of the '3 examples policy'.
- The HAC stated that the 3 Examples Policy is valuable for the following reasons:
    - When the policy originated, an applicant had brought forward an application featuring horizontally sliding windows. The HAC had to explain that these were not used on historic facades. In some cases like this, an applicant can show 1 example of a phenomenon that is not a common feature and not representative of historic Dawson. The HAC has more confidence in saying a phenomenon is representative of historic Dawson when 3 examples of its existence can be proven. The value of the policy is to slow down strange photographic examples, therefore making it more of a tool for filtering contentious design, rather than a rule. The provision of 3 examples is not a requirement for every single application that comes forward, it is context dependent.
- To clarify, applicants are welcome to bring forward unique examples of a historic element and if it seems context appropriate, the HAC will accept it. Additionally, unique photos of developments are accepted for replication – noting that they must be located on the site where the development existed historically.

Agenda Item: Adjournment **Presenter:** Angharad Wenz
Resolution: 22-06-08 **Seconder:** Jim Williams

That Heritage Advisory Committee meeting HAC 22-06 be adjourned at 8:21pm on March 17th, 2022.

Minutes accepted on: April 21st (Meeting #22-07)

Committee Minutes

THURSDAY APRIL 21st 2021
19:00

Meeting Type: Regular **Meeting:** # HAC 22-07
Facilitators: Stephani McPhee, PDO
Attendees: Angharad Wenz (chair), Megan Gamble, Jim Williams, Rebecca Jansen
Regrets: Eve Dewald, Charlotte Luscombe
Meeting Called to order at 7:27 PM.

Minutes

Agenda Item: **Agenda Adoption**
Resolution: 22-07-01

THAT the Agenda for Heritage Advisory Committee Meeting 22-07 has been adopted as amended.

Discussion:

- Add to unfinished business that HAC is creating a letter for businesses re: neon signs.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Conflict of Interest
Resolution: n/a

Discussion: None.

Agenda Item: Committee of the Whole
Resolution: 22-07-02

THAT the Heritage Advisory Committee move into the Committee of the Whole.

Discussion: None
Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Delegations
Resolution: n/a

Nick Wozniewski – DP 22-003

Discussion:

- Nick brought forward photos of his home and addition which were constructed in 2008 for the HAC's review.
- The HAC commented that the house looks historically compliant: the trim and roof pitch look correct. The HAC appreciates that the former owner reasonably adhered to the heritage design guidelines at the time of construction.

Agenda Item: Delegations
Resolution: n/a

Aurora Knutson and Jen Kehoe – 22-020

Discussion:

- Aurora and Jen work with Tr'ondëk Hwëch'in education department, and regularly organize events for the students. For this project, the grade 8 students collaborated with local artists to design the mural in spirit of mental wellness. The class is proposing to erect this mural, which is temporary in nature (painted on plywood), inside of the Minto Skateboard Park.
- The HAC asked about the exact location of the sign in the skate park – the applicants confirmed that it will be located on the west side fence inside the park. The skatepark would not be blocked from street view.
- The HAC asked how long it would stay up, given that it is temporary (5 panels condensed with plywood).
- The HAC expressed their concern about weathering of the sign and asked for more information on how it would be protected. The applicant noted that it will hopefully be high enough to be out of reach of vandalism.
    - The applicant expressed that they are considering other ways of protecting the sign from weathering, including painting over it with shellac every year.
    - The HAC recommended purchasing special sign board, which can be purchased from Arctic Inland.
    - The HAC also recommended that the applicants incorporate a border (like a picture frame) around the sign to mitigate water getting into the sides and degrading the mural.
    - The applicant accepted the HACs advice and mentioned that after a year, if the mural is not doing well outside, they are considering putting it inside the school or Youth Centre to preserve it instead.
- The applicants noted that in the future, they would like to work with a Han language specialist to paint a quote on the white part of the mural. They also hope to add a small plaque saying that the grade 8s designed it.
- The HAC sees the mural as a beautiful addition to the skatepark.

Agenda Item: Delegations
Resolution: n/a

Bob Magnusson – DP 21-096

Discussion:

- Bob is the contractor designing and building the framing for the Front St. ferry landing digital sign. He brought forward two options for the HAC's review as the final proposed designs.
- The HAC discussed that the main difference between option 1 and option 2 is that option 1 has tapered legs whereas the legs on option 2 extend to the ground. The HAC confirmed that option 2 is the preferred option.
- The HAC asked why the sign is not situated inside of the frame, to which the delegate clarified that they are trying to achieve the functionality in the sign (to pivot and hinge the sign down so that they can manage and maintain it).

Agenda Item: Revert to Heritage Advisory Committee
Resolution: 22-07-03

THAT the Committee of the Whole revert to the Heritage Advisory Committee.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Adoption of Meeting Minutes
Resolution: 22-07-04

THAT the Heritage Advisory Committee APPROVE the minutes from meeting #22-06 as presented.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from the Minutes
Resolution: n/a

Discussion: None.

Agenda Item: Applications
Resolution: 22-07-05

THAT the Heritage Advisory Committee APPROVE development permit #22-003 as submitted.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-07-06 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to APPROVE development permit #22-020 as submitted.

Discussion:

- The HAC recommends speaking with Parks & Rec dept, as well as PW about maintenance and installation.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-07-07 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to TABLE development permit #21-116 amendments as submitted.

Discussion:

- The HAC would like clarification on whether the firewall must extend past the envelope of the building to satisfy building code requirements. In terms of streetscape, this wall does not look contextually appropriate. If it is a requirement, what is the material being used and does it need to extend so far out? Usually firewalls are built right in the building envelope so the HAC requests clarification on whether this wall is indeed a firewall.
- If the wall is indeed a requirement, the HAC recommends making it blend in to the streetscape to make it less stark looking. Capping, trim, or ornamental features could be added to the wall to possibly make it blend in better.
- The HAC also emphasized that high quality signage might distract pedestrians from the wall if it is necessary. High quality signage is a priority for this central location.
- Solar panels are also a new addition on the current plans, the HAC commented that you cannot see the panels from the street and they do not perceive any issues.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-07-08 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to APPROVE option 2 of development permit #21-096 as submitted.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: New Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Jim Williams

None.

Discussion: None

Agenda Item: Unfinished Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Jim Williams

Municipal Historic Sites Shortlist for designation

Discussion:

- HAC member Jim brought forward a list of houses that may be worth designation. On the list, the residences are categorized by perceived importance. The list has been provided to the Committee.
- A HAC member mentioned that private residences will need permission from their owner prior to initiating the designation process.
- HAC member Megan will determine the addresses of the proposed residences to inform a walking tour of the town.
- The HAC discussed Administration's proposed action plan:
  1. allocate a walking tour to looking at the homes in this list (given the length of the list, it may be beneficial to choose one from each tier)
  2. rank them in order of priority to least priority
  3. this list can inform what residences should be designated over time.

Agenda Item: Unfinished Business **Presenter:** Angharad Wenz
Resolution: 22-07-09 **Seconder:** Jim Williams

Neon signage

Discussion:

- HAC is writing a letter to discourage neon signage

Agenda Item: Adjournment **Presenter:** Angharad Wenz
Resolution: 22-07-10 **Seconder:** Jim Williams

That Heritage Advisory Committee meeting HAC 22-07 be adjourned at 8:34pm on April 21st, 2022.

Minutes accepted on: May 5th, 2022 (Meeting #22-08)

Committee Minutes

THURSDAY MAY 5TH 2021
19:00

Meeting Type: Regular **Meeting:** # HAC 22-08
Facilitators: Stephani McPhee, PDO
Attendees: Angharad Wenz, Eve Dewald (chair), Charlotte Luscombe, Jim Williams, Megan Gamble
Regrets: Rebecca Jansen
Meeting Called to order at 7:04 PM.

Minutes

Agenda Item: **Agenda Adoption**
Resolution: 22-08-01

THAT the Agenda for Heritage Advisory Committee Meeting 22-08 has been adopted as amended.

Discussion:

- Tracy and Marcel unable to attend – however would still like their applications reviewed in the 'applications' portion.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Conflict of Interest
Resolution: n/a

Discussion: None.

Agenda Item: Committee of the Whole
Resolution: 22-08-02

THAT the Heritage Advisory Committee move into the Committee of the Whole.

Discussion: None
Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Delegations
Resolution: n/a

21-116 Danielle Clemmensen

Discussion:

- The delegate brought amended plans, which remove the wall adjacent the Trading Post. This was a mistake made by the architect.
- The signage from the last plans will be retained. Signage was amended for the current plans due to a miscommunication re: the meeting minutes from meeting #22-07.
- The HAC commented that this is turning into a nice-looking project and is relieved about the wall being removed.

Agenda Item: Delegations
Resolution: n/a

22-019 Ueli Kunzi & Jared Klok

Discussion:

- Ueli and Jared brought forward plans for the 3rd single detached dwelling proposed for the lot adjacent to the Bunkhouse. The dwelling in question will face Front St. although a grade difference between the lot and the road is significant. The location of the dwelling is at a lower grade than the street.
- The HAC asked some questions about the plans – specifically they confirmed that the cladding will be tin.
- The Committee raised concern about the symmetry of the façade facing Front St. Notably, windows only exist on one side of the door, which is not typical of historic design. Ideally there would be symmetry on both sides of the door if possible.
    - A HAC member commented that since the home is at a lower grade than Front St., mostly the top of the windows would be visible from the street.
    - To remedy this concern, the HAC suggested that one window be removed from the North side and be added to the opposite side of the door (in the bedroom).
    - The HAC provided another suggestion to put similarly sized window widths on the opposite side of the door than is being proposed now, however with minimized vertical measurements, situated at the higher extent to match the opposite side. This would provide the rhythm required by the Heritage Guidelines without sacrificing privacy. The HAC would like to see this in a drawing for the next meeting.
    - The delegate wondered if this were a strict requirement, as they have seen historic photos of asymmetry. The HAC responded that balance is an important component as per the Heritage design guidelines. Asymmetry is spoken about in the guidelines but usually not as a favourable component to replicate. Given that the development is in such an integral downtown location, design should be as historically accurate as possible.
        - As an example of where sometimes asymmetry existed: sometimes in the commercial zone, doors were not set in the centre of a building – offset side doors existed as functional entrances.
- The delegate confirmed that they will provide 2 options following the HAC's suggestions for the next meeting.
- The HAC commented that most commercial buildings in Dawson were taller and narrow and that the building is slightly short for the façade, however that it complements the other buildings on the lot. The delegate commented that there will be an extra 2ft or so below the building of foundation which will make it slightly taller.
- The delegate gave context that the planking will be stained darker with lighter trim around it for the band on top (flat stock horizontal, shiplap or cove siding will be used for the whole façade material but will be painted on top to differentiate). The HAC commented that milled material will be ideal rather than the cove siding for the façade material. The HAC confirmed some details with the delegate: that the corners are wider (1x6), interiors 1x4, and that one band will exist across the top.

Agenda Item: Delegations
Resolution: n/a

22-026 Troy Suzuki

Discussion:

- The delegate brought plans for a new house build, which will have dimensions of 30x32 on a single storey located in the North End.
- The HAC asked about exterior – the delegate responded that it will be board and batten.
- The HAC asked if the roof will be made of corrugated metal, and whether it is a circular vent at the gable end. The delegate responded yes to both.
- The HAC asked how high the house will be off of the lot grade? The delegate responded that he intends to keep it as low as possible, approximately 16 inches to 8-inch blocks.
- The HAC asked about the pitch on the roof, to which the delegate responded it will be 7x12.

- The HAC asked if there will be a soffit, or if it will be open. The delegate responded that there will be open rafter tails.
- The HAC asked for details on the windows. The delegate responded that the windows facing the street will be opening casement windows, which will have a mullion in the center.

Agenda Item: Delegations
Resolution: n/a

22-027 Brodie Klemm – personal deck

Discussion:

- The HAC was impressed to see the house, looks good.
- The delegate clarifid that the spindles will replicate a typical Dawson deck, it will be situated to the right side of the arctic entrance.
- The deck will not be covered.
- The HAC is satisfied with the details of the plans – the vertical spindles suspended between two railings are typical historically.

Agenda Item: Delegations
Resolution: n/a

Brodie Klemm – CBC building summary

Discussion:

- Brodie brought forward some details for the HAC's awareness, re: Council decisions. Council wants to sprinkler the building to avoid the need for an emergency stair, this has left 2 options.
- If removal of the vault is too cost prohibitive, Council will choose option 4. Otherwise, option 3 is the preferred option.
- The HAC asked whether the vault has heritage value in itself. The delegate stated that they need to check in on this. Rebecca took note when HAC formerly talked about removing the vault – they are awaiting insight from her.
- The delegate noted that the vault takes up 12.5% of main floor, which is valuable space. And the annual cost of having an outdoor elevator does not necessarily make sense. The removal of the vault is preferred (option 3), leaving a single staircase on the North elevation. This is exactly what the HAC wants to see.
- The HAC expressed their opinion that the top floor should not be entirely used for Council chambers – rather should be used for meeting booking space or much needed offices. Having a variety of uses for the space makes sense to avoid the building sitting vacant.
- The delegate informed the HAC that they will soon be considering window options and hope to have some mock up windows put in this year if possible. Some options from vintage woodworks have been provided to the HAC, which feature some trade-offs between energy efficiency and heritage replication. The delegate stated that if it is going to be a year-round building the windows must be winter proofed. Storm windows are an option.
- The delegate requested some input from the HAC on window options. The architect does not like the coating over some modern windows due to reflectivity, etc. The HAC made a few comments about window types:
    - Triple seal windows will have to be put in with a machine, they are huge and heavy.
    - To keep the windows roughly historic, their proportions could probably handle triple glazed.
    - The delegate said they would either be double or triple pane or storm windows; however, it is unclear at this stage. Historically storm windows did not exist on the building, rather they were an add on later.
    - For the 2022 window mock-up, the delegate is thinking of putting corbels on them. The HAC confirmed that white tin is historic, gold/yellow tin was done later in the 50s/60s.

Agenda Item: Revert to Heritage Advisory Committee
Resolution: 22-08-03

THAT the Committee of the Whole revert to the Heritage Advisory Committee.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Adoption of Meeting Minutes
Resolution: 22-08-04

THAT the Heritage Advisory Committee APPROVE the minutes from meeting #22-07 as amended.

Discussion:

- Neither Eve or Charlotte were present at the last meeting, and therefore did not second anything.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Business Arising from the Minutes
Resolution: n/a

Discussion: None.

Agenda Item: Applications
Resolution: 22-08-05

THAT the Heritage Advisory Committee APPROVE development permit #22-002 as submitted.

Discussion:

- The banner should be as close to canvas as possible.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-08-06 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to ADVISE development permit #22-024 as submitted.

Discussion:

- The HAC likes the idea of adding a greenhouse to the Little Blue Daycare lot and encourages the applicant to do so, however would like to see a structure that more closely aligns with the Heritage Design Guidelines.
- The HAC commented that the proposed shape is unconventional historically, and that they typically discourage the use of plastic. The HAC recommends a shed roof or gable roof and regular glass windows on the walls if possible, so when you look at the building it looks historic. The HAC recommends the proportions of a miniature house using more of a grid pattern on the walls.
- The HAC advises that the applicant thinks about the development in more of a permanent context, and that they choose the placement of the structure well on the lot.
- The property in question and its neighboring properties are historically sensitive, therefore it is important that the structure blends in with the surrounding historic character. The HAC concluded that the greenhouse does not comply with heritage design guidelines.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-08-07 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to APPROVE development permit #21-116 on the condition that the signage in the last design package be retained.

Discussion: None.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Eve Dewald
Resolution: 22-08-08 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to APPROVE development permit #22-026 as submitted.

Discussion: None.
Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Eve Dewald
Resolution: 22-08-09 **Seconder:** Angharad Wenz

THAT the Heritage Advisory Committee move to APPROVE development permit #22-027 as submitted.

Discussion: None.
Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Angharad Wenz
Resolution: 22-08-10 **Seconder:** Charlotte Luscombe

THAT the Heritage Advisory Committee move to ADVISE development permit #22-019.

Discussion:

- The square windows on side and back are not historic.
- The HAC would like to see amended designs reflecting the options discussed with the delegate.
- What about if symmetrical windows are put in but they're actually fake, an illusion? Blank windows – with symmetry on both sides of the door.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: Applications **Presenter:** Eve Dewald
Resolution: 22-08-11 **Seconder:** Jim Williams

THAT the Heritage Advisory Committee move to recommend the two heritage incentives #22-016 and #22-023 to Council for full approval of $5,000 each.

Votes For: 4 Votes Against: 0 Abstained: 0 CARRIED

Agenda Item: New Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Charlotte Luscombe

Discussion: None

Agenda Item: Unfinished Business **Presenter:** Angharad Wenz
Resolution: n/a **Seconder:** Eve Dewald

Neon sign letters

Discussion:

- The HAC was hoping to send these letters out, however the Chamber of Commerce is not operational. They are looking into other ways of sending the letter to business owners.

Agenda Item: Adjournment **Presenter:** Angharad Wenz
Resolution: 22-08-12 **Seconder:** Jim Williams

That Heritage Advisory Committee meeting HAC 22-08 be adjourned at 8:23pm on May 5, 2022.

Minutes accepted on: May 19, 2022 (meeting #22-09)

City of Dawson,
PO Box 308
Dawson City, YT Y0B 1G0

April 25, 2022

Dear Mayor William Kendrick,

The Canadian Wildlife Service at Environment and Climate Change Canada is interested in collaborating with you to ensure the conservation of migratory birds - an important component of Canada's biodiversity.

Canada hosts more than 450 species of migratory birds over the course of a year. Some of these birds — ducks, geese, loons, songbirds — are among the most familiar landmarks of the Canadian landscape, and are part of the cultural and spiritual experience of many Canadians. The *Migratory Birds Convention Act, 1994* (MBCA) and its regulations protect migratory birds and prohibit the disturbance or destruction of migratory bird nests and eggs on all lands and waters in Canada. Unfortunately, many activities associated with the construction or maintenance of residential, municipal, commercial, transportation and quarry infrastructure can lead to the inadvertent disturbance or destruction of migratory bird nests and eggs, and can have long-term consequences to migratory bird populations in Canada.

Advance planning can help you comply with the law and reduce potential negative consequences of your projects to migratory birds. We recommend that you:

1. Know your legal obligations (see Annex);
2. Prevent harm by not engaging in potentially destructive or disruptive activities at key sensitive times and key locations;
3. Implement appropriate mitigation measures that minimize the risk of incidental take of migratory birds, nests and eggs; and,
4. Inform all field operations staff of the selected avoidance and mitigation measures and provide appropriate advice/training on how to implement these measures.

The enclosed brochures provide additional information about avoiding harm to migratory birds. Please visit Environment and Climate Change Canada's website for more complete information.

https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds.html

It would be our pleasure to assist you with advice about risk reduction options for your specific situation. Please do not hesitate to contact Pam Sinclair at (867) 222-1622 or cwsnorth-scfnord@ec.gc.ca.

Sincerely,

Georgina Williston

Georgina Williston
Head, Environmental Assessment, IM/DM and Issues Management
Canadian Wildlife Service, Northern Region
Environment and Climate Change Canada

Annex

Migratory Birds Regulations
General Prohibitions

6. Subject to subsection 5(9), no person shall
   (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, or
   (b) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit therefor.

Migratory Birds Convention Act
Offences and Punishment
Offence - persons

13 (1) Every person commits an offence who
   (a) contravenes section 5, subsection 5.1(1) or (2), paragraph 5.2(a), (c) or (d), subsection 5.3(1), 8.1(6), or 11.24(1);
   (b) knowingly contravenes paragraph 5.2(b);
   (c) contravenes any provision of the regulations designated by regulations made under paragraph 12(1)(l);
   (d) contravenes an order made under subsection 8.1(1) or (2); or
   (e) contravenes an order made by a court under this Act.

Penalty — individuals

(2) Every individual who commits an offence under subsection (1) is liable,
   (a) on conviction on indictment,
      (i) for a first offence, to a fine of not less than $15,000 and not more than $1,000,000 or to imprisonment for a term of not more than three years, or to both, and
      (ii) for a second or subsequent offence, to a fine of not less than $30,000 and not more than $2,000,000 or to imprisonment for a term of not more than three years, or to both; or
   (b) on summary conviction,
      (i) for a first offence, to a fine of not less than $5,000 and not more than $300,000 or to imprisonment for a term of not more than six months, or to both, and
      (ii) for a second or subsequent offence, to a fine of not less than $10,000 and not more than $600,000 or to imprisonment for a term of not more than six months, or to both.

Penalty — other persons

(3) Every person, other than an individual or a corporation referred to in subsection (4), that commits an offence under subsection (1) is liable,
   (a) on conviction on indictment,
      (i) for a first offence, to a fine of not less than $500,000 and not more than $6,000,000, and
      (ii) for a second or subsequent offence, to a fine of not less than $1,000,000 and not more than $12,000,000; or
   (b) on summary conviction,
      (i) for a first offence, to a fine of not less than $100,000 and not more than $4,000,000, and
      (ii) for a second or subsequent offence, to a fine of not less than $200,000 and not more than $8,000,000.

Cliff Swallow

The Cliff Swallow is a common insect-eating bird that is found across North America.

It makes an oven-shaped nest out of hundreds of little balls of mud, which the birds carry one-by-one to the nest site. This acrobatic and adaptable bird nests on bridges and buildings, as well as on cliffs. They will also use artificial nest structures.

In Canada, populations are declining, possibly due to declines in insect populations.

Here's what you can do to help the Cliff Swallow:

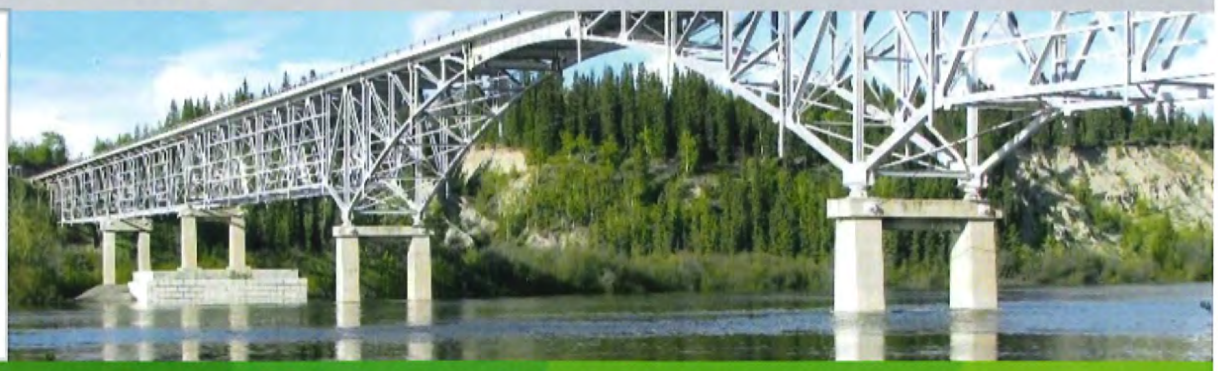
Never disturb or destroy a nest during the nesting season

Provide an alternative nest structure (see over)

Help protect rivers and wetlands

For more information and building plans contact:

Canadian Wildlife Service,
Northern Region
cwsnorth-scfnord@ec.gc.ca



Environment and Climate Change Canada
Environnement et Changement climatique Canada
Canada

Provide Nesting Habitat

Cliff Swallows readily adapt to artificial nesting structures; they need:

- **Shelter from rain**
- **A rough surface (vertical/horizontal) to attach their nest**
- **A source of mud**
- **Safety from ground predators**

Building plans are available from Canadian Wildlife Service, Northern Region: cwsnorth-scfnord@ec.gc.ca

Environment and Climate Change Canada | Environnement et Changement climatique Canada | Canada

Vegetation clearing

Consider birds before you clear

Environment and Climate Change Canada
Environnement et Changement climatique Canada
Canada

The issue

Clearing vegetation between May and August can have a negative impact on nesting migratory birds, and may contravene the *Migratory Birds Convention Act.*

Under the *Migratory Birds Convention Act (1994)*, it is an offence to damage, destroy, remove or disturb the nest of a migratory bird in Canada.

We sometimes need to clear vegetation, such as trees and shrubs, in order to create space for activities and structures, to increase visibility along roads, or to support emergency planning (e.g. firesmarting). However, clearing vegetation during the nesting season (between May and August) can have a negative effect on nesting birds. Nests are often very difficult to see, so you may not know they are there.

Did you know?

Birds may build their nests on the ground, in shrubs, and in trees. Bird nests can be extremely hard to detect, and are easily missed.

What now?

We can do our part and help birds by working together and planning our projects well.

1. **Plan** vegetation clearing for outside the migratory bird nesting period in our area
2. **Assess** risks to migratory birds and develop measures to minimize risks
3. **Understand** the *Migratory Birds Convention Act 1994*
4. **Visit** the "Avoiding Harm to Migratory Birds" page at Canada.ca for resources, including:
   - General Nesting Periods for Migratory Birds in Canada
   - Guidelines to reduce risk to Migratory Birds
   - Beneficial Management Practices for Reducing Risk to Migratory Birds

Birds Matter

Migratory birds hold high cultural, spiritual, economic, ecological and aesthetic value.

Birds:

- Generate tourism
- Have cultural significance
- Provide insect and pest control
- Feed some communities
- Get people outdoors, improving fitness and mental health
- Help connect us with nature

For more information, contact:

Canadian Wildlife Service, Northern Region

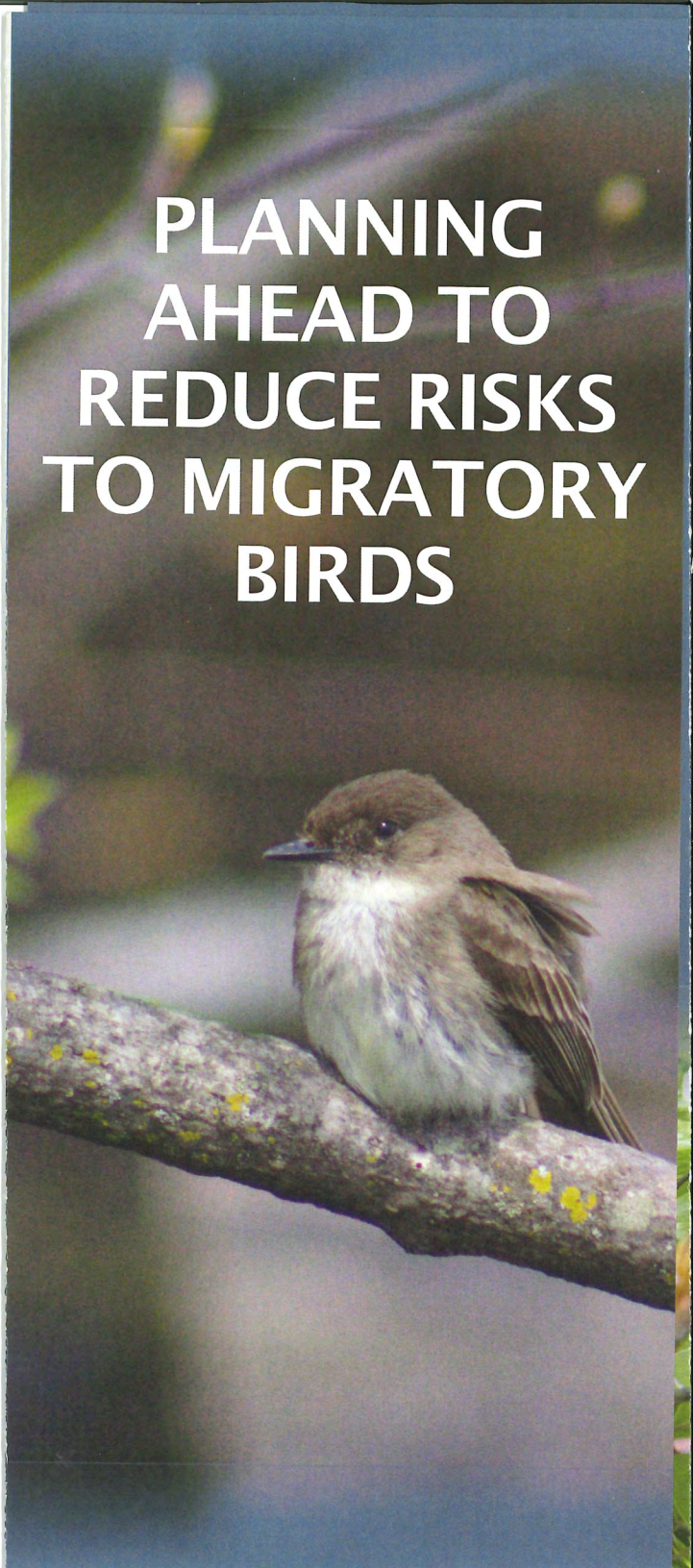
cwsnorth-scfnord@ec.gc.ca

Please visit "Avoiding Harm to Migratory Birds" at: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/

CANADIAN WILDLIFE SERVICE • SERVICE CANADIEN DE LA FAUNE •

Photographs:
Cover: Chipping Sparrow nestlings © Shyloh van Delft
2: Hermit Thrush nest with eggs © Shyloh van Delft
3: Hermit Thrush in nest © Shyloh van Delft
4: Canada Warbler on nest © Cameron Eckert
5: American Robin fledgling © Pam Sinclair
6: White-crowned Sparrow © Shyloh van Delft.
Backgrounds: Chipping Sparrow nest with eggs; Duck nest with eggs © Shyloh van Delft

PLANNING AHEAD TO REDUCE RISKS TO MIGRATORY BIRDS



WHY IS IT IMPORTANT TO PROTECT MIGRATORY BIRD NESTS?

Migratory birds play important roles in our environment — they contribute to environmental quality by protecting agricultural and forest products from pests, and promote the health and diversity of ecosystems through pollination and seed dispersion.

Unfortunately, migratory birds, their nests or eggs can be harmed by many routine activities undertaken on the land or in the water — such as clearing trees and other vegetation, draining ponds or marshes, and routine construction, maintenance and demolition activities.

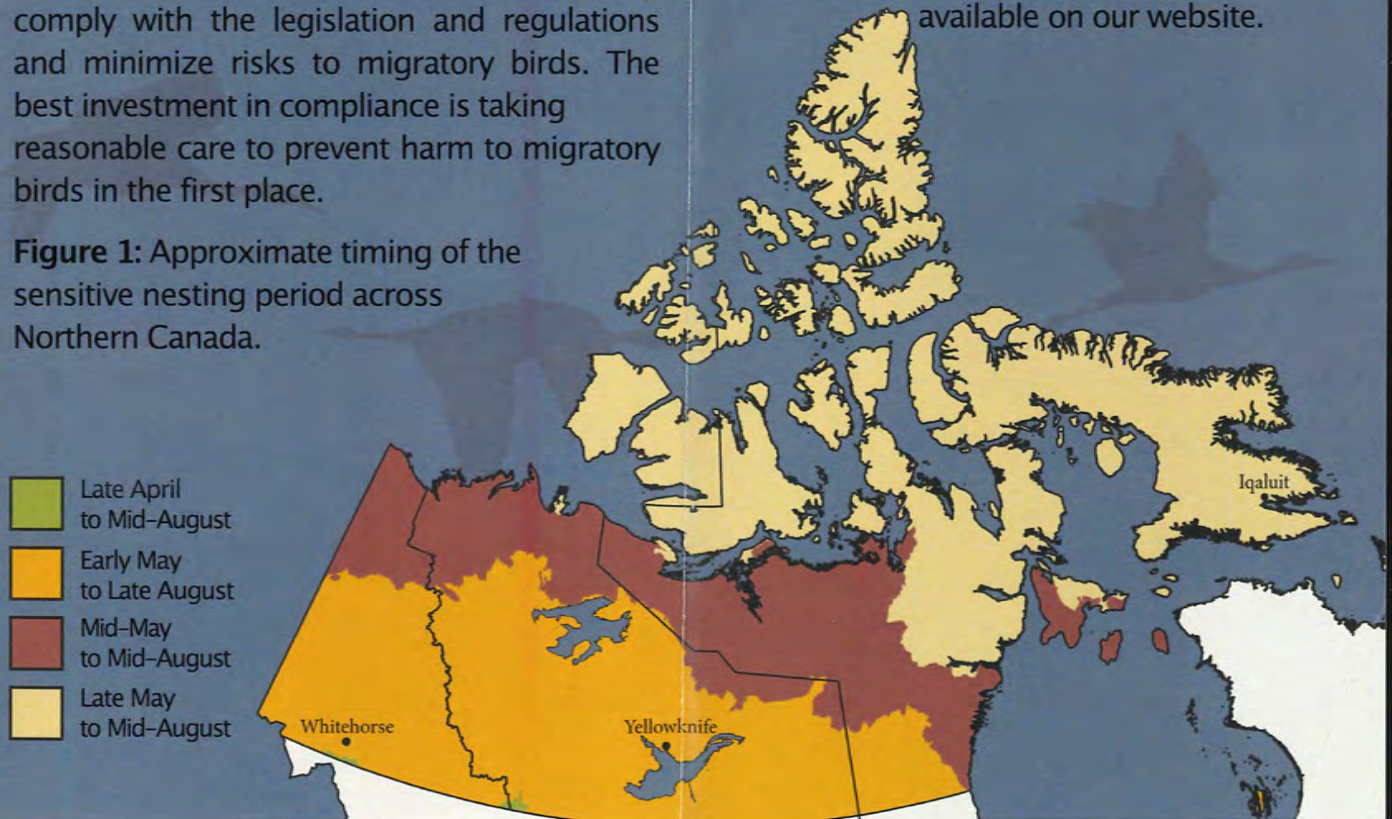
Harm includes killing, disturbing or destroying migratory birds, nests or eggs, and can have long-term negative effects on migratory bird populations in Canada. This is especially true if there are many incidents that harm birds.

WHAT IS THE LAW?

The Migratory Birds Convention Act, 1994 and its regulations protect migratory birds and prohibit the disturbance or destruction of migratory bird nests and eggs in Canada.The legislation and regulations apply to all lands and waters in Canada,regardless of ownership.

Individuals or companies working on the land or in the water are responsible for taking appropriate measures to ensure that they comply with the legislation and regulations and minimize risks to migratory birds. The best investment in compliance is taking reasonable care to prevent harm to migratory birds in the first place.

Figure 1: Approximate timing of the sensitive nesting period across Northern Canada.



HOW DO I KNOW IF MIGRATORY BIRDS ARE NESTING IN THE AREA?

You should plan to avoid engaging in potentially destructive or disruptive activities during the sensitive nesting period, which varies by region and by species (Figure 1).

If you need to determine whether migratory birds are nesting in an area at a particular time, consider using non-intrusive monitoring methods inorder to prevent disturbing-migratory birds while they maybe nesting. More detailed information related to determining the presence of nests, timing of nesting and risk factors to consider is available on our website.

WHAT SHOULD I DO IF I FIND A MIGRATORY BIRD'S NEST?

If nests containing eggs or young of migratory birds are located or discovered during operations, all disruptive activities in the nesting area should be halted until nesting is completed. Any nest found should be protected with a buffer zone determined by a set back distance appropriate to the species, the intensity of disturbance and the surrounding habitat until the young have naturally and permanently left the vicinity of the nest. Regional information about buffer zones and set back distances is available from our local offices.

If there are migratory bird nests where you plan to work, consider options like avoiding, adapting, rescheduling or relocating activities that could disturb or destroy the nests.

WHERE CAN I GET MORE INFORMATION?

For more information on avoiding harm and reducing the risks to migratory birds and their nests, please visit Environment and Climate Change Canada's website or contact the local Canadian Wildlife Service office near you.

https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/guidelines.html

Canadian Wildlife Service's Northern Region offices:

Canadian Wildlife Service
91780 Alaska Highway
Whitehorse YT Y1A 5X7
Phone: 867-667-3931

Canadian Wildlife Service
5019-52 Street
P.O. Box 2310
Yellowknife NT X1A 2P7
Phone: 867-669-4766

Canadian Wildlife Service
301-933 Mivvik St.
P.O. Box 1870
Iqaluit NU X0A 0H0
Phone: 867-979-7055

Canadian Wildlife Service Northern Region general email
cwsnorth-scfnord@ec.gc.ca

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Environment and Climate Change Canada | Environnement et Changement climatique Canada

BANK SWALLOW

(Riparia riparia)

in sandpits and quarries

Canada

Did you know?

The Bank Swallow is a declining migratory bird species that has lost 98% of its Canadian population over the last 40 years. The Bank Swallow is listed on Schedule 1 of the Species at Risk Act as Threatened.

This insectivorous bird is particularly drawn to sandpits, quarries, stock piles of sand and soil, and sandy banks along water bodies and roads. **Bank Swallows generally dig their burrows in near-vertical banks (slopes of at least 70 degrees) that are more than 2 metres high.** Bank Swallows typically use their nesting sites from mid-April to late August. This is the sensitive period during which the risk of harming the birds is especially high. The absence of the birds in August is a good indicator that the breeding season is over.

The best way to minimize the possibility of contravening the *Species at Risk Act and the Migratory Birds Convention Act*, 1994 is to fully understand the impact that your activities could have on Bank Swallows and to take reasonable precautions and appropriate avoidance measures. In fact, under these Acts, it is an offence for anyone to kill, harm, harass or capture an individual or to damage, destroy, remove or disturb its nest or eggs or residence without a permit.

The sand and gravel industry can play a major role in the conservation of Bank Swallows by adopting operating practices that do not harm the species.

Where can I get more information?

For more information on avoiding harm or reducing the risks to migratory birds and their nests, please visit Environment Climate Change Canada's website https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/ or contact Canadian Wildlife Service at cwsnorth-scfnord@ec.gc.ca

What you can do

Before the breeding season
(generally before mid-April)

- Prevent Bank Swallows from nesting in areas where operations will be carried out during the breeding season by contouring your piles to have a slope of less than 70 degrees and by creating suitable nesting habitat in inactive areas with vertical faces of at least 70 degrees.
- Install scaring devices to deter Bank Swallows from establishing colonies in active areas.

During the breeding season
(generally from mid-April to late August)

- Avoid intense activity near the colony. You can prevent disturbance by marking off a protective buffer zone around the colony and notifying all employees of its existence.
- Generally speaking, there is a particularly high risk of disturbing nesting when noisy activities or vibrations occur within 50 metres of the bird colony. This protective radius is only a rough guideline and must be adjusted after an assessment of the risk factors. In some cases, where operating activities are intense, a larger protective radius may be needed to minimize the risk of disturbance.
- Spend a few minutes flattening vertical faces in active areas at the end of the day to prevent Bank Swallows from digging burrows in them overnight or on weekends.
- Stop excavation work if Bank Swallows colonize a bank in an active area. Activities cannot resume until the birds leave at the end of the breeding period.
- Do not use scaring devices once the colony is established as they may interfere with ongoing Bank Swallow breeding activities.

After the breeding season
(generally after late August)

- If a nesting site needs to be excavated after the birds leave, compensate by providing an alternate site that can support nesting in the following year. To be suitable for nesting, the bank must have a slope of at least 70 degrees.

Notify your employees of the restrictions and techniques that can be implemented to prevent detrimental effects on the species.

Thank you for participating in the conservation of Bank Swallows.

Executive Assistant

From: Bill Kendrick
Sent: April 27, 2022 12:03 PM
To: Executive Assistant; CAO Dawson
Subject: Fw: Ramesh Ferris & Incoming President of Rotary International requests engagement with Dawson Mayor and Council

Please add this our next council meeting correspondence.

Bill K

From: Ramesh END-POLIO Ferris <rameshferris@gmail.com>
Sent: April 26, 2022 10:07 PM
To: Bill Kendrick; Elizabeth Archbold; Alexander Somerville; Patrik Pikalek; brenann.lister@cityofdawson.ca
Subject: Ramesh Ferris & Incoming President of Rotary International requests engagement with Dawson Mayor and Council

Hi Everyone, I hope all is well

I'm writing in my capacity as President of the Whitehorse Rendezvous Rotary Club.

The incoming president of Rotary International Jennifer Jones will be coming to the Yukon prior to her starting her term as Rotary President (July 1st). Jennifer is the first female President in the history of RI and she is from Ontario. The President of RI represents 1.3 million active Rotary members worldwide. This trip to the Yukon is part of a quick cross Canada tour prior to the start of her term.

Jennifer, her entourage of 8 other people (some other leaders with Rotary International, and some of her family members), along with my wife Dagmar and I will be arriving in Dawson on the Air North Flight around 5:25pm on Friday June 17.

The purpose of this visit is to get a better understanding of the north, how Rotary has impacted the community, promote Rotary's work as a volunteer service organization, meet community leaders and members in hopes to gain new partnerships for future community service projects. AS well it would be great if we could help educate them on the Klondike Gold Rush, and some of Dawson's most notable areas to visit.

My hope is that we can arrange an opportunity for the Mayor and council to meet with us on the evening of June 17 or sometime during the day on June 18. It would be great to get some photos at City Hall, and potentially raise the Rotary Flag (if possible). We will be sharing our experiences and engagements on social media which will have a potentially large reach.

June 19 we are on the Air North flight from Dawson to Inuvik where we will have a tour of Tuktoyaktuk, and Herschel Island.

If you have any ideas on how we can make Jennifer and her entourage feel warmly welcome in Dawson and make the visit extra special please let me know.

Can you please get back to me so we can discuss further the possibilities mentioned above.

If you also have any questions please let me know.

Thanks so much,

Ramesh Ferris
Rotarian * Global Citizen * Polio Survivor
867-687-2247
"Live as if you were to die tomorrow. Learn as if you were to live forever."
-Mahatma Gandhi

RCMP·GRC
ROYAL CANADIAN MOUNTED POLICE • GENDARMERIE ROYALE DU CANADA

MONTHLY POLICING REPORT April 2022

Dawson City RCMP Detachment "M" Division Yukon

The Dawson City RCMP Detachment responded to a total of 72 calls for service during the month of April, 2022.

OCCURENCES	April, 2022	Year to Date 2022	April, 2021	Year to date 2021	Year Total 2021
Assaults (all categories)	2	27	2	21	67
Sexual Assault	0	5	1	5	13
Break and Enter	2	6	0	6	15
Thefts (all categories)	0	6	2	12	46
Drugs (all categories)	0	1	2	8	28
Cause a Disturbance	1	16	7	22	90
Mischief	17	47	16	42	145
Impaired Driving	2	5	3	9	49
Vehicle Collisions	2	15	2	15	54
Mental Health Act	7	33	3	18	35
Assistance to General Public	2	13	1	15	66
Search and Rescue	0	1(Land)	0	1(Land)	3
Missing Persons	1	4	0	5	13
Wellbeing Checks	2	15	6	18	63
Check Stops (represents the actual number of check stops	0	2	0	0	4
Other Calls for Service	34	231	101	287	1224
Total Calls for Service	72	427	146	484	1915
Criminal Code Charges / (CDSA)	10	25	1	34	151 CC 3 CDSA
Liquor Act/MVA/CEMA Charges/Cannabis Act (Can Act)/Campground Act (Camp. Act)		1 MVA	1 Liquor Act 1 CEMA 2 MVA	3 MVA 1 CEMA 1 Liquor Act	8 CEMA 6 LA 36 MVA 1 CAN. ACT 1 Camp. Act

PLEASE NOTE: The statistic numbers in the report may change monthly as file scoring is added, deleted or changed. This occurs as investigations develops resulting in additional charges or proving an incident to be unfounded. Numbers as at/corrected to 2022.04.31

	April, 2022	Year to Date 2022 Total	April, 2021	Year Total 2021
Prisoners held locally	5	18	6	65
Prisoners remanded	0	0	0	8
Total Prisoners	5	18	6	65

Justice Reports	April, 2022	Year to Date 2022	April, 2021	Year Total 2021
Victim Services Referrals Offered	4	29	7	94
Youth Diversions	0	0	0	3
Adult Diversions	0	0	0	2
Restorative Justice Total	0	0	1	5

Annual Performance Plan (A.P.P.'S) Community Priorities

Community approved priorities are:

(1) Road Safety
(2) Substance Abuse
(3) Youth Initiatives
(4) Attendance at THFN and Community Events
(5) Restorative Justice

(1) Road Safety

With spring in full swing, patrols have increased around the area of Robert Service School. Patrols have increased as more students tend to be spending time outside after school on bikes and at the playground with an increased risk of running into the roadway.

With the warmer weather there has also been an increase in the use of quads and other ATV's on the roadways in Dawson City. Members of the RCMP have stopped and spoken the operators of these vehicles to explain the highway traffic act and the rules around operating an ATV around town compared to its use on a highway.

(2) Substance Abuse

Members of the Dawson City RCMP have been actively conducting foot patrols of the downtown area and along the water front educating members of the public about the liquor act and public consumption of alcohol. Members have continued to conduct patrols of Dawson City in the early morning hours and provided patrons with a ride home to prevent impaired driving.

(3) Youth Initiatives

Cst TOWER started the Top Cop Reading program at the Robert Service School with kindergarten to grade 4. The Top Cop Reading Program is a 30 day reading challenge to encourage students to read or be read to for 30 minutes a day outside of the classroom. At the end of the 30 days students with take part in an obstacle course that simulates the RCMP physical requirements and prizes will be awarded to all students that took part.

(4) Attendance at THFN and Community Events

Members of the Dawson City RCMP were very active participating in weekly meetings with various agencies in preparation for the Yukon and Klondike River's to break up as there was an increased risk of flooding. Cpl GRANT assisted with plans and engaging with EMO to gather supplies to address the potential of flooding in Dawson City.

Cst TOWER met with the City of Dawson Recreation Department to organize several bike events for the summer including weekly youth rides, the Midnight Dome Enduro mountain bike race and the Top Of The World Gravel bike race.

(5) Restorative Justice

All restorative justice matters have been completed.

Fun Fact:

While transporting the first mail from Dawson City, Yukon, Cst John RICHARDSON and William BELL were caught on the Hootalinqua River when the ice broke up and were swept downstream. Near 8 Mile cabin, 190 miles from Dawson City, RICHARDSON and BELL were able to save themselves by grabbing a hold of some tree branches and climbing the bank but the mail was lost.

Kindest regards,

Cst. Josh TOWER
Dawson City RCMP
Box 159
Dawson City, Yukon
Y0B 1G0

RCMP·GRC
ROYAL CANADIAN MOUNTED POLICE • GENDARMERIE ROYALE DU CANADA

MONTHLY POLICING REPORT March, 2022

Dawson City RCMP Detachment "M" Division Yukon

The Dawson City RCMP Detachment responded to a total of 87 calls for service during the month of March, 2022.

OCCURENCES	March, 2022	Year to Date 2022	March, 2021	Year to date 2021	Year Total 2021
Assaults (all categories)	9	26	8	19	67
Sexual Assault	2	2	1	4	13
Break and Enter	2	4	2	5	15
Thefts (all categories)	2	6	6	10	46
Drugs (all categories)	0	1	3	6	28
Cause a Disturbance	7	15	8	15	90
Mischief	15	29	11	26	145
Impaired Driving	2	3	1	6	49
Vehicle Collisions	3	13	5	13	54
Mental Health Act	15	26	6	15	35
Assistance to General Public	3	11	6	14	66
Search and Rescue	1(Land)	2 (Land)	0	1(Land)	3
Missing Persons	0	3	1	5	13
Wellbeing Checks	3	13	1	12	63
Check Stops (represents the actual number of check stops	0	2	0	0	4
Other Calls for Service	78	195	82	187	1224
Total Calls for Service	142	351	141	338	1915
Criminal Code Charges / (CDSA)	10	18	11	26	151 CC 3 CDSA
Liquor Act/MVA/CEMA Charges/Cannabis Act (Can Act)/Campground Act (Camp. Act)		1 MVA		1 MVA	8 CEMA 6 LA 36 MVA 1 CAN. ACT 1 Camp. Act

PLEASE NOTE: The statistic numbers in the report may change monthly as file scoring is added, deleted or changed. This occurs as investigations develops resulting in additional charges or proving an incident to be unfounded. Numbers as at/corrected to 2022.03.31

	March, 2022	Year to Date 2022 Total	March, 2021	Year Total 2021
Prisoners held locally	6	13	1	65
Prisoners remanded	0	0	0	8
Total Prisoners	6	13	1	65

Justice Reports	March, 2022	Year to Date 2022	March, 2021	Year Total 2021
Victim Services Referrals Offered	10	24	11	94
Youth Diversions	0	0	0	3
Adult Diversions	0	0	0	2
Restorative Justice Total	0	0	1	5

Cpl. Dustin GRANT and postmaster Daniel Vigliotti hand of the mail during the 46th running of the Percy DeWolfe Memorial Mail Race

Annual Performance Plan (A.P.P.'S) Community Priorities

Community approved priorities are:

(1) Substance Abuse
(2) Road Safety
(3) Youth Initiatives
(4) Attendance at THFN and Community Events
(5) Restorative Justice

(1) Substance Abuse

- Bar checks for alcohol and drugs will begin to increase as the nicer weather rolls around bringing in more visitors. Citizens found in a desperate need of a ride are being looked after and rides are being offered to ensure they get home safely in exigent circumstances.

(2) Road Safety

- Impaired investigations are being conducted on a regular bases and increased enforcement is predicted throughout the summer months. Speeding and distracted drivers are also a priority. Please remember don't drink and drive, call a friend or get a ride.

(3) Youth Initiatives

- School zone patrols are being done during the day to remind drivers to slow down and watch for kids. Cst. TOWER is still actively engaged with the Youth Counsel and the Top Cop Reading Program.

(4) Attendance at THFN and Community Events

- Members attend the Tr'ondek Hwech'in First Nation office and community events as they occur. As COVID measures are slowly dropping, it is expected that the regular events will be taking place again which will allow members to be even more active with the community.

(5) Restorative Justice

- No referrals were made this month to the Restorative Justice Program . There is the possibility of one case going forward but will be refereed by the courts if found appropriate. Each case is always looked at to see if restorative justice is appropriate.

Fun Fact:

In 1922, over 100 years ago, there was 3 times the population in Dawson City as there was in Whitehorse. The total population at that time in the Territory was 4,157.

Kindest regards,

Constable Phil PREMERL

Dawson City RCMP-GRC
Box 159
Dawson City, Yukon
Y0B 1G0

Mayor, Council, and the Recreation Center Design Team

We think it is important that we always try to understand what is important to other people. There are many needs to be filled in this new recreation center and we really hope that when you consider what is important to yourselves, that it's evident that the most important part of growing and supporting a healthy community are the children and the elders and that they are at the forefront of your thoughts and plans. Recreation facilities are key to the development of healthy communities.

This recreation centre can be a legacy that contributes to making this the most incredible Community in the Yukon. We understand that people have been curling and playing hockey in Dawson for well over a hundred years, and that curling, curling bonspiels, hockey, tournaments, and the celebrations are an important part of the community, but we urge you not to put that as the biggest priority when building this recreation centre as we feel that children and elders need to be of equal priority. Alcohol consumption generally increases at curling bonspiels, hockey tournaments, etc. and **you may want to consider moving the children's play area from being next door to the curling lounge** (unless liquor sales are only available in the evening).

Let's also consider what type of people you are trying to attract to Dawson and what you offer that is attracting them. By creating a positive atmosphere, these facilities become essential to personal health and wellness, thereby reducing reliance on healthcare and other costly social services. There is room for improvement in health and wellness in Dawson and it starts with leaders that are willing to make a difference, for the elders, the children and **all** members of the community.

We hope that the people making the "final" decisions for the recreation centre and the design of it, will advocate for those that are least likely or unable to advocate for themselves, like the elders and the children as they need to know they are supported by people that care about their health and wellness.

A couple of things to consider (or maybe you already have) …

- What other activities could utilize the curling and hockey rinks when the activities ***are not in season*** - Pickle ball, Lacrosse, Roller Hockey, Squash? We know that these are not in the plan, but just food for thought about using space for a **dual** purpose, over and above trade shows, Dust to Dawson, etc.
- In this plan, is there a for a room that would allow yoga, Zumba, dance, arts and crafts or anything like that?
- Do you need a canteen and a lounge, or could they be combined, and liquor sales only be available during evening hours?
- Could the kitchen be placed in the middle to separate the two rooms and it could be regular seating all day on both sides if necessary? I would assume that the lounge would hold events that require food and therefore it would be a better design to have the kitchen open to both the lounge and the canteen or for it to be one room.
- **What will be done with the empty space upstairs?** Is there an elevator to get to the second floor? If so, could it be located by the C7 area (above the curling rink) and locate the lounge up there? That would free up the lounge space below and it could be combined with the play area. Could a walking track be located above the gymnasium? Yes, we have heard that a walking track has been ruled out, but it really is important to have a place where people that are not

agile, can go and get some physical activity in the winter. It became very apparent to me as I hobbled around Dawson this past March with a hip issue, just how difficult it must be for people with mobility issues, as soon as that first snow falls.

This letter has all stemmed from a need to help find dedicated indoor play space for young children, but after listening to and reading comments from other, we realize there is a way bigger picture. Children are still our first priority and will always be, but we wanted to state a bigger view.

Sincerely,

Tom and Susan Pearse