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Subject: Palliser Trail ASP Update
Ref. CA000969

Mr. Kinzie

The Town of Canmore retained CIMA+ to perform an assessment of the revised Palliser Trail ASP area with regards to the Town's water and wastewater systems, and the potential impacts to capital projects recommended in the 2022 Utility Master Plan.

This assessment consists of updating the water and wastewater demands in the Palliser Trail area according to the new ASP concept plan, and reviewing the systems under 25 Year Growth Horizon scenario from the UMP with the updated demands.

SERVICE AREA AND LAND USE

The service area of the ASP update is contained entirely in the Off Site Levy Zone 2 on the northeast side of Highway 1. The land use is made up of medium to high density residential, mixed used commercial and civic/institutional. Residential unit estimates were summarized from the land use concept. Institutional, Commercial and Industrial (ICI) units were estimated from the parcel size of those land uses, and the estimated floor area for the mixed use commercial. An ICI density of 37 units/hectare was used, as per the design criteria in the UMP.

Also included were an existing 751 residential units from the Silvertip ASP. These are the residential units that were considered under the 25 Year Growth Horizon in the 2022 Utility Master Plan.

Land Use	Area (ha)	Units
ICI	2.9	135
Silvertip ASP (Residential)	17.3	751
Palliser ASP Update (Residential)	8.5	980
Total	28.7	1,866



Overall, there are 135 ICI units, and 980 residential units in the updated ASP area, and a total of 1,731 residential units in the Offsite Levy Zone 2. For comparison, the UMP had 117 ICI units and 751 residential units in the 25 Year Growth Horizon.

WATER AND WASTEWATER DEMANDS

Water and wastewater demands were calculated using the projected unit counts for the ASP area, and the unit demand rates set out in the UMP.

The following are the unit rates and peaking factors for the water demands.

Demand Type	Rate	Units
Residential	250	L/c/d
ICI	30 810	m ³ /ha/d L/unit/day
Maximum Day Demand Peaking Factor (per EDCG)	2 x ADD	PF
Peak Hour Demand Peaking Factor (per EDCG)	4 x ADD	PF

The following are the unit rates and peaking factors for the wastewater demands.

Demand Type	Rate	Units
Residential	250	L/c/d
ICI	30 810	m ³ /ha/d L/unit/day
Residential Peaking Factor	$1+14 / (4+P \frac{1}{2})$	Harmon's Formula
Commercial / Industrial Peaking Factor	3.5	PF

The following are the projected water demands for the Palliser Trail ASP area.

Land Use	ADD (L/s)	MDD (L/s)	PHD (L/s)
ICI	1.3	2.5	5.1
Silvertip ASP (Residential)	5.4	10.9	21.7
Palliser ASP (Residential)	7.1	14.2	28.4
Total	13.8	27.6	55.1



This is an approximately 7.3 L/s increase in Average Day Demand from the UMP projections.

The following are the projected wastewater demands for the Palliser Trail ASP area.

Land Use	ADWF	PF	PDWF	I&I	PWWF
	L/s		L/s	L/s	L/s
ICI	1.3	3.3	4.2	0.8	5.0
Silvertip ASP (Residential)	5.4	3.3	17.9	4.8	22.8
Residential - Medium / High Density	7.1	3.3	23.4	2.4	25.8
Total	13.8	-	45.5	8.0	53.5

This is an approximately 27.3 L/s increase in Peak Wet Weather Flow from the UMP predictions.

RAW WATER SUPPLY

The following are the results of the raw water supply analysis. Only the water supply for Pumphouse 1 was assessed, as that is where the demands in the OSL Zone 2 area were originally assigned to in the UMP. The Palliser Trail ASP updated increased the maximum day demand by approximately 14 L/s, and the annual demand by approximately 248,000 m³.

	25 Year Demand	License (Well #1)	License (Well #2)	License (Total PH1)
Annual Demand (m ³ /year)	2,276,899	1,195,620	926,345	2,121,985
Maximum Day Demand (L/s)	144	50	540	589.5

With the increased demands considered, there is a noted deficit in the available water licence at Pumphouse 1 by approximately 150,000 m³. Under the 25 Year Growth Horizon, a water supply deficit was identified at Pumphouse 2. As such, a water supply and treatment study was recommended to be performed to identify the best course of action for the Town to increase the available water supply. The increased demands due to the Palliser Trail ASP update do not change the requirement for this study and eventual treatment capacity upgrade. However, the new demands should be considered when the recommended study is performed.



WATER TREATMENT

The following are the results of the water treatment analysis. The Palliser Trail ASP updated increased the maximum day demand by approximately 14 L/s at Pumphouse 1.

	Future Max Day Demand	Treatment Capacity
25 Year - Pumphouse 1 (L/s)	144	93
25 Year - Pumphouse 2 (L/s)	174	170

Under the 25 Year Growth Horizon, a water treatment deficit was identified across both pump houses. As such, a water supply and treatment study was recommended to be performed to identify the best course of action for the Town to upgrade their treatment capacity, or increase supplemental storage. The increased demands due to the Palliser Trail ASP update do not change the requirement for this study and eventual treatment capacity upgrade. However, the new demands should be considered when the recommended study is performed.

WATER DISTRIBUTION SYSTEM

The revised water demands for the Palliser Trail ASP area were added to the Hydraulic Water Model developed for the UMP, and the model was run under the 25 Year Growth Horizon for both the Max Day Demand + Fire Flow and Peak Hour Demand scenarios.

Under the MDD+FF scenario, no additional deficiencies in available fire flow were identified. Under the PHD scenario, no additional deficiencies in service pressure were identified. No additional projects to the Town's water distribution network or pumping stations would be required to support the additional demands from the Palliser Trail ASP update.



WATER STORAGE

The following are the results of the water storage analysis. An additional Average Day Demand of approximately 150 m³/day were added to the Central and Eastern supply zones.

	Western Supply Zone	Central and Eastern Supply Zone	Silvertip
ADD (m ³ /day)	5,091	8,343	1,203
MDD (m ³ /day)	9,828	14,944	2,242
Fire Storage (300 L/s for 3.5 hours)	3,780	3,780	3,780
Equalization Storage - 25% MDD (m ³ /day)	2,457	3,736	560
Emergency Storage - 15% ADD (m ³ /day)	764	1,251	180
Recommended Storage (m ³)	7,001	8,768	4,521
Available Storage (m ³)	6,100	7,300	5,400

Overall, the additional demands from the Palliser Trail ASP update increased the recommended storage in the Central and Eastern supply zones by approximately 310 m³. Under the 25 Year Growth Horizon, a storage deficit in the Western and Central/Eastern supply zones was noted, with a 2,000 m³ storage upgrade recommended in the UMP. This recommended upgrade can accommodate the additional 310 m³ of required storage that result from the additional demands in the Palliser Trail ASP.

WASTEWATER COLLECTION SYSTEM

The revised water demands for the Palliser Trail ASP area were added to the Hydraulic Wastewater Model developed for the UMP, and the model was run under the 25 Year Growth Horizon for the peak wet weather scenarios.

No additional deficiencies in the collection system were identified, and as such no additional projects to the Town's wastewater collection system would be required to support the additional demands from the Palliser Trail ASP update.



LIFT STATIONS

Using the updated wastewater model, peak flows were assessed for Lift Station 7, which the entirety of the Palliser Trail ASP update collects into.

Lift Station	PWWF (L/s)	Firm Pumping Capacity (L/s)
LS 7	125	120

The increased flows from the Palliser Trail ASP update results in a Peak Wet Weather Flow slightly above the firm pumping capacity. However as per results from the wastewater model, this slight deficit does not result in surcharging at or upstream of the lift station, and should not trigger an upgrade at Lift Station 7.

CONCLUSION AND RECOMMENDATIONS

The water and wastewater systems in the Town of Canmore were assessed under the 25 Year Growth Horizon as per the UMP, with the additional demands associated with the Palliser Trail ASP update included.

In each of the system components assessed, the additional demands made minimal material impact to any noted deficiencies in the UMP. The most significant deficiency noted was the deficit to the raw water license out of Pumphouse 1, which should be considered when the recommended water supply and treatment study is being performed. No additional capital projects, or revisions to capital projects proposed in the UMP, will be required to support the Palliser Trail ASP update.

Regards,

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