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December 11, 2019

All Customers  
Other Interested Parties:

Re. 2019 Annual Plan

NOVA Gas Transmission Ltd (“NGTL”) has posted its 2019 Annual Plan on TC Energy’s website at:

<http://www.tccustomerexpress.com/6033.html>

Customers and other interested parties are encouraged to communicate their suggestions and comments regarding the development of the NGTL System to me at 403.920.7227

Yours truly,  
NOVA GAS Transmission Ltd.  
A wholly owned subsidiary of TC Energy

A handwritten signature in blue ink, appearing to read "Joe Zhou".

Joe Zhou  
Director, Capacity Management  
Commercial Operations  
Canada Gas

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## EXECUTIVE SUMMARY

The 2019 Annual Plan provides NOVA Gas Transmission Ltd.'s (NGTL's) customers and other interested parties an overview of potential NGTL System facilities that are expected to be applied for in the 2019/20 Gas Year. The 2019 Annual Plan describes NGTL's long-term outlook for receipts, deliveries, peak expected flows, proposed facilities, and design flow requirements supporting these proposed facilities. This 2019 Annual Plan is based on NGTL's June 2019 Design Forecast of receipts and deliveries.

Since the release of the 2018 Annual Plan, NGTL has identified a number of facility projects. NGTL's Tolls, Tariff, Facilities and Procedures (TTFP) Committee has been notified of these facilities, and they are summarized in *Appendix 2: Facility Status Update*.

NGTL provides commercial services under the NGTL Tariff using the combined assets of the NGTL System and the ATCO Pipelines (AP) System. NGTL follows facility planning processes to identify facilities required for the combined assets in the NGTL and AP footprints. For an overview of these processes, see the *Facilities Design Methodology* document and the *Guidelines for New Facilities* document. NGTL files facility applications with the Canada Energy Regulator (CER) for facility additions on the NGTL System within the NGTL footprint. AP files facility applications with the Alberta Utilities Commission (AUC) for facility additions on the AP System within the AP footprint.

The facilities identified in this Annual Plan were presented to the TTFP Committee on November 12, 2019. New facilities proposed after issuance of this Annual Plan will be shown in the *2020 Facility Status Update (NGTL 2020 Update)*, which can be accessed at <http://www.tccustomerexpress.com/871.html>.

For the 10 facilities projects identified in the 2019 Annual Plan, see Table E-1.

**Table E-1: Proposed Facilities Additions**

Project Area	Proposed Facilities	Annual Plan Reference	Description	Target In-Service Date	Regulator	Capital Cost (\$ Millions)
<b>Aggregate System Facilities</b>						
Peace River	Groundbirch Mainline Loop (Saturn)	Section 2	24 km NPS 42	Nov-22	CER	143
Peace River	Saddle Hills Compressor Station Unit Addition	Section 2	30 MW	Nov-22	CER	159
Peace River	Emerson Creek Compressor Station	Section 2	2 x 30 MW	Apr-23	CER	257
Peace River	Grande Prairie Mainline Loop No.4 (Valhalla North)	Section 2	33 km NPS 48	Apr-23	CER	204
<b>Alberta-British Columbia Export Facilities</b>						
Mainline	AB-BC Meter Station Expansion	Section 2	Meter Station	Nov-22	CER	8
Peace River	Edson Mainline Loop No.4 (Raven River)	Section 2	18 km NPS 48	Nov-22	CER	128
Mainline	Western Alberta Mainline Loop No.2 (Longview)	Section 2	10 km NPS 48	Nov-23	CER	65
Mainline	Western Alberta Mainline Loop No.2 (Lundbreck)	Section 2	7 km NPS 48	Nov-23	CER	83
Mainline	Western Alberta Mainline Loop No.2 (Turner Valley)	Section 2	23 km NPS 48	Nov-23	CER	209
<b>Medicine Hat Delivery Facilities</b>						
Mainline	Medicine Hat and Suffield Lateral Loop	Section 2	58 km NPS 24	Apr-23	CER	189
<b>Total</b>						<b>1,445</b>

The Aggregate System Facilities are required to transport growing aggregate system supply in the Peace River Project Area to satisfy growing intra-system demands.

The Alberta-British Columbia Export Facilities are required to meet the aggregate delivery requirements at the Alberta-British Columbia export point.

The Medicine Hat Delivery Facilities are required to meet the aggregate delivery requirements in the Medicine Hat area.

This 2019 Annual Plan includes the following sections:

- Executive Summary
- Chapter 1: Design Forecast
- Chapter 2: Design Flow and Mainline Facilities
- Chapter 3: Extensions, Lateral Loops and Meter Stations
- Appendix 1: Glossary of Terms
- Appendix 2: Facility Status Update
- Appendix 3: System Map (expected in March 2020)

- Appendix 4: Unit Transportation Costs

Electronic versions of the Annual Plan, the *Facilities Design Methodology* document, and the *Guidelines for New Facilities* document can be accessed at

<http://www.tccustomerexpress.com/871.html>.

Customers and other interested parties are encouraged to communicate their suggestions, comments and questions to NGTL regarding the 2019 Annual Plan to:

- Darryn Rouillard, Manager, Mainline Planning West (403) 920-6341
- Murray Ferraton, Manager, Customer Solutions (403) 920-5323
- Karen Hill, Manager, Receipt and Delivery Forecasting (403) 920-5622
- Joe Zhou, Director, Capacity Management (403) 920-7227

## 1.0 DESIGN FORECAST

### 1.1 INTRODUCTION

This Annual Plan is based on the June 2019 Design Forecast of receipts and deliveries for the NGTL System. An overview of the June 2019 Design Forecast was presented at the November 12, 2019 TTFP meeting.

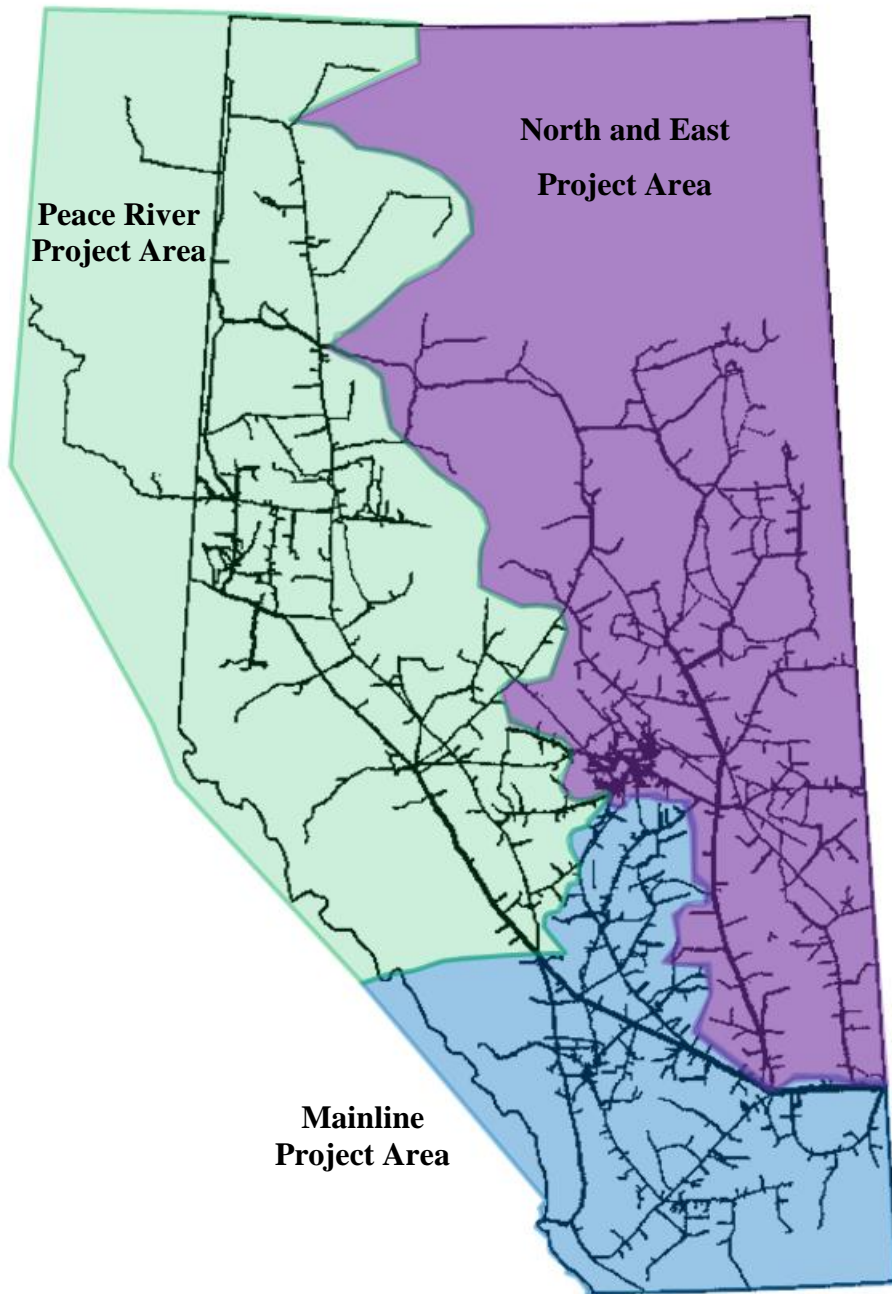
This section describes:

- economic assumptions used in developing the 2019 Design Forecast
- receipt and delivery forecasts for the NGTL System
- supply contribution, including winter withdrawal from storage facilities, used in the design process

For further information on forecasting methodology, see *Facilities Design Methodology*, Section 4.4: Design Forecast Methodology, which can be accessed at <http://www.tccustomerexpress.com/871.html>

In order to highlight the regional forecast differences on the NGTL System, this section references the three Project Areas as per the NGTL tariff. Figure 1-1 depicts the three Project Areas.

Figure 1-1: NGTL Project Areas





## 1.2 ECONOMIC ASSUMPTIONS

### 1.2.1 General Assumptions

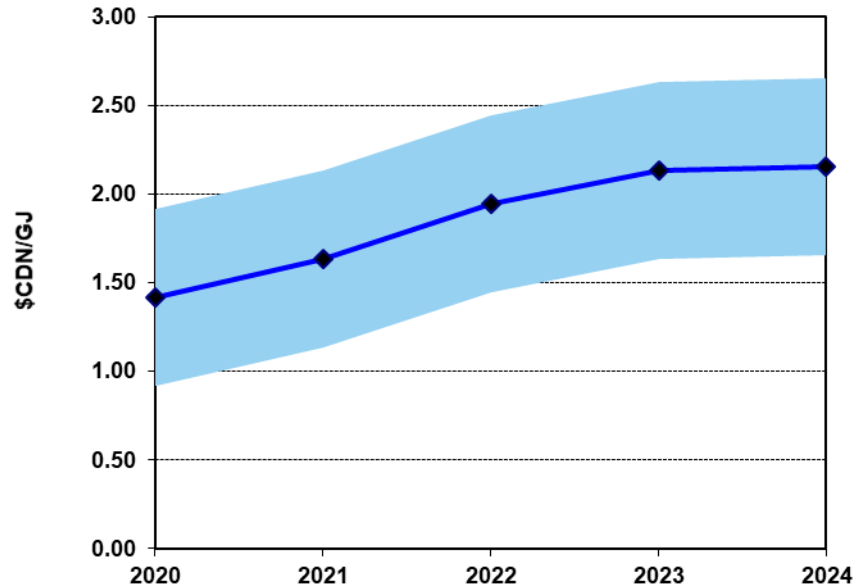
The following assumptions, developed in early 2019, reflect broader trends in the North American economy and energy markets, and underlie the forecast of receipts and deliveries:

- Over the next several years, North American natural gas demand will increase, led by the electrical generation and industrial sectors as well as U.S. LNG (Liquified Natural Gas) exports.
- In the US, industrial growth is broadly based, while the oil sands and electrical generation lead the sector's growth in Western Canada.
- Several policy drivers at the provincial and federal level, are supporting continued progress in coal-to-gas conversion of electricity generation.
- LNG export projects are being developed in both the U.S. and Canada. Those in the US started exporting in 2016 and will continue to grow. Canada LNG exports are expected to begin in 2024 with LNG Canada.
- Low cost associated gas supplies from oil plays and liquids rich gas plays are exerting more influence on North American prices, and NIT continues to price below Henry Hub as traditional markets for Western Canadian supplies are challenged by short-term availability of egress capacity and competing basins.
- New supply must continually be developed to maintain and/or grow the supply in the basin due to the natural declines of existing supply.
- NIT/AECO prices are expected to grow to the range of around \$1.67 - \$2.67 Cdn/GJ by 2024.

### 1.2.2 Average Natural Gas Price Forecast

TransCanada considers commodity pricing to determine the economic viability of future production. The 2019 natural gas price forecast range developed by TransCanada is shown in Figure 1-2.

Figure 1-2: Average Nominal NIT Price



### 1.3 GAS DELIVERY FORECAST

Several sources of information were considered in developing the gas delivery forecast. First, operators of downstream facilities such as connecting pipelines, local distribution companies (LDCs), and industrial plants were requested to provide a forecast of their maximum, average, and minimum requirements for deliveries from the NGTL System over the next 10 years. The forecasts were analyzed and compared with historical flow patterns at NGTL Delivery Points. In cases where NGTL's analysis differed substantially from the operator's forecast, NGTL contacted the operator and either the operator's forecast was revised or NGTL adjusted its analysis. In cases where the operator did not provide a forecast, NGTL based its forecast on historical flows and growth rates for specific demand sectors.

Deliveries to intra markets on the NGTL System are forecasted to rise, primarily due to industrial demand in the oil sands sector and gas-fired electrical generation. At major Export Points, throughput increases compared to recent years.

**1.3.1 Average Annual Delivery Forecast**

Forecast deliveries are expressed as an average daily flow. The Average Annual Delivery Forecast is the aggregate forecast deliveries for the NGTL System. The Average Annual Delivery Forecast, for Gas Years 2020 through 2024 are listed by Delivery Type in Table 1-1 and further detailed by Project Area in Table 1-2.

**Table 1-1: System Average Annual Delivery Forecast by Delivery Type**

Delivery Type	June 2019 Design Forecast (10 <sup>6</sup> m <sup>3</sup> /d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Export	186.2	192.0	197.0	198.6	205.0
Intra System	172.1	177.5	183.3	189.4	195.1
<b>Total System</b>	<b>358.2</b>	<b>369.5</b>	<b>380.3</b>	<b>388.0</b>	<b>400.1</b>
Delivery Type	June 2019 Design Forecast (Bcf/d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Export	6.6	6.8	7.0	7.0	7.2
Intra System	6.1	6.3	6.5	6.7	6.9
<b>Total System</b>	<b>12.6</b>	<b>13.0</b>	<b>13.4</b>	<b>13.7</b>	<b>14.1</b>
Note: Totals for Receipt & Delivery may not align due to rounding. System Fuel is included in totals Volumes expressed as an average daily flow for each gas year, at 101.325 kPa and 15°C.					

**Table 1-2: Intra System Deliveries – Average Annual Delivery Forecast by Project Area**

Project Area	June 2019 Design Forecast (10 <sup>6</sup> m <sup>3</sup> /d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	12.7	11.6	11.8	15.4	19.0
North and East	111.1	116.4	121.3	123.7	125.6
Mainline	43.8	44.9	45.4	45.5	45.5
<b>Total</b>	<b>167.6</b>	<b>172.9</b>	<b>178.5</b>	<b>184.6</b>	<b>190.1</b>
Project Area	June 2019 Design Forecast (Bcf/d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	0.4	0.4	0.4	0.5	0.7
North and East	3.9	4.1	4.3	4.4	4.4
Mainline	1.5	1.6	1.6	1.6	1.6
<b>Total</b>	<b>5.9</b>	<b>6.1</b>	<b>6.3</b>	<b>6.5</b>	<b>6.7</b>
Note: Totals for Receipt & Delivery may not align due to rounding. System fuel is excluded from project area numbers Volumes expressed as an average daily flow for each Gas Year and excludes fuel.					

**1.3.2 Maximum Day Delivery Forecast**

Peak deliveries (Maximum Day Delivery) are also forecast for the NGTL Delivery Points and are based on customer input, market conditions, firm transportation contracts, and historical flows.

A summary of the June 2019 Design Forecast winter and summer Maximum Day Delivery by Project Area for Intra System Deliveries is provided in Table 1-3 for winter and Table 1-4 for summer.

**Table 1-3: Winter Maximum Day Intra System Delivery Forecast**

Project Area	June 2019 Design Forecast (10 <sup>6</sup> m <sup>3</sup> /d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	23.8	24.9	31.8	36.3	40.0
North and East	165.7	170.9	184.8	188.1	190.9
Mainline	84.7	86.4	87.1	87.6	88.1
<b>Total</b>	<b>274.1</b>	<b>282.1</b>	<b>303.8</b>	<b>312.0</b>	<b>319.0</b>
Project Area	June 2019 Design Forecast (Bcf/d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	0.8	0.9	1.1	1.3	1.4
North and East	5.8	6.0	6.5	6.6	6.7
Mainline	3.0	3.0	3.1	3.1	3.1
<b>Total</b>	<b>9.7</b>	<b>10.0</b>	<b>10.7</b>	<b>11.0</b>	<b>11.3</b>
Note: Totals for Receipt & Delivery may not align due to rounding					

**Table 1-4: Summer Maximum Day Intra System Delivery Forecast**

Project Area	June 2019 Design Forecast (10 <sup>6</sup> m <sup>3</sup> /d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	15.5	16.2	29.3	31.2	34.9
North and East	148.7	155.0	165.6	168.3	170.8
Mainline	65.3	65.9	66.4	66.6	66.9
<b>Total</b>	<b>229.4</b>	<b>237.1</b>	<b>261.3</b>	<b>266.1</b>	<b>272.6</b>
Project Area	June 2019 Design Forecast (Bcf/d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	0.5	0.6	1.0	1.1	1.2
North and East	5.2	5.5	5.8	5.9	6.0
Mainline	2.3	2.3	2.3	2.4	2.4
<b>Total</b>	<b>8.1</b>	<b>8.4</b>	<b>9.2</b>	<b>9.4</b>	<b>9.6</b>
Note: Totals for Receipt & Delivery may not align due to rounding					

#### 1.4 RECEIPT FORECAST

NGTL develops a Receipt Forecast on an average annual basis using information collected from several sources, including upstream information from customers, industry publications and government agencies.

- NGTL uses well based forecasting methods and models to generate forecasts of future production. Factors such as gas price, liquids content in the gas, economics, total number of drilling locations available, well production profiles, pace of development, material and equipment availability, potential capital requirements, and access constraints when developing a forecast of supply are considered.
- For conventional production, there has been little to no activity in the last few years. NGTL anticipates that conventional supply will continue to decline. This production decline will be noticed mostly in the north east and east parts of the basin, which are areas outside of the Peace River Project Area.
- The decline rate of legacy gas and the more recent supply from shale and tight sandstone reservoirs varies across the basin and from year to year. Typically, the basin declines about 20% (18% to 22%) per year if left unsupported without new wells.

Exploration activity focused on unconventional shale and tight sandstone reservoirs has resulted in increasing Montney and Deep Basin gas volumes entering the NGTL System primarily through the Peace River Project Area. The incremental shale gas and tight sandstone gas supply is expected to more than offset existing production declines, and will gradually increase system supply to nearly 14.2 Bcf/d in 2023/24.

Gas supplied from storage facilities was not included in the data presented in this section. For information pertaining to gas supply from Commercial Storage Facilities, see Section 1.6.

#### 1.4.1 Average Receipt Forecast

The Average Receipt Forecast is the forecast aggregate receipts for the NGTL System for the 2020 through 2024 Gas Years. A summary of System Average Receipts by Gas Year and Project Area is expressed as an average daily flow and shown in Table 1-5.

**Table 1-5: System Average Receipts**

Project Area	June 2019 Design Forecast (10 <sup>6</sup> m <sup>3</sup> /d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	303.3	318.8	334.0	348.6	362.2
North and East	11.2	10.4	9.7	9.0	8.4
Mainline	44.5	40.7	37.4	34.5	32.0
<b>Total</b>	<b>359.0</b>	<b>369.9</b>	<b>381.1</b>	<b>392.2</b>	<b>402.6</b>
Project Area	June 2019 Design Forecast (Bcf/d)				
	2019/20	2020/21	2021/22	2022/23	2023/24
Peace River	10.7	11.3	11.8	12.3	12.8
North and East	0.4	0.4	0.3	0.3	0.3
Mainline	1.6	1.4	1.3	1.2	1.1
<b>Total</b>	<b>12.7</b>	<b>13.1</b>	<b>13.5</b>	<b>13.8</b>	<b>14.2</b>

Note: Totals for Receipt & Delivery may not align due to rounding.

### 1.5 SUPPLY DEMAND BALANCE

Supply received on to the NGTL System is balanced with System deliveries (net of gas in storage). System deliveries by destination are shown in Figure 1-3, while System receipts by Project Area are shown in Figure 1-4.

Figure 1-3: System Deliveries by Destination

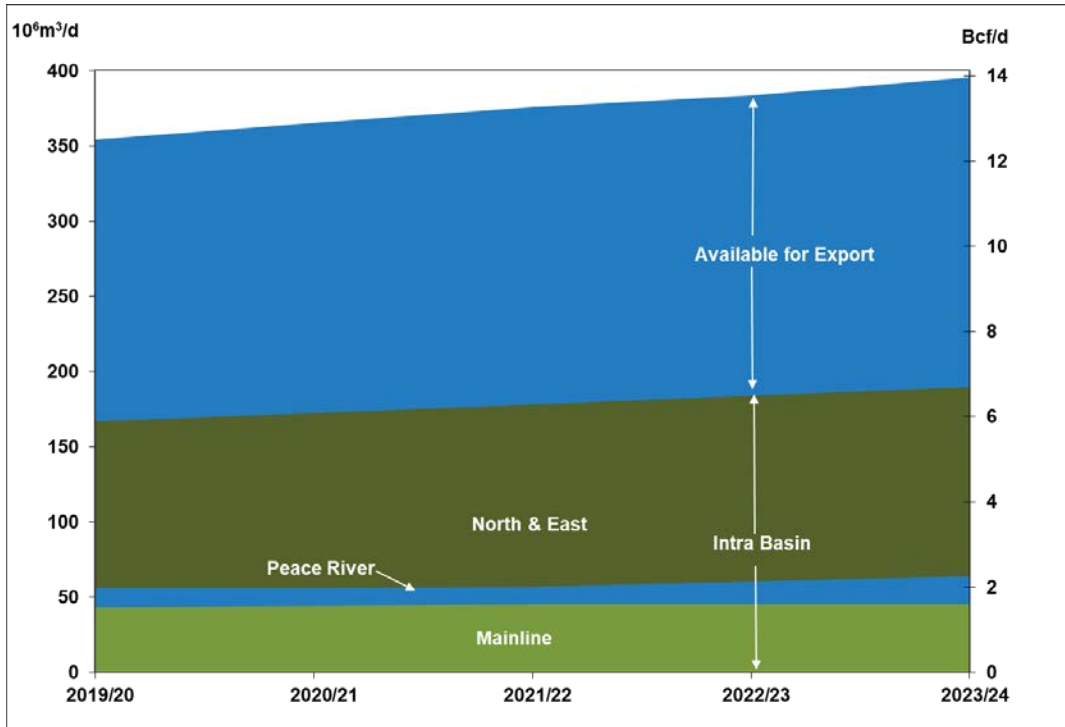
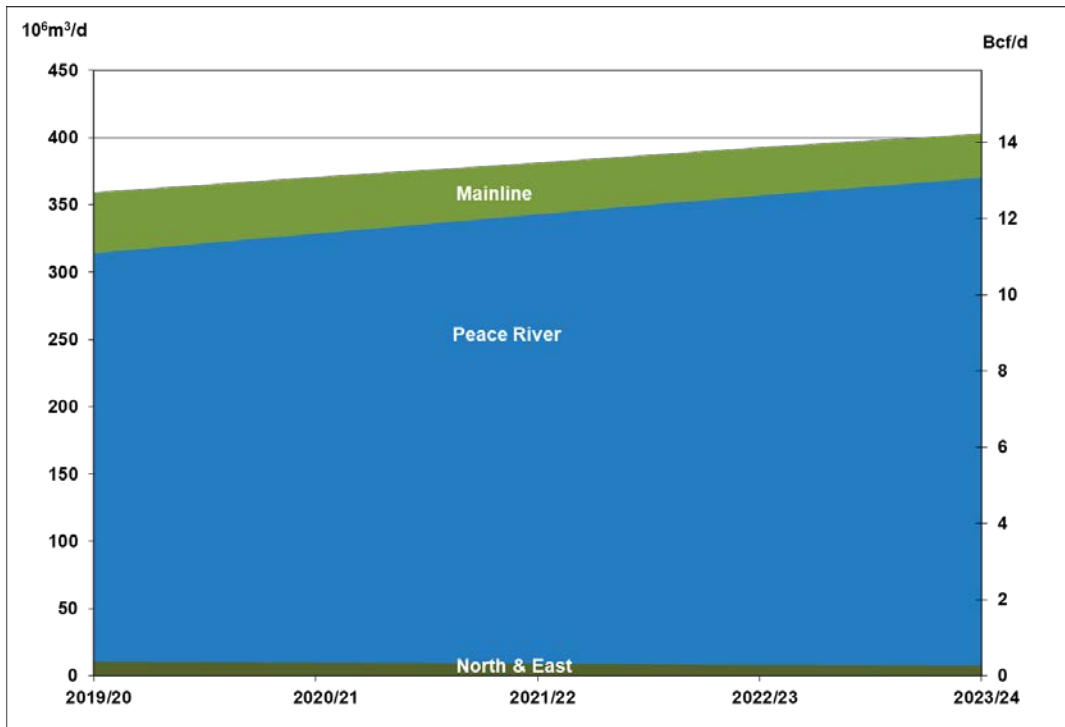


Figure 1-4: System Receipts by Project Area



**1.6 STORAGE FACILITIES****1.6.1 Commercial Storage**

There are eight commercial storage facilities connected to the NGTL System (AECO 'C', Big Eddy, Carbon, Chancellor, Crossfield East #2, January Creek, Severn Creek and Warwick Southeast Meter Stations). The total deliverability from Storage Facilities is significant, but actual maximum day receipts from storage are dependent on a number of factors, including market conditions, level of working gas in each storage facility, compression power at each storage facility, and NGTL System operations.

For design purposes, a supply contribution from Storage Facilities is used to meet peak day winter delivery requirements and provide for a better correlation between forecast design flow requirements and historical actual flows for the winter period. Historical withdrawals during recent winter periods for each Storage Facility were used to determine a reasonable expected rate of withdrawal for future winter seasons.

For the receipt meter capacity for each of the connected commercial storage facilities, see Table 1-6.

**Table 1-6: Receipt Meter Capacity from Commercial Storage Facilities**

Storage Facility	Receipt Meter Capacity from Commercial Storage Facilities	
	10 <sup>6</sup> m <sup>3</sup> /d	Bcf/d
AECO C	45.2	1.6
Big Eddy	41.0	1.4
Carbon	12.2	0.4
Chancellor	35.8	1.3
Crossfield East 2	16.4	0.6
January Creek	19.3	0.7
Severn Creek	11.6	0.4
Warwick Southeast	9.6	0.3
<b>Total</b>	<b>191.1</b>	<b>6.7</b>
Note: Storage is considered an interruptible supply source. Totals have been rounded.		



### 1.6.2 Peak Shaving Storage

The Fort Saskatchewan Salt Caverns are a peak shaving storage facility in the greater Edmonton area within the ATCO Pipeline footprint, in North of Bens Lake Design Area of the NGTL System. Similar to Commercial Storage Facilities, the total deliverability from the peak shaving Storage Facility is significant, but the actual maximum day receipt from storage depends on a number of factors, including market conditions, level of working gas, compression power at the storage facility and NGTL System operations.

For design purposes, a supply contribution from the peak shaving Storage Facility is used to meet peak day winter delivery requirements and provide for a better correlation between forecast design flow requirements and historical actual flows for the winter period. The maximum withdrawal rate and the maximum working inventory of the Storage Facility are used as the upper limits for the supply contribution provided.

## 2.0 DESIGN FLOWS AND MAINLINE FACILITIES

### 2.1 INTRODUCTION

This section contains the proposed natural gas transportation mainline facilities that may be applied for on the NGTL System in the 2019/20 Gas Year to meet the design flow requirements. Included is information regarding size, routes, locations and cost estimates.

The design flows are presented for design areas where new mainline facilities are required. Design flows are based on the June 2019 design forecast presented in Section 1, and were determined using the methodology described in *Facilities Design Methodology*, Section 3.5: Mainline Facilities Flow Determination. This document can be accessed at <http://www.tccustomerexpress.com/871.html>.

This section includes a comparison of historical flows to the design flows. Additionally, the expected design capability is shown for the Gas Year when facilities are required in each applicable design area. Where there is a shortfall between design flow and the design capability, a facility solution has been proposed. A facility application to the regulator for construction and operation is triggered by Firm Transportation (FT) contracts in excess of design capability and submitted to ensure the facility is in place in time to meet the FT requirements. Aggregated FT contract levels are also presented to indicate commercial underpinning of the proposed facilities.

This section of the Annual Plan presents facilities grouped by common purpose. Facilities that serve aggregate system requirements are first presented, followed by facilities that serve the requirements of specific areas. Presentation of the proposed facilities in this manner is intended to improve the clarity of their requirement and commercial underpinning.

An overview of the design flows and proposed facilities resulting from the June 2019 design forecast was presented to the TTFP on November 12, 2019.

For a summary of the status of mainline facilities that have been proposed, applied for, under construction or placed in-service since the December 2018 Annual Plan, see *Appendix 2: Facility Status Update*.

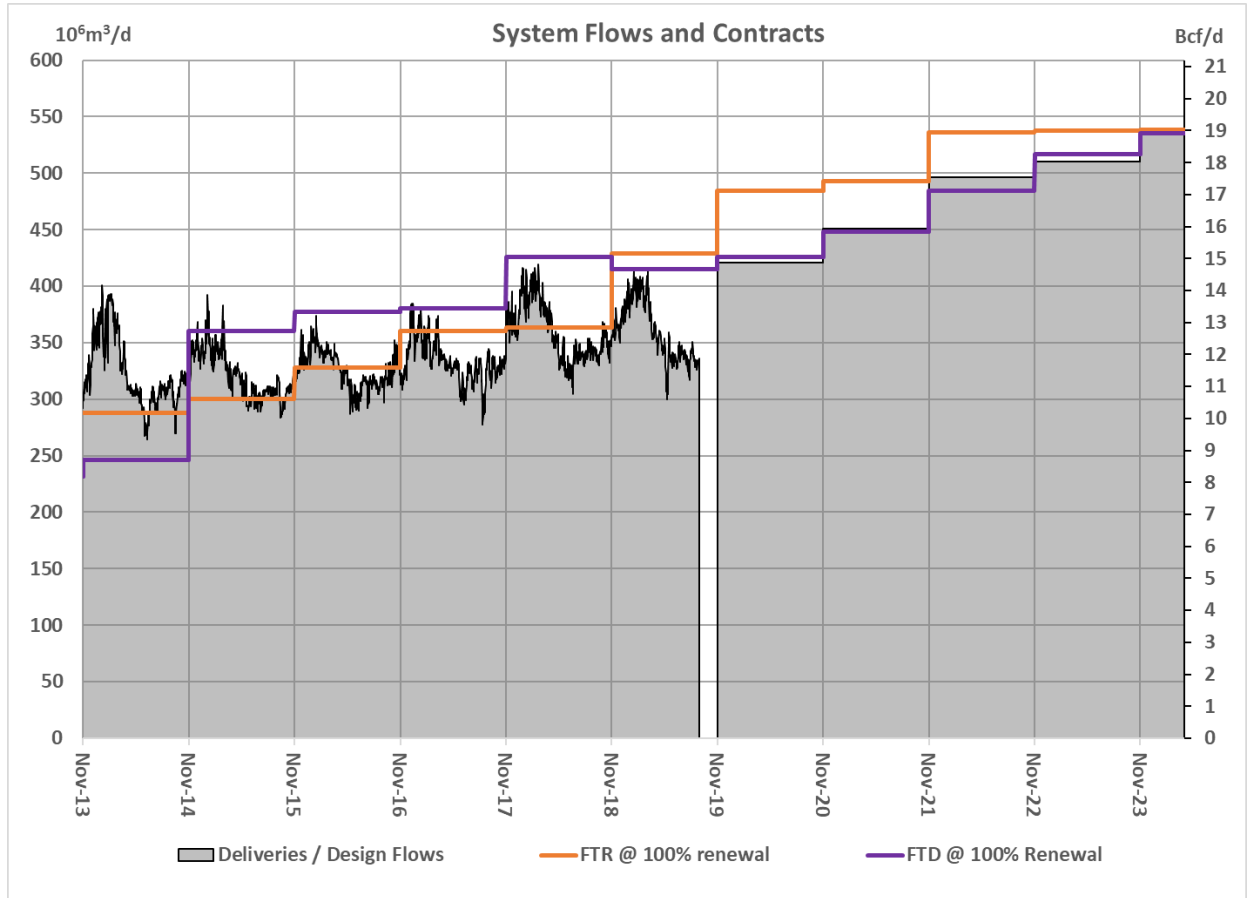
## 2.2 AGGREGATE SYSTEM REQUIREMENTS

As described in Section 1, aggregate system demand continues to grow. From the figures provided in Table 1-1, system demand grows from 12.6 Bcf/d to 14.1 Bcf/d from 2019/20 to 2023/24. Facilities for these aggregate system requirements are proposed for November 2022, which will serve the demand increase from 13.4 Bcf/d in 2021/22 to 13.7 Bcf/d in 2022/23, and for April 2023, which will serve the demand increase from 13.7 Bcf/d in 2022/23 to 14.1 Bcf/d in 2023/24.

Also described in Section 1 is the continued aggregate supply growth and shift towards the Peace River Project Area. Increasing supply in the Peace River Area will serve to offset supply declines in other areas of the system and increase the total system supply, matching the increasing aggregate system demand. Supply in the Peace River Area was ~81% of the total system supply in 2018/19 and it is the only region in the system where supply is growing. From the figures provided in Table 1-5, supply in the Peace River Area grows from 84% of the total system supply to 90% of the total system supply from 2019/20 to 2023/24, commensurate with an 12% increase in total system supply over the same period.

The forecasted annual average daily flowrates described in Section 1 are translated into peak day design flows which are used for system facility design. The design flows for the system therefore reflect the forecasted increases in average annual total system supply and demand. Figure 2-1 shows how the system design flows at the beginning of each gas year grow from 14.9 Bcf/d to 18.9 Bcf/d from 2019/20 to 2023/24. Figure 2-1 also shows the aggregate system FT-R and FT-D levels as of November 1 annually. As can be seen, the increasing design flows are supported by increasing system FT -R and FT-D contract levels.

Figure 2-1: Aggregate System Flows, Design Flows, and Contracts



### 2.3 FACILITIES FOR AGGREGATE SYSTEM REQUIREMENTS

As described in Section 2.2, increasing supply in the Peace River Area will serve the increasing aggregate system demands.

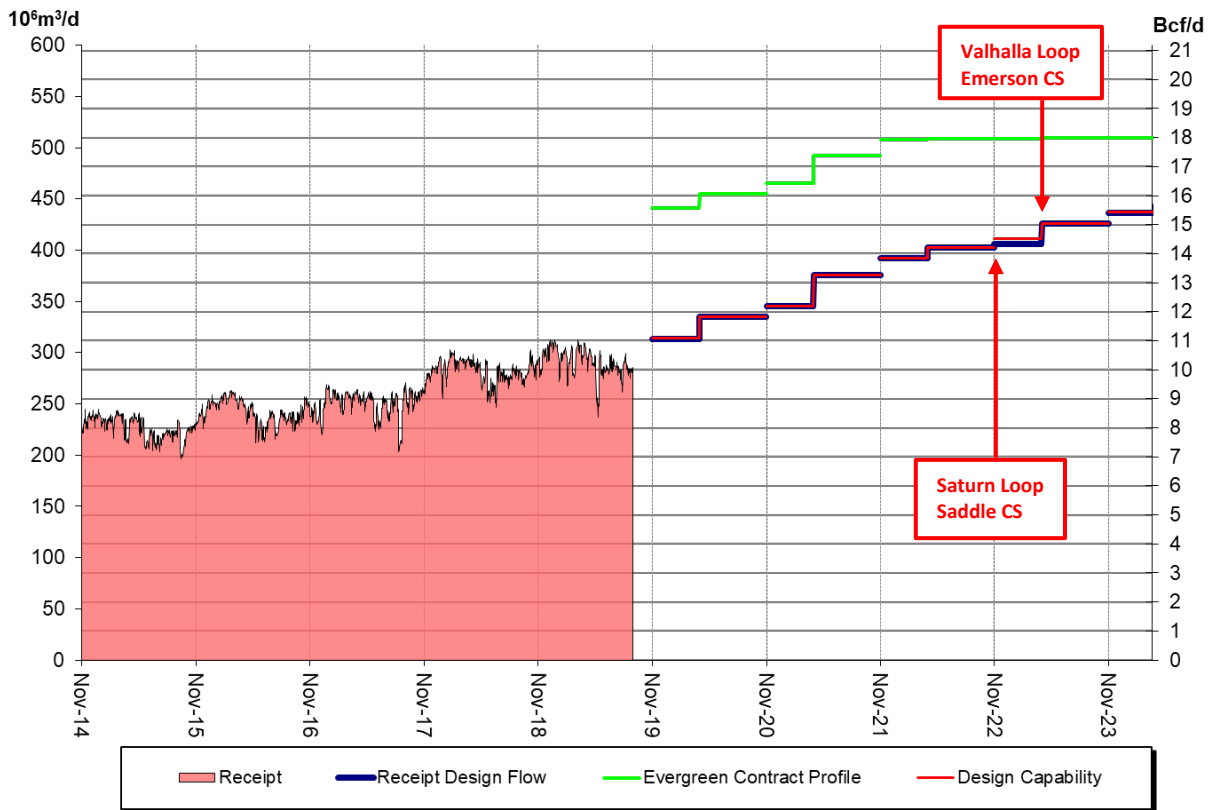
Since it represents such a large portion of total system supply, the design condition for the Peace River Area is very interdependent with total system conditions. The prevailing design condition for the Peace River Area is therefore best represented by a Total System Flow-Within condition: When total system deliveries are at their maximum and total system receipts, a vast majority of which are from the Peace River Area, are at their peak as well. System facilities must be capable of transporting enough gas out of the Peace River Project Area to meet expected peak deliveries throughout the rest of the system.

2.3.1 Design Flows - Peace River Project Area

The design flows for the Total System Flow-Within design condition in the Peace River Project Area are the maximum expected local receipts in the area. The continued receipt growth in the area will be accommodated by four proposed facilities.

Figure 2-2 shows historical receipts, receipt design flow, contract levels and design capability for the Peace River Project Area. Receipt design flow rises throughout this forecast period, attributable to increasing supply in the Peace River Project Area. The proposed facilities are required to keep the design capability above the rising design flow as highlighted in red in Figure 2-2. Further details on the proposed facilities are provided in Sections 2.3.2.

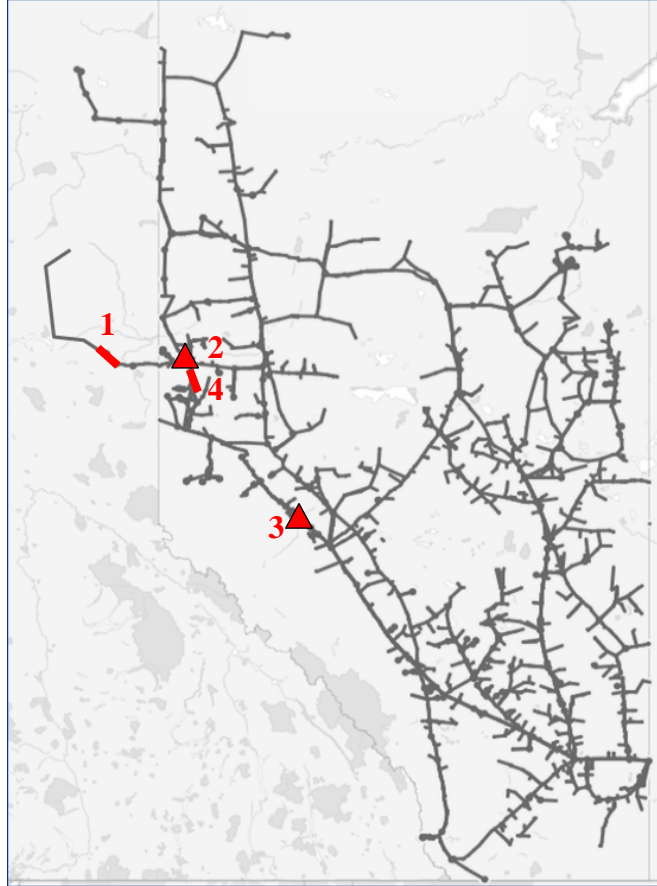
Figure 2-2: Peace River Project Area Design Chart



### 2.3.2 Proposed Facilities for Aggregate System Requirements

Figure 2-3 shows the locations of the proposed facilities required to meet aggregate system requirements resulting from the Total System Flow-Within design condition.

**Figure 2-3: Proposed Facilities for Aggregate System Requirements**



Applications for the proposed facilities are expected to be filed with the CER in gas year 2019/2020 and the facilities are proposed to be in-service in 2022 and 2023. The two facilities proposed for November 2022 are expected to be applied for as a single project, and the two facilities proposed for April 2023 are expected to be applied for as a separate single project. For details on each of the proposed facilities, see Table 2-1.

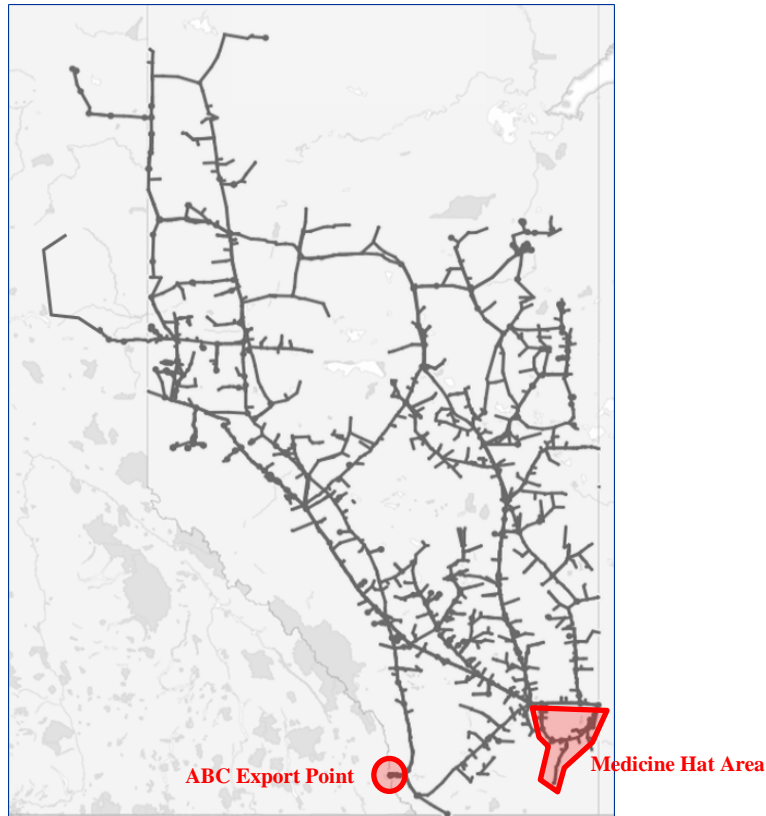
**Table 2-1: Proposed Facilities for Aggregate System Requirements**

Map Location	Applied-For Facility	Description	Target In-Service Date	Forecast Cost (\$Millions)
1	Groundbirch Mainline Loop (Saturn)	24 km NPS 42	Nov 2022	143
2	Saddle Hills Compressor Station Unit Addition	30 MW	Nov 2022	159
3	Emerson Creek Compressor Station	2 x 30 MW	Apr 2023	257
4	Grande Prairie Mainline Loop No.4 (Valhalla North)	33 km NPS 48	Apr 2023	204
			<b>Total</b>	<b>763</b>

**2.4 FACILITIES FOR SPECIFIC AREA DEMANDS**

Proposed facilities are required to meet delivery requirements at the Alberta-British Columbia (ABC) export point, and the Medicine Hat area. Both these areas are shown in Figure 2-4.

**Figure 2-4: ABC Export Point and Medicine Hat Area**

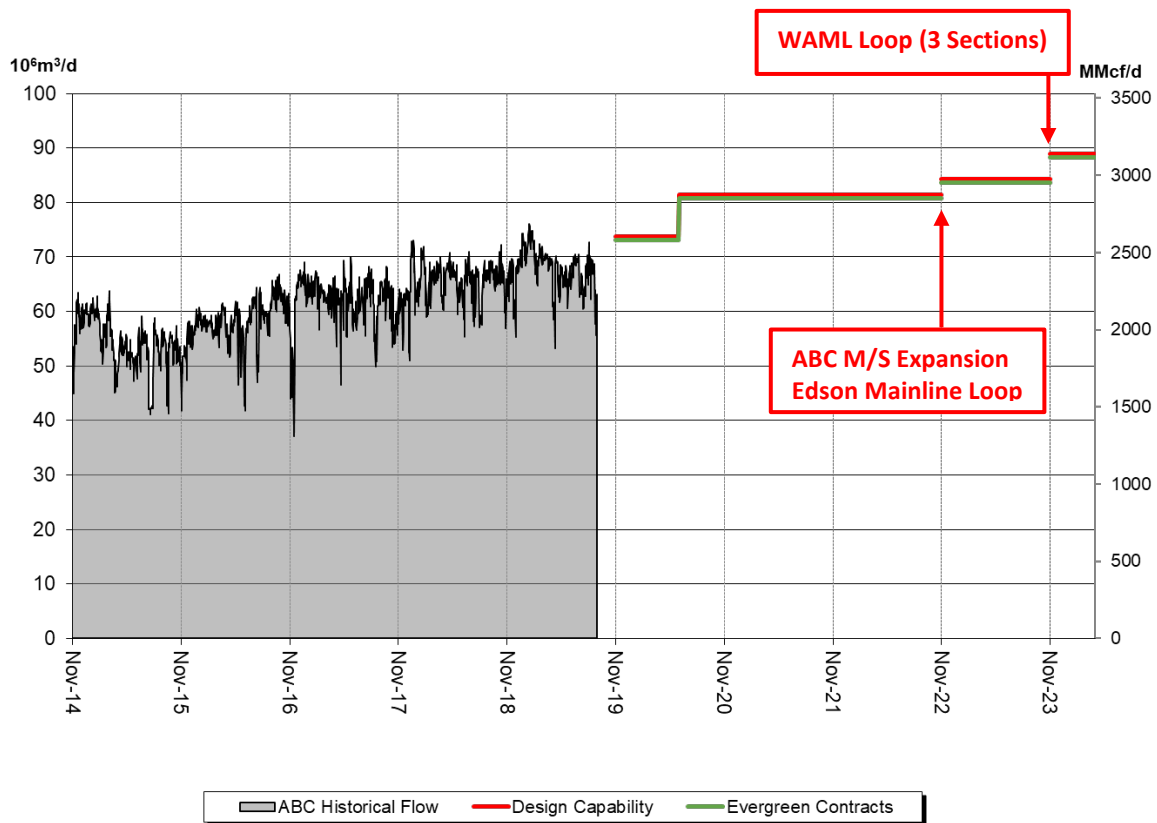


2.4.1 Design Capability – ABC Export Point

The prevailing design condition for the ABC export point is also the Total System Flow-Within Condition: When total system deliveries are at their maximum. The design capability for ABC represents the capability to deliver to ABC when all other system deliveries are at their maximum and utilizing major portions of system capability.

Figure 2-5 shows historical flows, contract levels and design capability at ABC. Contract level rises throughout this forecast period, attributable to fully subscribed open season offerings. Five proposed facilities are required to keep the design capability above the rising contract level as highlighted in red in Figure 2-5.

Figure 2-5: ABC Export Point Design Chart

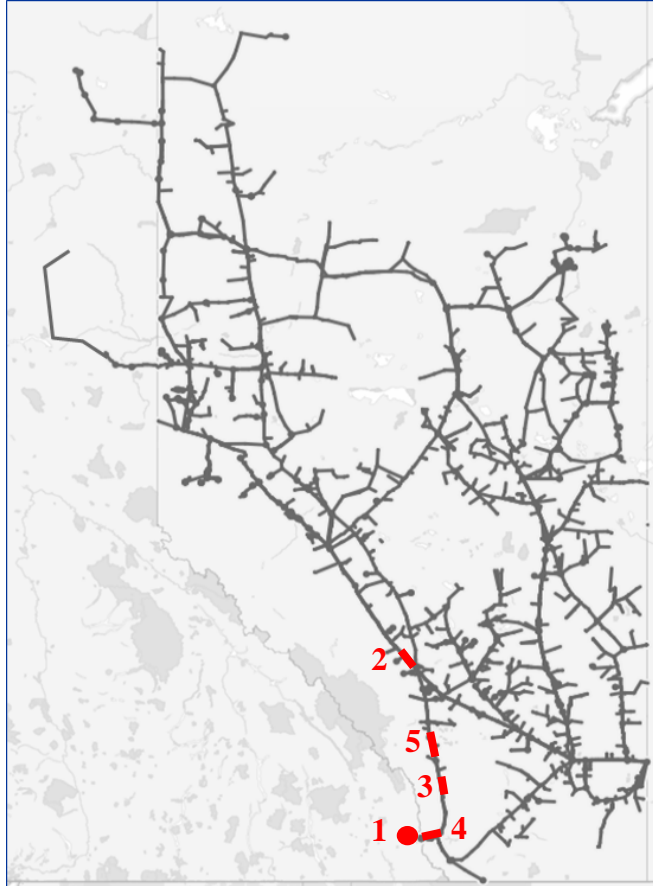




### 2.4.2 Proposed Facilities for ABC Export Point

Figure 2-6 shows the location of the proposed facilities required for ABC export demand.

**Figure 2-6: Proposed Facilities for ABC Export Demand**



Applications for the proposed facilities are expected to be filed with the CER in gas year 2019/2020 and the facilities are proposed to be in-service in 2022 and 2023. The two facilities proposed for November 2022 are expected to be applied for as a single project, and the three facilities proposed for November 2023 are expected to be applied for as a separate single project. For details on each of the proposed facilities, see Table 2-2.

**Table 2-2: Proposed Facilities for ABC Export Demand**

Map Location	Proposed Facility	Description	Target In-Service Date	Forecast Cost (\$Millions)
1	AB-BC Meter Station Expansion	Meter Station	Nov 2022	8
2	Edson Mainline Loop No.4 (Raven River)	18 km NPS 48	Nov 2022	128
3	Western Alberta Mainline Loop No.2 (Longview)	10 km NPS 48	Nov 2023	65
4	Western Alberta Mainline Loop No.2 (Lundbreck)	7 km NPS 48	Nov 2023	83
5	Western Alberta Mainline Loop No.2 (Turner Valley)	23 km NPS 48	Nov 2023	209
			<b>Total</b>	<b>493</b>

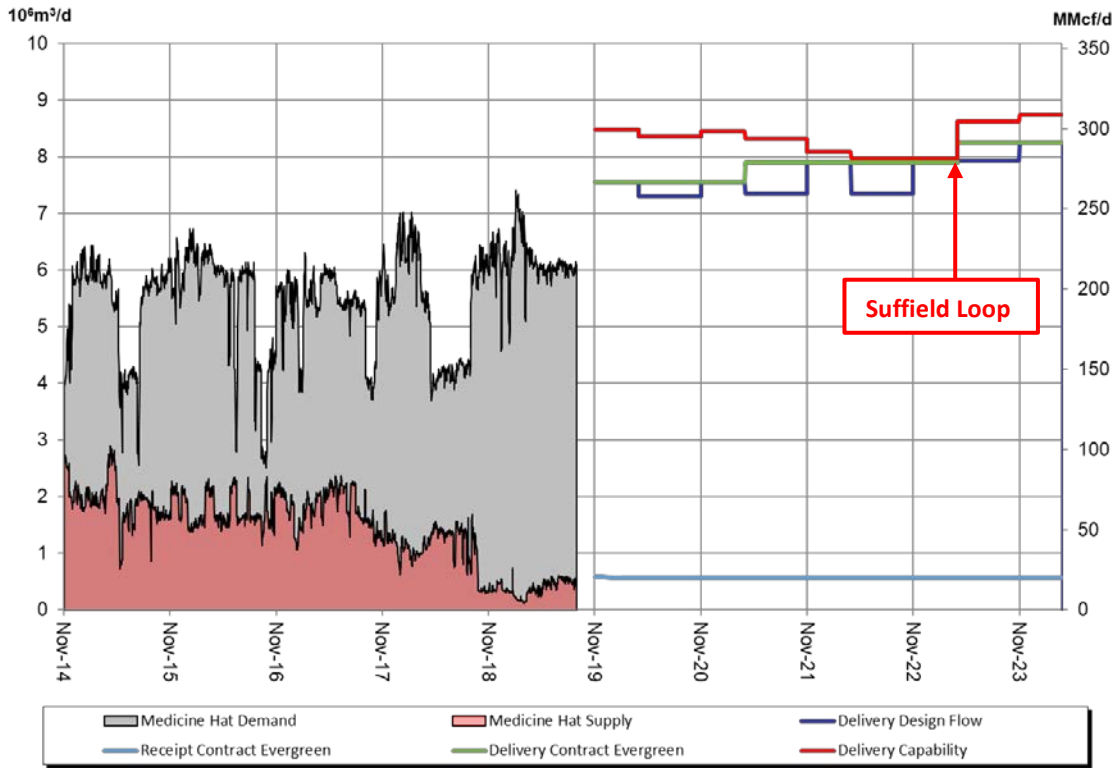
### 2.4.1 Design Flows – Medicine Hat Area

The prevailing design condition for the Medicine Hat area is Flow-Within Condition:

When local area deliveries are at their maximum and local area receipts are at their minimum. As local area receipts continue to decline and demands increase, facilities are required to transport in more receipts from outside the area to satisfy demand requirements.

Figure 2-7 shows historical flows, design flows, contract levels and design capability for the Medicine Hat Area. As can be seen, receipts have significantly declined over the last several years with the receipt contract level reflecting this drop. Absent additional facilities, delivery capability decreases as there is less local supply available. In addition to this, delivery design flow rises throughout this forecast period, attributable to a combination of increasing residential and industrial demands. A proposed facility is required to counteract the declining receipts and delivery capability, keeping it above the rising delivery design flow as highlighted in red in Figure 2-7.

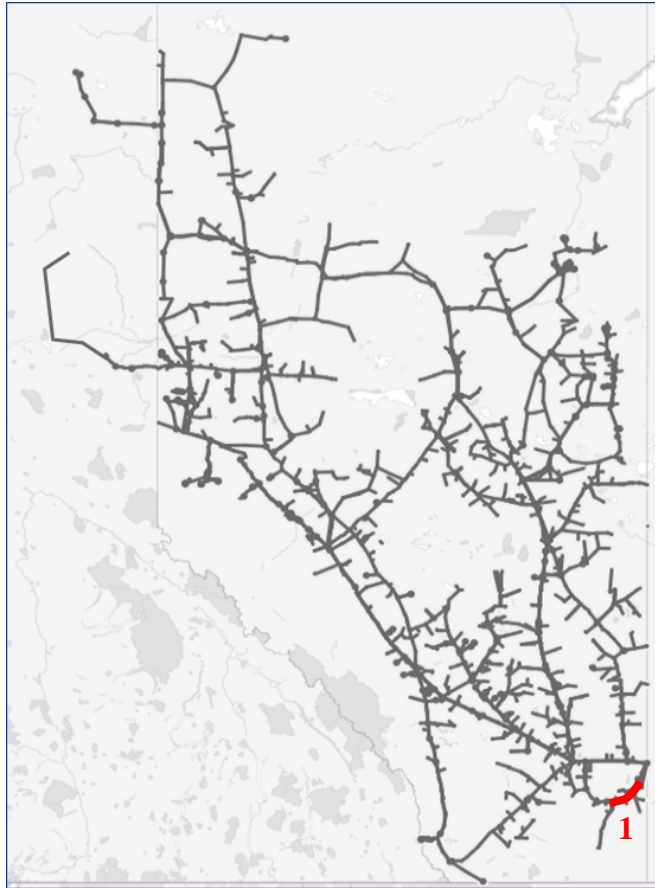
Figure 2-7: Medicine Hat Area Design Chart



2.4.2 Proposed Facilities for Medicine Hat Area Demands

Figure 2-8 shows the location of the proposed facility required for Medicine Hat area demands.

**Figure 2-8: Proposed Facility for Medicine Hat Area Demands**



An application for the proposed facility is expected to be filed with the CER in gas year 2019/2020 and the facility is proposed to be in-service in 2023. For details on the proposed facility, see Table 2-3.

**Table 2-3: Proposed Facility for Medicine Hat Area Demands**

Map Location	Proposed Facility	Description	Target In-Service Date	Forecast Cost (\$Millions)
1	Medicine Hat and Suffield Lateral Loop	58 km NPS 24	Apr 2023	189
			<b>Total</b>	<b>189</b>

**3.0 EXTENSION FACILITIES, LATERAL LOOPS AND METER STATIONS**

No additional extension facilities, lateral loops or receipt and delivery meter stations have been identified for this Annual Plan.

For a summary of the status of facilities that have been proposed, applied for, under construction or placed in-service since the 2018 Annual Plan, see *Appendix 2: Facility Status Update*.

**Planned Meter Stations**

Meter station projects are identified and planned to meet customer requests for service on an ongoing basis throughout the year. As new meter station projects are identified the TTFP will be informed and the new meter station projects will be included in the *2020 Facility Status Update (NGTL 2020 Update)*, which can be accessed at <http://www.tccustomerexpress.com/871.html>

**Appendix 1: Glossary of Terms**

The following definitions are provided to help the reader understand the Annual Plan. The definitions are not intended to be precise or exhaustive and have been simplified for ease of reference. These definitions should not be relied on to interpret NGTL's Gas Transportation Tariff or any Service Agreement. Capitalized terms not defined here are defined in NGTL's Gas Transportation Tariff.

**Allowance for Funds Used During Construction (AFUDC)**

The capitalization of financing costs incurred during construction of new facilities before the facilities are included in rate base.

**Annual Plan**

A document outlining NGTL's planned facility additions and major modifications.

**Average Annual Delivery**

The average day delivery determined for the period of one Gas Year. All forecast years are assumed to have 365 days.

**Average Day Delivery**

The average day delivery over a given period, determined by summing the total volumes delivered divided by the number of days in that period. It is determined for either a Delivery Point or an aggregation of Delivery Points.

**Average Receipt Forecast**

The forecast of average flows expected to be received onto the NGTL System at each receipt point.

**Coincidental**

Occurring at the same time.

**Delivery Meter Station**

A facility that measures gas volumes leaving the NGTL System.

**Delivery Point**

The point where gas might be delivered to customer by company under a Schedule of Service, which shall include but not be limited to Group 1 Delivery Point, Group 2 Delivery Point, Group 3 Delivery Point, Extraction Delivery Point and Storage Delivery Point.

**Delivery Design Area**

The NGTL System is divided into five delivery design areas used to facilitate delivery service within or between Delivery Design Areas:

- Northwest Alberta and Northeast BC Delivery Area
- Northeast Delivery Area
- Southwest Delivery Area
- Southeast Delivery Area
- Edmonton and Area Delivery Area

**Demand Coincidence Factor**

A factor applied to adjust the system maximum and minimum day deliveries in a design area to a value more indicative of the expected actual peak day deliveries.

**Design Area**

The NGTL System is divided into three project areas – Peace River Project Area, North and East Project Area and Mainline Project Area. These project areas are subdivided into design and sub design areas. This subdivision allows the system to be modelled in a way that best reflects the pattern of flows in each area of the system.

**Design Capability**

The maximum volume of gas that can be transported in a pipeline system considering design assumptions. Usually presented as a percentage of design flow requirements.

**Design Flows**

Forecast of Peak Expected Flow required to be transported in a pipeline system considering design assumptions.

**Design Forecast**

Forecast of the most current projection of receipts and deliveries over a five-year design horizon.

**Expansion Facilities**

Facilities that will expand the existing NGTL System to/from the point of customer connection, including any pipeline loop of the existing system, metering and associated connection piping and system compression.

**Extension Facilities**

Facilities that connect new or incremental supply or markets to the NGTL System.

**Firm Transportation**

Service offered to customers to receive gas onto the NGTL System at Receipt Points or deliver gas off the NGTL System at Delivery Points with a high degree of reliability.

**Flow-Through Design Condition**

For the purposes of facility design, a condition for a specified area when deliveries are at their minimum and receipts are at their maximum in that area.



**Flow-Within Design Condition**

For the purposes of facility design, a condition for a specified area when deliveries are at their maximum and receipts are at their minimum in that area.

**Gas Year**

A period beginning at 800 hours (08:00) Mountain Standard Time on the first day of November in any year and ending at 800 (08:00) Mountain Standard Time on the first day of November of the next year.

**Interruptible Transportation**

Service offered to customers to receive gas onto the NGTL System at Receipt Points or deliver gas off the NGTL System at Delivery Points, provided capacity exists in the facilities, that is not required to provide firm transportation.

**Lateral**

A section of pipe that connects one or more Receipt or Delivery Points to the mainline.

**Liquefied Natural Gas (LNG)**

Natural gas that has been cooled down to liquid form for ease of transport.

**Loop**

The paralleling of an existing pipeline by another pipeline.

**Mainline**

A section of pipe, identified through application of the mainline system design assumptions, necessary to meet the aggregate requirements of all customers.

**Maximum Day Delivery**

The forecast maximum volume, included in the design, to be delivered to a Delivery Point.

**Maximum Operating Pressure**

The maximum operating pressure at which a pipeline is operated.

**Minimum Day Delivery**

The forecast minimum volume, included in the design, to be delivered to a Delivery Point.

**NPS**

Nominal pipe size, in inches.

**Non-coincidental**

Non-simultaneous occurrence.

**Peak Expected Flow**

The peak flow expected to occur at a point or points on the NGTL System. For a design area or subdesign area, this is the coincidental peak of the aggregate flow. For a single receipt point, it is equivalent to field deliverability.

**Project Area**

For design purposes, the NGTL System is divided into three project areas – Peace River Project Area, North and East Project Area and Mainline Project Area.

Dividing the system this way allows the system to be modelled in a way that best reflects the pattern of flows in each area of the system.

**Receipt Meter Station**

A facility that measures gas volumes entering the NGTL System.

**Receipt Point**

The point on the NGTL System at which gas may be received from customer by company under a Schedule of Service.

**Storage Facility**

Any commercial facility where gas is stored, that is connected to the NGTL System, and that is available to all customers.

**Summer Season**

The period starting April 1 and ending on October 31 of any calendar year.

**System Average Receipts**

The forecast of aggregate average receipts at all Receipt Points.

**Transportation Design Process**

The process that includes qualifying a customer's applications for service, designing additions to the system, sourcing all required facilities and installing facilities to meet firm transportation requests.

**Winter Season**

The period starting November 1 of any year and ending on March 31 of the following year.

**Appendix 2: 2019 Facility Status Update**

The current format of Appendix 2 requires an 8.5”x14” page size in landscape orientation. As such, it is now maintained as a separate document which can be accessed at

<http://www.tccustomerexpress.com/5869.html>.

### Appendix 3: System Map

The System Map, including the 2019 Annual Plan facilities, is expected to be available in March 2020 and can be accessed at <http://www.tccustomerexpress.com/6033.html>.

**Appendix 4: Unit Transportation Cost Data**

This appendix is being provided pursuant to the direction contained in the National Energy Board, the predecessor to the CER, Order TG-004-2018 at page 3 through which it approved the NGTL 2018-2019 Revenue Requirement Settlement Application. It provides unit transportation cost data for three historical years and the five years covered in the 2019 Annual Plan.

The unit transportation cost data for each year was calculated by dividing revenue requirement by annual throughput.

**Unit Transportation Cost Data  
(2017 to 2024)**

	2017	2018	2019	2020	2021	2022	2023	2024
<b>A: Revenue Requirement [\$ millions]</b>	1,866 <sup>1</sup>	2,094 <sup>1</sup>	2,258 <sup>2</sup>	2,472 <sup>3</sup>	2,850 <sup>4</sup>	3,172 <sup>4</sup>	3,404 <sup>4</sup>	3,603 <sup>4</sup>
<b>B: Throughput<sup>5</sup> [10<sup>9</sup>m<sup>3</sup>]</b>	119	128	130 <sup>2</sup>	131 <sup>3</sup>	136 <sup>6</sup>	139 <sup>6</sup>	142 <sup>6</sup>	147 <sup>6</sup>
<b>C: = A/B Unit Cost [ \$ million/10<sup>9</sup>m<sup>3</sup>]</b>	15.7	16.4	17.4	18.9	21.0	22.8	24.0	24.5

## Sources:

1. From NGTL's Quarterly Surveillance Reports for the period ending December 31.
2. From NGTL's 2019 Final Rates Application.
3. From NGTL's 2020 Interim Rates Application.
4. Based on an illustrative escalation of NGTL's 2020 Revenue Requirement using simplifying assumptions for Rate Base additions and Revenue Requirement line items.
5. Based on the sum of all NGTL deliveries excluding storage injections.
6. Based on NGTL's Design Forecast prepared in June 2019.