

TRANS MOUNTAIN EXPANSION PROJECT UPDATE

Project Cost and Schedule

The total Project cost has increased from \$12.6 to \$21.4 billion, which includes the costs of all known enhancements, changes, delays and financing, including the substantial impact of the November 2021 floods in the Hope, Coquihalla, and Fraser Valley areas.

With all work fronts now active, Project construction is now more than 47 per cent complete, and overall project progress is at approximately 55 per cent complete. Mechanical completion of the Project is anticipated to occur in the third quarter of 2023.

Breakdown of Project Costs

The increase in costs, from \$12.6 billion to \$21.4 billion, can be attributed to five broad categories – project enhancements, safety and security, productivity challenges, schedule pressures and financing costs. The following is a range of examples of enhancements and challenges that impact the cost and schedule for the Expansion Project and form the basis of the new updated forecast, some of which are in the Project's control and others are not.

Project Enhancements

- Approximately \$2.3 billion increase.
- Changes in design and construction have had significant but necessary cost and schedule impacts. For example, changes to construction in the Jacko Lake, BC area has led to a \$100 million increase in costs related to construction methodology, Indigenous inclusion programs, enhancements to the safety of the system, environmental protection and the protection of heritage and cultural resources.
- The Coldwater Western Route has added over \$77 million in costs to complete additional pre-execution studies, enhanced archeological reviews and increased field work.
- Trans Mountain has entered into Indigenous Mutual Benefit Agreements (MBA's) with 69 First Nations, worth over \$580 million, which is almost \$200 million more than the previous Project estimate.
- Construction enhancements beyond industry standard have also been implemented including an increased number of inspectors for wildlife protection; increased number of horizontal directional drills, and water crossings – all executed to further protect the environment and eco-system. These programs caused increased Project costs of \$210 million and more than \$70 million for reclamation.
- Includes implementation of state-of-the-art leak detection program that has increased detection costs by over \$90 million to \$105 million.
- Increase of \$325 million for major trenchless crossings at water crossings and key roadways to avoid environmental impacts and public inconvenience.

- Additional camp constructions, due to increased worker requirements for Project construction and to reduce demands on local accommodations, included two new workers accommodation camps, Blue River and Ohamil, at a cost of \$66 million.
- The Project has moved more than one hundred anthills, moved almost 150,000 amphibians, and thousands of fish and snails, and created permanent homes for snakes and birds across the Project. Protection of snakes, badgers, snails, frogs, and anthills are done with great care along areas of the pipeline through relocating, tagging, and providing “crossings”. These unplanned efforts have added \$50 million to the Project cost.
- Protection of rare moss in several locations requiring its removal and replacement by hand.
- Protection of hundreds of kilometres of sensitive ground by using additional matting, for a cost increase of \$320 million.
- Environmental professionals have logged more than 25,000 person-days working in the field prior to construction; an additional 34,000 person-days have been spent implementing site-specific mitigation measures (as of December 2021). This has led to a \$120 million cost increase.

Examples of other Project Enhancements include:

- Diverted four unplanned watercourses within Burnaby Terminal that flow into the Eagle and Silver Creek waterways - these diversions were put in place to isolate and protect the streams from construction and future operations activities.
- Developed an industry-leading *Environmental Protection Rules Program*, which is the first of its kind - these ten Environmental Protection Rules (EPRs) have been communicated to everyone who works on the Expansion Project.
- Environmental mitigation measures for in-water construction at Westridge to minimize underwater and atmospheric noise – use of vibratory pile driving over impact piling, use of bubble curtains, use of a noise shroud during impact pile driving and underwater noise monitoring with mobile hydrophones. In April 2020, implementation of an additional fish deterrent method known as Acoustic Fish Deflection.

Safety and Security Enhancements

- Approximately \$500 million increase.
- The Project implemented a critical voluntary safety stand down in December 2020 to re-initiate, re-activate and re-set safety performance and culture across all spreads. Costs related to unproductive time during the safety stand down and immediate direct costs associated with implementation of response measures amounted to approximately \$180 million. Significant additional costs associated with the corresponding immediate three-month Project delay are captured throughout the other broad categories.
- The Project is being executed by a significant number of contractors and a workforce of more than 12,000 people across two provinces. The safety of that workforce is of paramount importance to Trans Mountain and the company has taken meaningful and unprecedented actions to enhance the safety of the

workforce at significant increased costs to the Project. Security costs for the Project doubled since the previous estimate, increasing by approximately \$117 million.

Additional costs in this category included:

- Trans Mountain incurred additional expenses to expand its number of field inspectors and supervisors to ensure the highest effectiveness of contractor oversight.
- Additional safety costs were incurred through implementing measures to keep workers safe during dramatic weather events.

Productivity Challenges

- Approximately \$1.7 billion increase.
- Trans Mountain removed one major construction contractor, had one contractor leave, and onboarded three new construction contractors across the Project.
- Some contractors' work productivity did not perform at previously estimated levels. This can be attributed to experienced worker availability, inefficient work start-up due to permit delays, and in some cases unforeseen ground and geotechnical conditions. Contractor productivity is improving and now reaching acceptable levels.
- Two years of COVID-19 restrictions and regulations have had an impact on costs as we implemented measures to ensure worker's safety; enhanced testing, social distancing measures, transportation and housing changes, and new accommodations requirements have limited the productivity of work crews.
- Includes weather delays (heat waves and wildfires), and impact of 2021 BC flooding.
- The combined effects of extreme weather, and substantial COVID measures is approximately \$1.4 billion.

Schedule Pressures

- Approximately \$2.6 billion increase.
- Trans Mountain requires several thousand permits across the Project. Permit application and processing timelines have impacted the ability to commence work, and to realize efficiencies in accessing work areas.
- The Project stand-down costs due to seasonal work issues including bird windows, extreme heat and fire seasons had an impact on the periods where work would have otherwise been completed and the time that workers were able to work in specific areas.
- Through construction progression at Burnaby Terminal and Westridge Marine Terminal, there was a need for additional earth works in these two key areas of construction that impacted the overall schedule and costs.
- Late 2021 flooding impacts in BC will affect schedule by up to three months.

Financing

- Approximately \$1.7 billion increase.
 - Financing costs have increased due the schedule extension, and the increase in the budget required to complete the Project.
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Employment & Training

As of December 31, 2021, there were approximately 12,000 people working on the Project. Trans Mountain is committed to prioritizing and maximizing Indigenous, local and regional hiring to the greatest extent possible.

- Approximately 20,000 people have been employed on the Project to date.
 - Trained approximately 6,840 people, approximately 840 were Indigenous.
 - More than \$60 million in education and training funding, programs and initiatives.
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Appendix

The Appendix contains updates on construction activity across the Project.



[Here](#) is a link to photos from the Trans Mountain Expansion Project.

Major Project Activities and Construction Progress by Region

- Construction of the Project is 47 per cent complete as of February 11, 2022.
- More than 536 kilometres has been stripped and graded.
- Approximately 423 kilometres of pipe has been welded.
- More than 380 kilometres of pipe is in the ground.
- 31 trenchless crossings have been completed out of the current total of 62 planned for the Project.

Greater Edmonton

Includes approximately 50 kilometres of pipeline construction and the expansion of Edmonton Terminal.

Milestones:

- Mechanically complete pipeline construction in February 2022.
- 14 major trenchless crossings complete.
- Community Benefit Agreements with City of Edmonton and Strathcona County.

Edmonton Terminal

As a part of the Project, four new storage tanks are being added to the Edmonton Terminal bringing the total to 39. The new tanks will add approximately 970,000 bbl of capacity to the Terminal for a total of 9.0 million bbl.

Milestones:

- 68 per cent complete.
- Construction of the four new tanks is complete.

Yellowhead Area

Includes four pump stations and approximately 285 kilometres of pipeline construction.

Milestones:

- More than 68 per cent complete.
- Approximately 200 kilometres of pipe installed.
- Four pump stations are more than 75 per cent complete.
- 11 major trenchless crossings complete.
- Community Benefit Agreements with Wabamun, Parkland County, Spruce Grove, Stony Plain, Yellowhead County, Edson and Hinton.

Reactivation – Jasper to Mount Robson and West Barriere

To complete the full twinning of the pipeline system, two pipeline segments that have been maintained in a deactivated state will be reactivated including approximately 150 kilometres of pipe from Hinton, Alberta to Hargreaves, BC, and approximately 42 kilometres of pipe from Darfield to Black Pines, BC.

Milestones:

- More than 58 per cent complete.
- Multiple digs underway in each reactivation segment.

North Thompson Region

Includes five pump stations, three camp communities and more than 275 kilometres of pipe between Mount Robson and Darfield, BC.

Milestones:

- More than 38 per cent complete.
- 4 major trenchless crossings complete.
- Three camp communities successfully operating – Blue River (capacity of 550), Clearwater (capacity of 550) and Valemount (capacity of 600).
- \$3.2 million in infrastructures to the Village of Valemount and \$3.1 million in infrastructure upgrades to District of Clearwater.
- Community Benefit Agreements with Valemount, Barriere, Clearwater and the Thompson-Nicola Regional District (which includes Vavenby, Birch Island, Black Pool, Blue River, Avola, Little Fort and Black Pines in the BC Interior).

BC Interior

Includes three new pump stations, one camp community and approximately 185 kilometres of pipeline construction.

Milestones:

- More than 45 per cent complete.
- 2 major trenchless crossings complete.
- One camp community successfully in operation – Merritt (capacity 400).
- Mobilization has started for innovative micro-tunneling construction at Jacko Lake
- Community Benefit Agreements with Kamloops and Merritt.
- Clearing underway at Coldwater Western Route.

Coquihalla to Hope

Includes one pump station and approximately 85 kilometres of pipeline.

Milestones:

- More than 22 per cent complete.
- One camp community successfully operation – Ohamil (capacity 350).

- Relationship with Shxw'ōwhámél First Nation for long-term development involving Ohamil Camp Community site.
- Community Benefit Agreement with Hope and Fraser Valley Regional District (Laidlaw and Popkum).
- Construction yard developed and in use at Popkum Indian Reserve

Fraser Valley

Includes approximately 70 kilometres of pipeline construction from Popkum/Bridal Falls to Langley, multiple trenchless crossings, and project areas requiring modified techniques to accommodate unique land uses or environmental conditions and the expansion of Sumas Terminal in Abbotsford.

Milestones:

- Construction commencing in Abbotsford.
- \$400,000 investment towards rural water access for Abbotsford residents.
- Community Benefit Agreement with City of Chilliwack, City of Abbotsford, Fraser Valley Regional District.
- Direct Pipe installation started at Sumas River.

Lower Mainland

The Lower Mainland includes 35 kilometres of pipeline construction between Langley and Burnaby.

Milestones:

- More than 16 per cent complete.
- Clearing and construction underway in Langley and Surrey.
- Fraser River crossing is underway (trenchless crossing between Surrey and Coquitlam).
- Community Benefit Agreement with Township of Langley, City of Surrey, City of Coquitlam, Coquitlam Foundation, Metro Vancouver Regional District.

Burnaby Terminal

Involves removal of one existing storage tank and installation of 14 new storage tanks (for a total of 26 tanks) at Burnaby Terminal including enhanced storm water treatment system, and relocation of four non-fish bearing watercourses.

Milestones:

- More than 58 per cent complete.
- Construction of 9 of 14 tanks is underway.
- New fire water pond complete.
- Burnaby Mountain tunnel portal exit nearing completion.
- Fire water-fire foam piping nearing completion.

Westridge Marine Terminal

Involves construction of three new shipping berths and a new utility dock for support vessels including installation of more than 165 marine piles to support dock complex. The existing berth will be decommissioned and includes foreshore expansion to accommodate new operations infrastructure and buildings.

Milestones:

- More than 62 per cent complete.
- Berth 1 and 2 superstructure complete including loading arms in place.
- Foreshore ground improvements significantly complete.
- Burnaby Mountain Tunnel portal development complete.

Burnaby Mountain Tunnel

Burnaby Mountain Tunnel is a 2.6 kilometre tunnel connecting Burnaby Terminal and Westridge Marine Terminal.

Milestone:

- More than 45 per cent complete.
- Tunnel boring machine has progressed over 750 metres.

Pump Stations

There are 12 new pump stations being added to the pipeline system to accommodate the Expansion, 11 for the new pipeline and one for the existing pipeline. Pump stations are a critical component of the operations of our pipeline system. They contain electric motors to drive the pumps that maintain the pressure and flow rate in the pipeline.

Ten of the new pump stations will be added at existing facilities, with the final two being added at new sites in BC.

- Several pump stations are mechanically complete.
- Work continues on pump stations in
 - Hargreaves
 - McMurphy
 - Darfield
 - Kamloops
 - Hope
 - Kingsvale
- Construction on the expanded pump station in Jasper will commence within weeks.