

Modal SHIFT NOTE 3 · MAY 2026

Modal shift Note 3:

Ridership envelope for the ALTO corridor, 2035–2080

An assessment of plausible annual ridership for the ALTO corridor across a 45-year operating horizon. The framework is built on three multiplicands — corridor population and its trajectory, per-capita intercity trip generation, and ALTO's modal share of those trips under three fare and subsidy regimes — and draws directly on the modal-shift machinery developed in the two companion notes on rail–air and rail–car substitution. The resulting envelope is then compared with the published ALTO forecasts, the McGill TRAM stated-preference projections, the Munk School GEPL independent academic model, the C.D. Howe Institute scenario analysis, and the federal government's own 2021 Joint Project Office business case.

SUMMARY

ALTO ridership in any given year is the product of corridor population, per-capita intercity trip generation, and ALTO's share of those trips. Each multiplicand has a defensible range; combining the favourable and unfavourable ends produces upper and lower envelopes. The two companion notes on rail–air and rail–car modal shift supply the modal-share machinery; this note adds the population denominator and the temporal trajectory.

The corridor population baseline is approximately 14.9 million across the directly-served census metropolitan areas in 2025. The 2024–25 federal Immigration Levels Plan, which for the first time set caps on temporary residents, has produced a structural inflection: Toronto's CMA shrank by 1,000 people in 2024–25 after gaining 269,000 the year before, and Greater Golden Horseshoe growth collapsed from approximately 313,000 per year to 40,000. This produces a credible lower trajectory (0.5 per cent annual growth) that did not exist in pre-2024 forecasts, and bounds the upper trajectory (1.6 per cent) below pre-2024 expectations.

Three fare and subsidy regimes span the realistic policy envelope. Heavy subsidy holds fares at VIA-equivalent levels with \$2.5–4.5 billion in annual public absorption of capital service, and captures approximately 38–42 per cent of the addressable market. Moderate subsidy — the canonical published-business-case configuration — sets fares at parity with air, requires \$1.5–2.5 billion in annual subsidy, and captures 28–32 per cent. Minimal subsidy under P3 yield management produces fares above air, requires \$0.5–1.5 billion in residual subsidy, and captures only 20–23 per cent.

The combined envelope for the corridor at mature operation runs from approximately 6.1 to 25.7 million annual passengers by 2080, with a central case of 12.5 million. The 2055 reading — ALTO's published headline year — is 3.7 to 17.2 million across the envelope, with a central case of 9.2 million; the corridor is not yet at mature operation in 2055 under the announced three-phase opening sequence. ALTO's published 24-million-by-2055 figure sits 40 per cent above the upper bound for 2055 and is incompatible with the announced phasing under any plausible ramp curve. The 43-million-by-2084 figure remains well above the upper bound under continued growth.

The CRI central case is consistent with the McGill TRAM stated-preference projection of 10.5 million by 2050 in directional terms — TRAM treats the corridor as fully open at its stated-preference horizon, while the CRI envelope reflects realistic phased-opening mechanics. The CRI upper bound by 2050 of 13.0 million sits within the C.D. Howe Institute high-speed scenario range of 12–21 million for the same year; by 2080 the CRI upper bound of 20.7 million reaches the upper end of that range. The Munk School GEPL implied corridor figure of 16–17 million by year 20 of operation aligns with the CRI upper case at maturity. The federal government's own 2021 business case figure of approximately 13.5 million per year is also consistent with the upper end of the CRI envelope. ALTO's published targets are an outlier against every other forecast for the corridor.

1. Framework

ALTO's annual ridership in any year is the product of three quantities: the corridor population served, the average number of intercity trips each resident makes per year on the served pairs (across air, rail, and car), and ALTO's share of those trips. Forecasting ridership therefore requires forecasting each multiplicand and combining their realistic ranges into an envelope of outcomes.

The two companion notes — on rail–air substitution (Note 1) and rail–car substitution (Note 2) — supply the modal-share machinery. Note 1 derives the air-substitution S-curve from the international literature, calibrates it against the European empirical record, and locates the corridor's three rail scenarios on the curve at travel time and at price-shifted operating points.

Note 2 extends the framework to road-rail substitution under a North American calibration anchored on current VIA Rail's 13 per cent rail share against road on the corridor's principal pairs, and develops the price-ratio, group-size, gas-price, and reliability sensitivities that shape realised modal share. Together the two notes provide canonical readings for ALTO's modal capture on each pair under defined operating assumptions.

What the two notes do not provide is the population denominator that converts modal share into absolute passenger volume, the per-capita trip generation that scales the addressable market with demographic change, the temporal phasing that distinguishes opening-year from mature-state ridership, and the explicit fare and subsidy regimes that determine which canonical readings apply. This note adds those four pieces and produces the resulting envelope across 2035–2080. It does not introduce new modal-share parameters; the modal-share readings used here are those derived in the two companion notes.

Ridership = corridor population × intercity trips per capita × ALTO modal share, scaled by ramp-up. Each multiplicand has a defensible range. The envelope combines them.

2. Corridor population baseline and trajectory

ALTO directly serves a set of census metropolitan areas spanning Toronto in the west to Québec City in the east, with intermediate stops at Peterborough, Ottawa, Laval, Trois-Rivières, and a number of secondary centres along the alignment. The 2025 baseline population in the directly-served CMAs is approximately 14.9 million, distributed across Toronto (7.10 million), Montréal (4.62 million), Ottawa-Gatineau (1.55 million), Québec City (0.86 million), and the smaller served centres including Trois-Rivières, Peterborough, and the intermediate cities of the corridor (Kingston, Belleville, Brockville, Cobourg, Cornwall, Drummondville) at approximately 0.8 million combined.

The 2024–25 demographic year produced a structural inflection. The federal Immigration Levels Plan announced in October 2024 was the first to set targets for temporary resident arrivals — the catch-all category covering international students, temporary foreign workers, and permit-pending arrivals — alongside the long-standing permanent-resident targets. The plan capped non-permanent residents at approximately 5 per cent of the national population, which required a multi-year drawdown of the existing stock. The effect on the corridor's two largest CMAs was immediate. Toronto's CMA recorded a net change in non-permanent residents of –44,800 in 2024–25 against +228,000 the year before, and the CMA's total population shrank by approximately 1,000 in the same year, following an annual gain of 269,000 in 2023–24. Montréal grew at +0.5 per cent against +2.9 per cent the year before. Greater Golden Horseshoe population growth collapsed from approximately 313,000 per year over 2022–24 to roughly 40,000 in 2024–25.

This is a structural break in the trajectory that pre-2024 forecasts had used as their baseline assumption. It does not unwind a corridor population that had already accumulated, but it does

invalidate the linear extrapolation of pre-2024 growth. Ridership forecasting that was anchored on a continuation of 2.5 to 3.5 per cent annual CMA growth — the pace observed during the 2022–24 surge — now requires explicit recalibration.

Three trajectories bracket the realistic forecast range. The lower trajectory assumes the 2024–25 inflection is structural: temporary-resident caps remain in place across multiple political cycles, aging accelerates the natural-increase deficit in the corridor's older suburban and rural belts, and net interprovincial migration continues to drain Ontario and Québec toward the Prairies. Annual corridor-weighted growth in this trajectory is approximately 0.5 per cent, close to the natural-increase floor with a small corridor-CMA premium over the national average. The central trajectory assumes the inflection is largely a one-off correction, immigration policy normalises at moderate levels by the early 2030s, and corridor-weighted growth resumes at approximately 1.0 per cent — slower than the pre-2024 surge but consistent with longer-run Canadian demographic norms and a modest corridor-CMA premium over the national average. The upper trajectory assumes a return toward the pre-2024 pace after a future political cycle, with corridor-weighted growth of approximately 1.6 per cent per year.

Corridor population trajectories, 2025–2080

Trajectory	Annual growth	2050	2080	Driver
Lower	0.5%	16.9 million	19.6 million	NPR drawdown is structural; aging accelerates
Central	1.0%	19.1 million	25.7 million	NPR drawdown is one-off; immigration normalises
Upper	1.6%	22.2 million	35.6 million	Pre-2024 pace partly resumes after political cycle

Table 1. Three population trajectories for the directly-served ALTO corridor CMAs, anchored on the 2025 baseline of approximately 14.9 million. The lower trajectory reflects the structural assumption that the 2024–25 federal cap on non-permanent residents persists across political cycles. The upper trajectory assumes a partial return to pre-2024 pace; it is bounded below the pre-2024 surge because the 2022–24 pace is not consistent with the announced cap and the federal infrastructure capacity for absorbing it. The central trajectory is the working assumption for the envelope that follows; the upper and lower trajectories define the population-side bounds.

The scale of the 2024–25 demographic break is best seen by plotting the post-cap trajectory against the trajectory that would have been forecast under continued surge conditions. Figure 1 overlays both — pre-2024 trajectories (dashed) anchored on the growth pace implied by the 2022–24 surge years across the range of immigration scenarios that pre-cap demographic projections had considered, and post-2024 trajectories (solid) anchored on the federal cap on

non-permanent residents and the demographic data released by Statistics Canada in January 2026. The shaded gap between each matched pair of lines shows the demographic correction that this note's envelope applies.

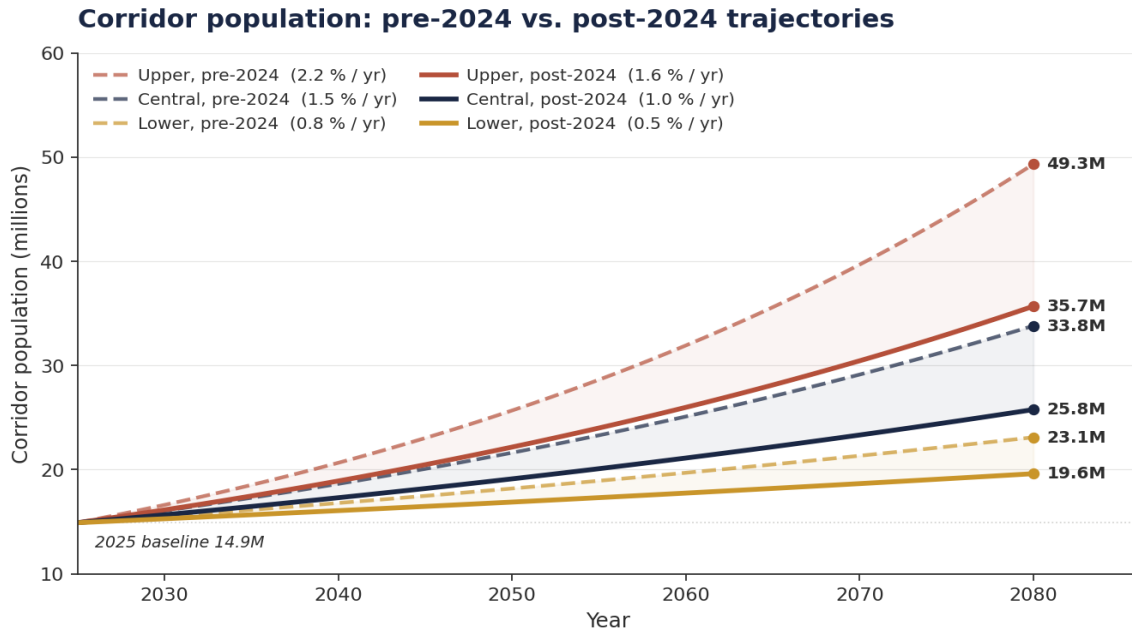


Figure 1. Corridor population trajectories, 2025–2080, comparing pre-2024 and post-2024 demographic assumptions on the same axis. Dashed lines represent the pre-2024 trajectories that comparable published forecasts for the corridor (TRAM, Munk GEPL, C.D. Howe, federal JPO 2021) used as their implicit population input. Solid lines represent the post-2024 trajectories used in this note, reflecting the 2024 federal Immigration Levels Plan cap on non-permanent residents and the demographic data released by Statistics Canada in January 2026, with a corridor-CMA premium of approximately 0.4 percentage points applied over the StatCan national projection scenarios. The 2080 endpoint comparison is striking: under the pre-2024 Upper assumption the corridor approaches 50 million by 2080, against 35.6 million under the post-2024 Upper assumption; under the Central assumption the gap is 33.8 million versus 25.7 million; under the Lower assumption the gap is 23.1 million versus 19.6 million. The post-2024 Upper trajectory sits below the pre-2024 Central trajectory across much of the forecast horizon, indicating that what was previously considered a high-growth scenario is now an upper-bound case. Approximately 15 to 25 per cent of the gap between the CRI envelope and the other published forecasts for the corridor can be attributed to this single demographic correction alone, before any consideration of modal-shift parameters, ramp-up curves, or fare and subsidy regimes.

The three corridor trajectories used in this analysis are anchored on Statistics Canada's official population projections for Canada, released January 27, 2026 (catalogue number 17-20-0003, with the supporting interactive dashboard at catalogue 71-607-X-2022015), with a corridor-CMA growth premium of approximately 0.4 percentage points applied to each of the three principal scenarios. The StatCan projections use July 2025 population estimates as the base — 41.7 million nationally — and publish ten scenarios reflecting different fertility, mortality, immigration, emigration, and non-permanent resident assumptions. The three principal scenarios map onto the three corridor trajectories used in this note as follows. The CRI lower corridor trajectory (0.5

per cent annual growth, reaching 19.6 million by 2080) corresponds to the StatCan low-growth (LG) scenario, which combines low fertility (1.09 children per woman by 2050), high mortality, low immigration (6.9 per thousand by 2050), high emigration, and a falling non-permanent resident share (4.2 per cent in 2030 dropping to 3.2 per cent by 2050); at the national level the LG scenario produces population growth of essentially zero (-0.01 per cent) by 2074/2075 and a national total of 44.0 million by 2075. The CRI central corridor trajectory (1.0 per cent, reaching 25.7 million by 2080) corresponds to the StatCan medium-growth M1 scenario, with medium fertility (1.32 by 2050), medium immigration (9.2 per thousand by 2050), and a 4.6 per cent non-permanent resident share — producing national growth of 0.67 per cent by 2074/2075 and a national total of 57.4 million by 2075. The CRI upper corridor trajectory (1.6 per cent, reaching 35.6 million by 2080) corresponds to the StatCan high-growth (HG) scenario, with high fertility (1.55), low mortality, high immigration (11.3 per thousand by 2050), low emigration, and a 6.2 per cent non-permanent resident share — producing national growth of 1.34 per cent by 2074/2075 and a national total of 75.8 million by 2075.

The corridor-CMA growth premium

The corridor-level annual growth rates used in this note (0.5 / 1.0 / 1.6 per cent across the three trajectories) sit approximately 0.4 percentage points above the corresponding StatCan national CAGRs over the 2025–2075 horizon (0.11 / 0.64 / 1.20 per cent for the LG, M1, and HG scenarios respectively, computed as $((\text{endpoint} / 41.7\text{M})^{(1/50)} - 1)$ from the published 2025 and 2075 totals). The 0.4-percentage-point corridor-CMA growth premium reflects the empirical pattern in which the corridor's directly-served census metropolitan areas have grown faster than the national average over the recent past, moderated for forward-looking structural factors specific to the corridor.

The historical case for a corridor premium is straightforward. Population-weighted across the directly-served CMAs, the corridor grew at approximately 1.8 per cent annually over 2000–2025 against the national pace of 1.23 per cent — a population-weighted historical premium of approximately 0.55 percentage points. Toronto's CMA alone grew at approximately 2.5 per cent annually over that period, reflecting its position as the country's primary immigration destination and the continuing concentration of Canadian economic activity into the corridor's western anchor. Ottawa–Gatineau grew at approximately 1.5 per cent, supported by federal public-service expansion and tech-sector growth. Montréal and Québec City grew at approximately 1.2 per cent and 1.0 per cent respectively, both slower than the national average but still positive.

Two forward-looking factors moderate the historical premium. First, Quebec's projected demographic-weight decline (its share of the national population falling from 21.7 per cent in 2025 to between 18.1 and 19.1 per cent in 2050 across all StatCan scenarios) pulls Montréal-CMA and Québec-City-CMA growth back toward or below the national average. Second, Calgary, Edmonton, and Vancouver are capturing a rising share of net interprovincial migration that historically flowed toward Toronto, which moderates the Toronto-CMA premium going forward. The net effect is a corridor that continues to grow modestly faster than the national

average, but with the forward premium compressed from the historical 0.55 percentage points to approximately 0.4 percentage points — applied uniformly across the three principal scenarios. This is the working premium used in this note. It sits between a no-premium reading (which would assume corridor growth tracks national growth exactly, an overly conservative assumption inconsistent with the historical pattern) and a full-historical-premium reading (which would assume the 0.55-percentage-point historical gap persists undiminished, an overly optimistic assumption that ignores the projected Quebec decline and Western redirection). The 0.4-percentage-point premium is therefore a conservative reading of the empirical evidence — chosen explicitly to ensure that the resulting envelope is not vulnerable to the argument that the CRI corridor trajectories underweight the directly-served CMAs' historical and projected growth advantage over the national average.

3. Per-capita intercity trip generation

The corridor's three principal city pairs — Toronto–Ottawa, Toronto–Montréal, and Ottawa–Montréal — together carry approximately 19.9 million annual person-trips across air, rail, and car (Note 2, Table 1). Adding the secondary pairs — Montréal–Québec City, Ottawa–Québec City, intermediate-station traffic on the principal pairs (Toronto–Kingston, Toronto–Belleville, Ottawa–Brockville, Montréal–Cornwall), and Toronto–Peterborough — brings the addressable corridor market to approximately 25 million annual person-trips. Against a 2025 corridor population of 14.9 million, this implies a per-capita rate of approximately 1.68 trips per resident per year on the directly-served axes.

Per-capita trip generation is shaped by competing effects over a 45-year horizon. On the suppressing side, hybrid work has structurally reduced corridor business travel below the pre-pandemic baseline, and AI-mediated meetings will continue to erode the marginal demand for in-person business travel. The trip-generation literature consistently finds that business travel adjusts more elastically to communication-technology improvements than leisure travel does. On the supporting side, urbanisation and the continuing concentration of Canadian economic activity into the corridor support per-capita trip generation, particularly leisure travel, and rising affluence in the corridor's secondary centres tends to lift intercity demand.

The net effect over the forecast horizon is roughly stable to mildly declining. The range used in this note is 1.6 to 1.8 trips per capita per year, with the central case closer to 1.7. This range does not assume any structural shift in the trip-generation function; it spans the realistic envelope of how hybrid work, demographic ageing, and corridor concentration interact over the period. A more aggressive structural decline — for example a long-run collapse of business travel toward 1.4 trips per capita — would compress the envelope further. A more aggressive structural rise — for example a return of intercity business travel to pre-pandemic levels — would lift it. The note's central envelope uses the stable-to-mildly-declining assumption.

4. Modal share by fare and subsidy regime

ALTO's share of the addressable market is the third multiplicand, and is the dimension on which the corridor decision turns most directly. The two companion notes derive the canonical modal-share readings under defined operating assumptions; this section translates those readings into three fare and subsidy regimes that span the realistic policy envelope, and produces the implied aggregate share of the corridor's addressable trip market under each regime.

The aggregate share is a weighted blend across air, current rail, and car markets on the three principal pairs, with weights corresponding to the 2025 baseline volumes from Note 2 Table 1: approximately 3.25 million air trips, 2.13 million current rail trips, and 14.5 million car trips on the three principal pairs (the secondary pairs are treated proportionally, with similar capture ratios). The blend reflects realistic group composition (Note 2, Section 4) — a mix of solo, couple, and family travellers across the corridor's leisure and business demand profile — rather than the solo-traveller readings that anchor the time-and-price geometry.

Regime A — Heavy operating subsidy (low fares)

Under heavy subsidy, fares are held at VIA-equivalent levels — approximately \$80 to \$130 economy on Toronto–Montréal, \$60 to \$90 on Toronto–Ottawa — which produces a rail-to-air price ratio of 0.4 to 0.5 (Note 1, Section 4) and a per-person rail-to-car price ratio of approximately 1.0 for a solo traveller (Note 2, Section 4). The capital cost of ALTO is absorbed into the public capital account through the standard public-infrastructure model used for European HSR and the model under which VIA Rail already operates. Annual operating subsidy in this regime is approximately \$2.5 to \$4.5 billion, covering capital service plus the gap between fare revenue and operating cost.

Modal capture under Regime A: approximately 85 per cent of the air market on the principal Toronto pairs (93 per cent on Toronto–Ottawa, 78 per cent on Toronto–Montréal, per the price-shifted readings in Note 1 Figure 4 with $r \approx 0.5$); essentially 100 per cent of existing VIA rail demand, now carried by ALTO; and approximately 22 per cent of the rail+car market under realistic group-mix conditions (Note 2 Figure 6 weighted across solo, couple, and family travellers). Aggregate share of the addressable market: approximately 38 to 42 per cent.

Regime B — Moderate subsidy (parity with air)

Under moderate subsidy, fares are set at parity with air — approximately \$150 to \$220 on Toronto–Montréal, \$110 to \$160 on Toronto–Ottawa — producing a rail-to-air price ratio close to 1.0 and a per-person rail-to-car price ratio of approximately 2.0 to 2.4 for a solo traveller. This is the canonical published-business-case configuration referenced in the two companion notes and in ALTO's own communications. Annual operating subsidy is approximately \$1.5 to \$2.5 billion, reflecting the partial absorption of the higher capital base into the public account.

Modal capture under Regime B: approximately 70 per cent of the air market (88 per cent on Toronto–Ottawa, 66 per cent on Toronto–Montréal, per Note 1 Table 2); approximately 95 per cent of existing VIA demand (a small share priced out at the high end); and approximately 9 to 11 per cent of the rail+car market on a group-weighted basis. Aggregate share of the addressable market: approximately 28 to 32 per cent. This is the regime under which the canonical 24-million headline figure is implicitly framed.

Regime C — Minimal subsidy under P3 yield management

Under minimal subsidy, the Cadence consortium prices for revenue maximisation rather than market expansion — the standard P3 yield-management approach. Fares move above air parity: approximately \$220 to \$350 or above on Toronto–Montréal, \$150 to \$250 or above on Toronto–Ottawa. The rail-to-air price ratio rises to 1.1 to 1.4, and the per-person rail-to-car price ratio reaches 3 to 4 for a solo traveller and above 12 for a family of four. Annual operating subsidy is approximately \$0.5 to \$1.5 billion — still positive, because the fully self-funded P3 model is not survivable arithmetic at any modal share consistent with the framework, despite the public communications that frame ALTO as zero-subsidy.

Modal capture under Regime C: approximately 50 per cent of the air market (75 per cent on Toronto–Ottawa, 45 per cent on Toronto–Montréal); approximately 80 per cent of existing VIA demand (significant price-out at the lower end of the existing rail market); and approximately 4 per cent of the rail+car market on a group-weighted basis. Aggregate share of the addressable market: approximately 20 to 23 per cent.

Regime summary

Regime	Fare structure	Annual subsidy	Air capture	Car capture	Aggregate share
A. Heavy subsidy	T-Mtl ~\$80–130; r_air ≈ 0.4–0.5	\$2.5– 4.5B/yr	~85%	~22%	38–42%
B. Moderate (canonical)	T-Mtl ~\$150–220; r_air ≈ 0.9–1.0	\$1.5– 2.5B/yr	~70%	~9–11%	28–32%
C. Minimal (P3 yield)	T-Mtl ~\$220–350+; r_air ≈ 1.1–1.4	\$0.5– 1.5B/yr	~50%	~4%	20–23%

Table 2. Three fare and subsidy regimes for ALTO, with the implied modal capture on each segment of the addressable market and the aggregate share of corridor person-trips. The aggregate-share column is a weighted blend across the air, current rail, and car markets on the three principal pairs, derived from the canonical readings in Notes 1 and 2 with realistic group composition. The factor-of-two range across regimes operates independently of the infrastructure choice: the same ALTO physical asset produces double or half the ridership depending on the fare and subsidy decision. No regime delivers self-funding at any modal share consistent with the modal-shift framework.

5. Phasing and segment completion

ALTO ridership in any specific year depends on three timing variables that operate together: the construction schedule, which determines when revenue service can begin; the segment opening sequence, which determines what fraction of the corridor's addressable market is being served; and the ramp curve on each opened segment, which determines what fraction of mature ridership has been realised. Each variable carries its own range of uncertainty, and the front end of the ridership trajectory is sensitive to all three.

Construction timeline

The 2026–2034 period is consumed by completion of the consultation cycle, environmental assessment, expropriation across the alignment, detailed engineering design, the P3 contract negotiation with the Cadence consortium, and early enabling works including utility relocations, geotechnical investigation, and station-area planning. None of this period produces revenue service. Realistic procurement experience for Canadian P3 megaprojects of comparable scale — Eglinton Crosstown, Ottawa Confederation Line, the Ontario Line — suggests these timelines slip rather than compress. The 2035 date that appears in some ALTO communications as an opening-year reference is not consistent with the procurement schedule under any defensible reading; the earliest plausible phased opening is approximately 2038, with the central scenario closer to 2040 and a defensible upper-end risk extending to 2042.

Phase 1: Montréal–Ottawa

ALTO's announced phasing opens the Montréal–Ottawa segment first. This is the shortest of the three principal segments (approximately 190 km), traverses the simplest engineering and geological conditions on the corridor, and serves the Ottawa–Montréal city pair — the smallest of the three principal pairs by both passenger volume and air-substitutable demand. The Ottawa–Montréal pair carries approximately 5 million annual person-trips across air, rail, and car (Note 2, Table 1), against a total corridor addressable market of approximately 25 million. Phase 1 therefore covers approximately 20 per cent of the corridor's addressable demand at the moment it opens. This is the principal engineering and political reason for sequencing it first: it is the lowest-risk segment to deliver, the federal-provincial cost-share is the simplest, and revenue service can begin while the more complex segments are still under construction.

The implication for ridership forecasting is that Phase 1 ridership in its early years is structurally small. It cannot draw on the Toronto–Montréal flow (the largest single pair on the corridor) because Toronto is not yet connected, and it cannot draw on the Toronto–Ottawa flow for the same reason. Phase 1 alone therefore supports only the Ottawa–Montréal demand pool, and even at full Phase 1 maturity the corridor is operating at approximately one-fifth of its eventual capacity. The early-year ridership trajectory is correspondingly modest, and the political optics of the opening years require explicit framing: a successful Phase 1 opening at 80 per cent of its mature ridership still represents only 16 per cent of the corridor's eventual demand.

Phase 2: Toronto–Ottawa extension

The second phase extends the corridor west from Ottawa to Toronto, adding approximately 450 km of new-build dedicated track and bringing the three principal pairs (Toronto–Ottawa, Toronto–Montréal, and Ottawa–Montréal) all onto the operational network. Phase 2 is the demand inflection point of the corridor. Opening Phase 2 unlocks two demand flows that did not exist on Phase 1 alone: the Toronto–Ottawa direct pair (approximately 6.2 million annual person-trips), and the Toronto–Montréal pair (approximately 8.7 million), which now flows over the Phase 1 segment as part of an end-to-end Toronto–Montréal journey. The Toronto–Ottawa segment also captures the intermediate-station demand at Peterborough, Kingston, and Belleville — flows that are smaller than the principal pairs but contribute meaningfully to corridor totals.

Phase 2 therefore adds approximately 60 per cent of the corridor's addressable demand on top of the Phase 1 segment. Cumulative Phase 1+2 coverage is approximately 80 per cent of corridor — the full Toronto–Ottawa–Montréal triangle, which is the heart of the corridor's modal-shift case. The remaining 20 per cent of corridor demand requires Phase 3. The schedule risk on Phase 2 is moderate: substantial expropriation across Eastern Ontario, complex grade-separation across the Frontenac Arch and the Napanee Limestone Plain, the Leda clay segment around Brockville and Smiths Falls, and the political negotiation with Eastern Ontario municipalities and Indigenous nations along the alignment. The plausible Phase 2 opening window is approximately 2042–2046, with the central scenario closer to 2045.

Phase 3: Trois-Rivières and Québec City extension

The third phase extends the corridor east from Montréal to Québec City via Trois-Rivières and the Laval connection. Phase 3 adds the remaining approximately 20 per cent of the corridor's addressable demand: the Montréal–Québec City pair (approximately 3 million annual person-trips), the Ottawa–Québec City pair (approximately 1.2 million), and the intermediate-station traffic on the Quebec section. Phase 3 is the most schedule-vulnerable element of the project for three reinforcing reasons. The St-Lawrence crossing between Montréal and the south shore involves substantial structural engineering and Leda clay differential settlement risk. The southern-shore-vs-Trois-Rivières routing has not been settled, with Québec provincial preferences still in active negotiation. And the federal-provincial cost-share on the Phase 3 segment is unresolved, with Québec seeking firmer commitments before the corridor decision is finalised. The 2047–2052 opening window for Phase 3 is therefore an earliest plausible range; central scenario closer to 2050, defensible downside to 2055, and a Phase-3-deferred outcome where the QC extension is permanently postponed or delivered as upgraded conventional rail rather than HSR is a credible scenario that the envelope should reflect.

The North American ramp curve

The ramp-up curve in the North American context is meaningfully slower than the European comparators. Madrid–Barcelona took approximately four years after opening in 2008 to decisively overtake the air bridge on the rail-versus-air pair, and operated under structural conditions far more favourable to rail than ALTO does — high fuel taxes, congestion-charged urban cores, dense feeder transit, and an established rail-travel culture. Brightline Miami–Orlando, the closest current North American analogue operating against parallel toll-free highway, remains in financial ramp-up after several years of operation, with bond ratings recently downgraded to CCC+ and ridership well below the levels that European HSR achieves on comparable distances. The North American context produces slower ramp curves than the European calibration would imply.

The ramp curve used in this envelope is calibrated against the Brightline observed profile (2024–26) for the lower and central cases, and against the Madrid–Barcelona profile for the upper case. The three-track calibration reflects the same fare and subsidy regime structure used elsewhere in the envelope: Regime C's yield-management posture produces a slower ramp because higher fares suppress the early-adopter demand that drives a fast modal-shift transition; Regime A's heavy-subsidy posture produces a faster ramp because low fares accelerate market discovery and habit formation; Regime B sits in between.

Years post-segment-opening	Lower (Regime C)	Central (Regime B)	Upper (Regime A)
Year 1	15%	25%	35%
Year 3	35%	50%	65%
Year 5	55%	70%	80%
Year 8	75%	85%	92%
Year 10+	90%	95%	100%

Table 3. Ramp factors applied to each opened segment, expressed as the fraction of that segment's mature ridership realised in each year post-opening. The three columns correspond to the three fare and subsidy regimes from Section 4: Regime C (minimal subsidy, P3 yield management) produces a slower ramp; Regime A (heavy subsidy, low fares) produces a faster ramp; Regime B sits between them. The ramp is applied to Phase 1 (Montréal–Ottawa), Phase 2 (Toronto–Ottawa extension), and Phase 3 (Trois-Rivières–Québec City extension) separately, with each segment's clock starting from its own opening year. Combined corridor ridership in any given year is therefore the sum of (Phase 1 mature × Phase 1 ramp) + (Phase 2 mature × Phase 2 ramp) + (Phase 3 mature × Phase 3 ramp), where Phase 1 mature is approximately 20 per cent of full-corridor mature, Phase 2 mature is approximately 60 per cent, and Phase 3 mature is approximately 20 per cent.

Phase opening schedule by scenario

The phase opening years vary across the three scenarios because, as Section 6 explains in detail, the fare and subsidy regime correlates with realistic delivery pace through political-commitment, cost-overrun, and federal-provincial cost-share dynamics. The schedule used in each scenario is summarised below.

Scenario	Regime	Phase 1 (Mtl–Ott)	Phase 2 (Ott–Tor)	Phase 3 (Mtl–QC)
Lower	C — minimal subsidy	2042	2048	2055
Central	B — moderate subsidy	2040	2045	2050
Upper	A — heavy subsidy	2038	2042	2046

Table 4. Phase opening schedule by scenario, showing the central plausible opening year for each phase under each fare and subsidy regime. Phase 1 (Mtl–Ott) opens earliest under Regime A's heavy public commitment and latest under Regime C's lean P3 financial structure. Phase 3 (Mtl–QC) is the most schedule-sensitive segment because of the St-Lawrence crossing, Leda clay risk, and the unresolved federal-provincial cost-share negotiation with Québec; its opening year moves most widely across the three scenarios. The dates are central plausible readings within each scenario; defensible early and late bounds extend each opening year by approximately ± 2 to ± 3 years. The scenarios bundle the schedule with the population and regime dimensions for internal consistency, as the next section discusses; in principle, alternative combinations across the three dimensions are possible and would produce intermediate trajectories.

Combining segment ramps

Under the central scenario, Phase 1 (Mtl–Ott) opens 2040, Phase 2 (Ott–Toronto) opens 2045, Phase 3 (Mtl–QC) opens 2050. Applying the central-case ramp factors against each phase's share of corridor mature ridership produces the following profile. In 2045, Phase 1 is in its fifth year of operation (70 per cent ramp on its 20-per-cent share), and Phase 2 has just opened (25 per cent ramp on its 60-per-cent share); the corridor is therefore operating at approximately 29 per cent of its mature potential. In 2050, Phase 1 is near mature, Phase 2 is at year five (70 per cent ramp), and Phase 3 has just opened (25 per cent ramp); the corridor is at approximately 65 per cent of mature. In 2055, Phase 1 and Phase 2 are mature, and Phase 3 is at year five (70 per cent); the corridor is at approximately 88 per cent of mature. Genuine full-corridor mature operation is reached around 2060.

Three observations follow. First, the front end of the trajectory is meaningfully slow under the three-phase structure. The 2040 central-case figure is 0.4 million — Phase 1 alone in its opening year, serving only the Ottawa–Montréal pair at 25 per cent of its mature share. The 2045 figure is 2.8 million — substantially below the published comparator forecasts but consistent with the realistic mechanics of a three-phase build. The corridor does not approach its mature ridership until the early 2050s in the central case, and not until the mid-2050s in the

lower case. Second, the convergence to mature ridership is shifted later by approximately five years compared to a single-phase opening, with full corridor maturity in the 2058–2062 window rather than 2055. ALTO's published 24-million-by-2055 figure is incompatible with the announced phasing under any plausible ramp curve: the corridor cannot be at mature operation in 2055 if Phase 3 only opens in 2050. Third, the policy implication is that the early years of operation will be financially exposed. Phase 1 alone, even at full Phase 1 maturity, generates ridership of approximately 1 to 5 million annual passengers across the regimes — a fraction of what is needed to support operating economics on a \$60–90 billion capital base.

Phase 1 only — schedule sensitivity

Two sensitivity readings on schedule risk are worth flagging. First, if Phase 2 (Toronto–Ottawa) is delayed substantially or delivered only as upgraded conventional rail, the corridor is permanently capped at Phase 1's 20-per-cent share of corridor demand. The mature ridership in this scenario is approximately 1.2 to 5.1 million annual passengers across the three regimes (lower 1.2, central 2.5, upper 5.1) — well below all published comparator forecasts and below the level required to support any reasonable interpretation of the corridor's operating economics. Second, if Phase 3 (Mtl–QC) is permanently deferred but Phase 1 and Phase 2 are completed, the corridor is capped at the Phase 1+2 share of approximately 80 per cent of corridor demand. The mature ridership in this scenario is approximately 4.9 to 20.5 million across the three regimes (lower 4.9, central 10.0, upper 20.5) — sitting in the same range as the McGill TRAM stated-preference projection (10.5 million by 2050) for the central case, and reaching the upper end of the C.D. Howe HSR scenario range under the upper case. The Phase-3-deferred scenario is the more credible of the two downside readings given Québec's negotiating position. Neither is the central case in this note's envelope but both are scenarios that any independent review of the corridor's projected fiscal trajectory should reflect.

6. Ridership envelope, 2035–2080

Combining the population trajectory (Section 2), the per-capita trip generation (Section 3), the modal-share regime (Section 4), and the phasing and ramp-up framework (Section 5) produces the envelope below. The lower bound combines Regime C with the lower population trajectory and 1.6 trips per capita; the central case combines Regime B with the central population trajectory and 1.7 trips per capita; the upper bound combines Regime A with the upper population trajectory and 1.8 trips per capita. Each combination is paired with the corresponding ramp curve from Table 3 and the phase opening schedule from Table 4, applied separately to Phase 1 (Mtl–Ott), Phase 2 (Ott–Toronto extension), and Phase 3 (Mtl–QC extension).

Year	Status	Lower (M)	Central (M)	Upper (M)
2035	Construction; no revenue service	0	0	0
2040	Phase 1 (Mtl–Ott) opening years	0	0.4	1.8
2045	Phase 1 maturing; Phase 2 (Ott–Tor) opens	0.5	2.8	9.2
2050	Phase 1+2 maturing; Phase 3 (Mtl–QC) opens	1.9	6.7	14.8
2055	Phase 1+2 mature; Phase 3 ramping	3.7	9.2	17.2
2060	All phases near-mature plus growth	4.8	10.2	18.7
2070	Mature plus sustained growth	5.8	11.3	21.9
2080	Mature plus full forecast growth	6.1	12.5	25.7

Table 5. ALTO annual ridership envelope, 2035–2080, in millions of passengers, with three-phase opening sequence and ramp applied per Section 5. Phase opening dates by scenario are summarised in Table 4. Lower bound: Regime C × lower population × 1.6 trips/cap × Regime C ramp curve. Central case: Regime B × central population × 1.7 trips/cap × Regime B ramp curve. Upper bound: Regime A × upper population × 1.8 trips/cap × Regime A ramp curve. Each combination is internally consistent: Regime A's heavy operating subsidy is what enables both higher trip generation and the faster ramp under the upper population trajectory, and is also what justifies an earlier phase 2 and 3 schedule; Regime C's yield management produces both lower modal capture and a slower ramp, alongside later phase openings. The 2040 figures reflect Phase 1 alone serving its 20-per-cent share of the corridor's addressable demand. The 2045 figures reflect Phase 2 just opening with its 60-per-cent share. The 2050 figures reflect Phase 3 just opening, with the corridor at approximately 65 per cent of mature potential under the central case. Genuine full-corridor mature operation is reached around 2060, not 2055.

The phase opening dates differ across the three scenarios because the fare and subsidy regime correlates with the realistic delivery pace through three reinforcing mechanisms. Regime A's heavy federal subsidy implies a level of political and fiscal commitment that historically compresses procurement schedules — heavily-funded projects face strong political pressure for early openings, and federal cost-overrun absorption removes the renegotiation friction that delays projects with tighter financial structures. Regime C's minimal-subsidy posture, by contrast, pushes the consortium to find pricing structures that allow the P3 to carry more of the cost, which delays delivery while financing structures are worked out. The Canadian P3 megaproject record (Eglinton Crosstown, Ottawa Confederation Line, the Ontario Line) supports this pattern: lean financial structures correlate with schedule slippage. Phase 3 specifically is exposed to this dynamic because it carries the St-Lawrence crossing, Leda clay risk, and the

unresolved federal-provincial cost-share negotiation with Québec — under Regime A, Ottawa absorbs more of the Phase 3 cost and Québec's negotiating position is easier to satisfy; under Regime C, each side is fighting over a tighter budget and the negotiation extends. Phase 3 therefore moves to 2046 under the upper-case schedule and to 2055 (or later) under the lower-case schedule.

This regime-schedule bundling produces internally-consistent scenarios — each combines population, regime, and schedule assumptions that fit together coherently as a single story of how the corridor unfolds — but readers should note that the three dimensions are in principle independent. A heavy-subsidy Regime A combined with the lower population trajectory, for example, would produce a faster early-year ramp than the Lower scenario shown here; a P3-yield-management Regime C combined with the upper population trajectory would produce a slower ramp than the Upper scenario shown here. The envelope width at the front end therefore reflects bundled rather than fully independent uncertainty, and the Lower-Upper spread in 2040 through 2050 captures the realistic correlation between the three dimensions rather than their full statistical range. By 2070–2080, when all schedule effects have played out and every scenario is at or near steady-state operation, the envelope reflects the population and modal-share dimensions only and is no longer affected by the schedule coupling.

The envelope is wide. The factor-of-two to factor-of-three spread between lower and upper bounds reflects genuine uncertainty across the population, trip-generation, modal-share, and phasing dimensions. The fare and subsidy choice — which is a policy decision rather than an infrastructure decision — is the single largest controllable lever. Switching from Regime C to Regime A approximately doubles both the steady-state ridership and the speed of approach to that steady state, at any given combination of population and trip generation. This is independent of whether ALTO is built at 200 km/h or 300+ km/h.

Figures 2a, 2b, and 2c plot the year-by-year trajectory of ridership across 2030–2080 under the three fare and subsidy regimes separately. Within each figure, the three lines correspond to the three demographic trajectories from Section 2: lower (0.5 % annual population growth, 1.6 trips per capita), central (1.0 % growth, 1.7 trips), and upper (1.6 % growth, 1.8 trips). The dispersion within each figure shows the range of outcomes attributable to demographic and trip-generation uncertainty; the dispersion across the three figures shows the range attributable to the fare and subsidy choice — a policy decision rather than an infrastructure decision. The ALTO published 24-million-by-2055 target is marked on each chart as a reference point.

Regime A — heavy subsidy, low fares

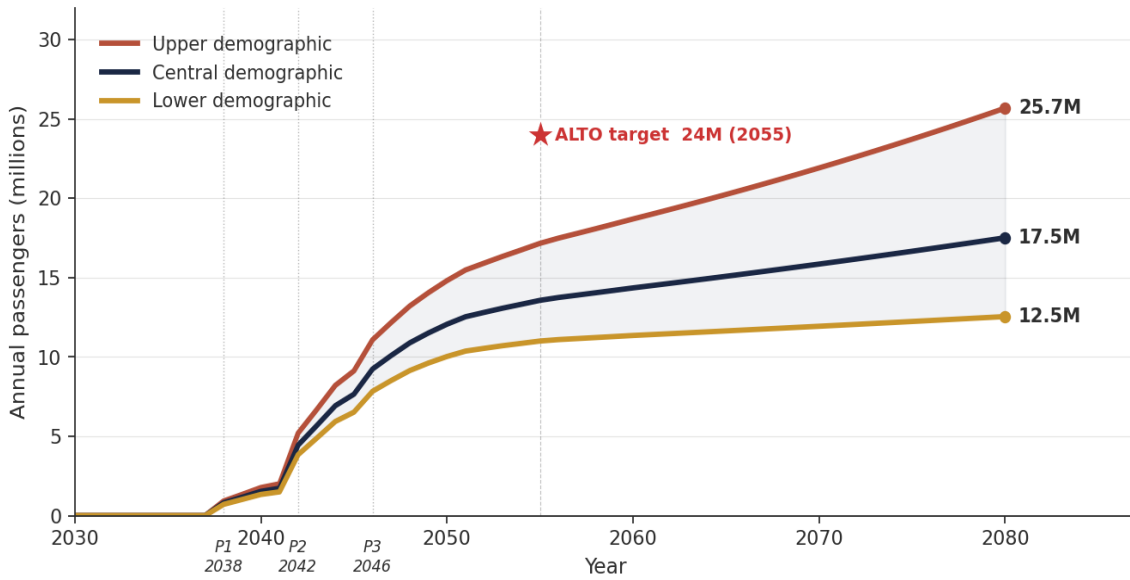


Figure 2a. Ridership trajectory under Regime A (heavy operating subsidy, fares held at VIA-equivalent levels, \$2.5–4.5 billion in annual public absorption of capital service). Aggregate modal share of the addressable market is 38–42 per cent. Phase opening dates are 2038 / 2042 / 2046 under this regime.

The 2055 readings are 11.0 / 13.6 / 17.2 million across the lower / central / upper demographic trajectories; the 2080 readings are 12.5 / 17.5 / 25.7 million. Even under the most favourable combination — Regime A with upper demographic growth — the ALTO public target of 24 million by 2055 sits 40 per cent above the trajectory.

Regime B — moderate subsidy, parity with air

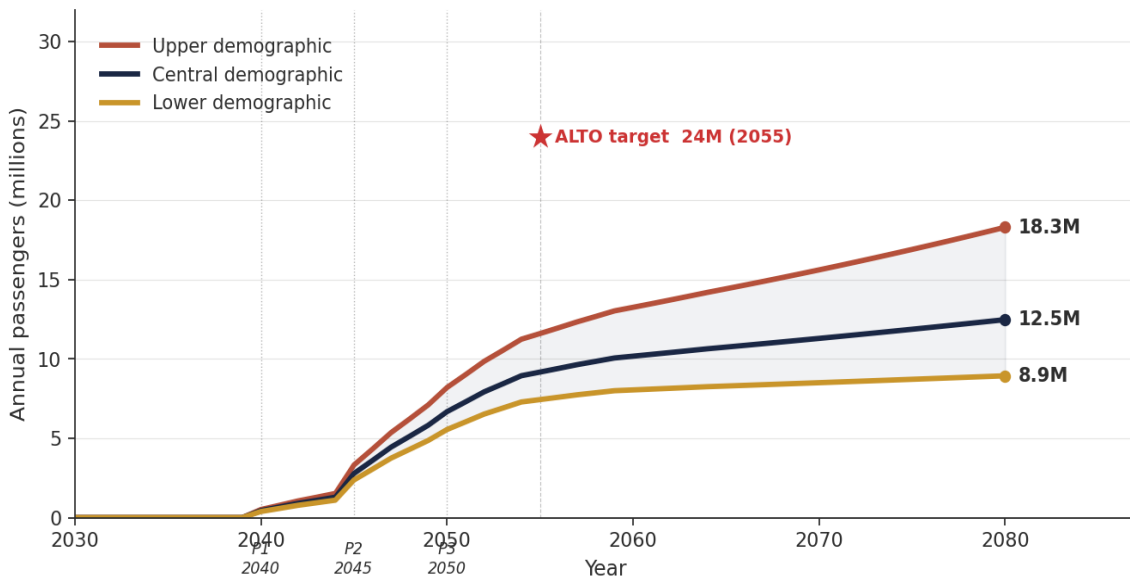


Figure 2b. Ridership trajectory under Regime B (moderate subsidy, fares at parity with air, \$1.5–2.5 billion in annual subsidy). This is the canonical configuration under which the published business case is implicitly framed. Aggregate modal share of the addressable market is 28–32 per cent. Phase opening

dates are 2040 / 2045 / 2050. The 2055 readings are 7.4 / 9.2 / 11.6 million; the 2080 readings are 8.9 / 12.5 / 18.3 million. Under Regime B with any demographic trajectory, the ALTO public target sits well above the achievable range — by a factor of approximately 2.1 to 3.2 at the 2055 horizon.

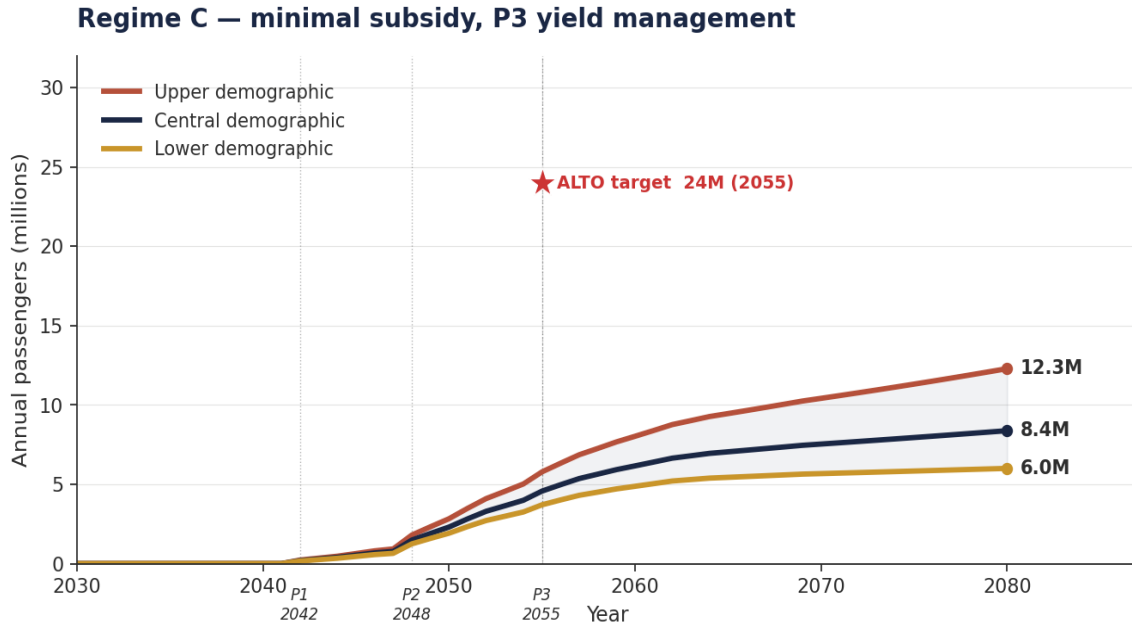


Figure 2c. Ridership trajectory under Regime C (minimal subsidy, P3 yield management, fares above air parity, \$0.5–1.5 billion in residual subsidy). Aggregate modal share of the addressable market is 20–23 per cent. Phase opening dates are 2042 / 2048 / 2055. The 2055 readings are 3.7 / 4.6 / 5.8 million; the 2080 readings are 6.1 / 8.5 / 12.4 million. Under Regime C — the configuration most consistent with the Cadence consortium’s announced commercial structure — even the upper demographic trajectory falls below the McGill TRAM stated-preference projection at the 2055 horizon and well below ALTO’s published targets across all timeframes considered.

Three patterns are visible in the comparison across the three figures. First, the regime choice (which is a policy lever) shifts the trajectory by a factor of approximately two between Regime A and Regime C at any given demographic assumption: 2080 mature ridership at the central demographic is 17.5 million under Regime A, 12.5 million under Regime B, and 8.5 million under Regime C. The same physical infrastructure produces materially different ridership outcomes depending on the fare and subsidy choice. Second, the demographic choice (which is partly structural and partly a function of immigration policy) shifts the trajectory by a factor of approximately two between lower and upper demographic at any given regime: 2080 mature ridership under Regime A is 12.5 million under the lower demographic and 25.7 million under the upper. Third, the ALTO public target of 24 million by 2055 sits above every plausible 2055 trajectory in every figure. The closest reading — Regime A with upper demographic growth — produces 17.2 million at 2055, which is 28 per cent below the ALTO target. Reaching 24 million by 2055 requires not just the most favourable regime (Regime A) but a demographic trajectory above the upper case and a corridor that is fully mature by 2055 rather than still ramping Phase 3 — three conditions that cannot all be satisfied simultaneously under the announced phasing.

By 2080, the Regime A upper trajectory of 25.7 million does reach the same neighbourhood as ALTO's 24-million-by-2055 figure, but a full quarter-century later.

7. Comparison with published forecasts

The CRI envelope can be placed alongside the other published forecasts for the same corridor. Five comparators are available: ALTO's public communications (the 24- and 43-million figures associated with the Imbleau presentations and the Fast Forward document); the ALTO Corporate Plan filed with Treasury Board (which includes Local Services and produces a lower internal headline figure); the McGill Transportation Research at McGill (TRAM) stated-preference projections (El-Geneidy et al.); the Munk School Global Economic Policy Lab independent academic analysis; the C.D. Howe Institute scenario analysis from the All Aboard report (Jones and Fariha, February 2025); and the federal Joint Project Office's 2021 business case, released through Access to Information in November 2025. A reference-class adjustment using the Flyvbjerg, Holm and Buhl meta-analysis of rail-project ridership accuracy is included for completeness.

Source	Method	By 2050	By 2055	By ~2080–85
ALTO public targets Imbleau / Fast Forward	Not disclosed	—	24 million (2055)	43 million (2084)
ALTO Corporate Plan Treasury Board filing	Not disclosed (incl. Local Services)	—	17 million (2059)	—
McGill TRAM El-Geneidy et al., Mar 2026	Stated-preference survey, n ≈ 8,300	10.5 million	—	~19.7 million (year 50)
Munk School GEPL U. of Toronto	Disclosed logit with induced demand	T-Mtl 9.4M (year 20); corridor scaled ~16–17M	T-Mtl 10.5M (year 30); corridor ~18–19M	—
C.D. Howe Institute Jones & Fariha, Feb 2025	Scenario analysis using VIA's own forecasts as inputs	12–21 million (HSR scenario range)	—	—
Federal JPO 2021 ATI release Nov 2025	Federal pre-procurement business case (HFR 177 km/h spec)	~13.5 million (cumulative 405M / 30 years)	—	—

Source	Method	By 2050	By 2055	By ~2080–85
Flyvbjerg adjustment ALTO –65% reference class	Empirical mean rail forecast overstatement	—	8.4 million (from 24M)	15 million (from 43M)
CRI envelope Lower / Central / Upper	Modal-shift × population × subsidy regime	1.9 / 6.7 / 14.8	3.7 / 9.2 / 17.2	6.1 / 12.5 / 25.7

Table 6. Published and modelled ridership forecasts for the ALTO corridor. Forecasts are not strictly comparable across columns: ALTO's 2055 figure is an opening-phase target dependent on full-corridor completion well before 2055; the Munk GEPL figures are for the Toronto–Montréal segment alone and have been scaled to a corridor equivalent using the GEPL's own segment-share assumption; the C.D. Howe range applies a sensitivity analysis to VIA's forecasts rather than producing an independent estimate; the JPO 2021 figure is for the predecessor HFR 177 km/h specification, not the ALTO 300+ km/h specification. The pattern is nevertheless robust: every forecast built from a disclosed methodology — TRAM, Munk GEPL, and the federal JPO — sits within or close to the upper end of the CRI envelope, and well below the ALTO public targets.

Two patterns are visible in the table. First, the dispersion among the disclosed-methodology forecasts is narrow: TRAM at 10.5 million by 2050, Munk GEPL at 16–17 million corridor-equivalent by year 20, the JPO 2021 at 13.5 million per year, and the C.D. Howe high-speed scenario range of 12 to 21 million by 2050 all sit within the same broad zone. The CRI central case of 6.7 million in 2050 rising to 9.2 million by 2055 — and 12.5 million by 2080 — sits on the conservative side of this cluster, broadly aligning with the lower end of the disclosed-methodology range at the corridor's mature state. The CRI upper bound of 14.8 million by 2050 rising to 25.7 million by 2080 sits centrally within the cluster, overlapping with the C.D. Howe HSR scenario range and reaching the JPO 2021 figure by mid-century. Second, the dispersion between this cluster and the ALTO public targets is wide. The 24-million-by-2055 figure is roughly 40 per cent above the CRI upper bound for that year, more than double the TRAM number for a comparable timeframe, and 14 per cent above the upper end of the C.D. Howe scenario range. The 43-million-by-2084 figure remains well above the CRI envelope: the upper bound under continued growth reaches approximately 27.7 million by 2085, which is 36 per cent below the ALTO 43-million target — a gap that would require both modal share above the modal-shift literature's 40-per-cent ceiling and induced demand effects beyond those observed on the closest international comparators.

The ALTO Corporate Plan figure of 17 million by 2059 — filed with Treasury Board and including ridership on retained Local Services rather than only the new high-speed line — is approximately 30 per cent below the ALTO public 24-million figure. ALTO's own internal forecast, in other words, is closer to the upper bound of the CRI envelope and to the C.D. Howe

upper scenario than it is to the ALTO public communications. The reconciliation of the two ALTO figures is not publicly disclosed.

Every forecast for the corridor built from a disclosed methodology — TRAM survey, Munk GEPL logit, federal JPO business case — sits within or close to the CRI envelope. ALTO's 24-million public target sits 40 per cent above the upper bound at 2055 and is the outlier in the published literature.

8. Why the CRI envelope sits below the published comparator forecasts

The CRI envelope's central case sits below the cluster of disclosed-methodology forecasts (TRAM at 10.5 million by 2050, Munk GEPL implied corridor 16–17 million by year 20, federal JPO 2021 at 13.5 million per year, and the C.D. Howe high-speed scenario range of 12–21 million by 2050), and its upper bound sits centrally within that cluster. This is not a forecasting error in those studies. The published comparators were constructed for different analytical purposes, were finalised on different timelines, and apply different methodological assumptions at the points where the modal-shift literature offers latitude. Six identifiable factors account for the bulk of the divergence between the CRI envelope and the published cluster, listed below in roughly descending order of estimated impact.

1. The 2024–25 demographic inflection is post-cutoff for every other forecast

The single largest source of divergence is timing. Every published forecast for the corridor was finalised before the federal Immigration Levels Plan caps on non-permanent residents began producing observable effects on Toronto's CMA count. The C.D. Howe report was published in February 2025; TRAM completed its survey in October 2025; Munk GEPL pre-dates 2024; the federal JPO business case is built on 2018–19 demographic inputs; and ALTO's public communications assume continuation of the 2022–24 surge. The 2024–25 demographic data released by Statistics Canada in January 2026 — Toronto's CMA contracting by approximately 1,000 people after gaining 269,000 the year before, Greater Golden Horseshoe growth collapsing from 313,000 per year to 40,000 — was not available to any of these studies. The post-2024 trajectory used in this note (Figure 1, solid lines) was not a defensible scenario one year ago; it is now the realistic baseline. Repricing the corridor demand against the post-cap demographic envelope accounts for approximately 15 to 25 per cent of the gap between the CRI envelope and the published comparator cluster, before any other methodological consideration applies.

2. Modal-shift S-curve recalibrated against North American conditions

The modal-shift literature is dominated by European, Japanese, and Chinese comparators. The default calibration of the rail–air S-curve (50 per cent share at price parity at travel time approximately 35 per cent below the air alternative) and the rail–car S-curve (50 per cent share

at price parity at rail journey time approximately 35 per cent below car drive time) is anchored on those comparators. Note 2 of this initiative recalibrates the rail–car curve explicitly against current VIA Rail's approximately 13 per cent rail share against road on the corridor's principal pairs (at $\tau \approx 1.0$), shifting the curve's inflection point from $\tau_0 = 0.65$ to $\tau_0 = 0.46$ — a structural North American penalty of $\alpha \approx 0.67$ reflecting toll-free highways, low fuel taxes, free parking, dispersed origin-and-destination patterns, weak feeder transit, and the cultural autonomy preference visible in revealed-preference data. The published comparator forecasts use European-anchored elasticities and modal-share curves, which produce systematically higher rail capture against road at any given travel time. The recalibration accounts for approximately 15 to 25 per cent of the gap, with the largest effect on the road-substitutable share of the addressable market (which dominates corridor demand).

3. Phased opening sequence is explicit in the CRI envelope; implicit step-change in others

ALTO's announced phasing opens the corridor in three sequential segments — Phase 1 Montréal–Ottawa (approximately 20 per cent of corridor demand), Phase 2 the Toronto extension (approximately 60 per cent), and Phase 3 the Québec City extension (approximately 20 per cent). The CRI envelope models each phase's own opening date and ramp curve explicitly, producing a 2055 reading that reflects Phase 3 still being in mid-ramp under the central case (Section 5 and Table 5). The published comparator forecasts handle phasing differently. ALTO's 24-million-by-2055 figure implicitly assumes the full corridor is at mature operation in 2055, which is incompatible with Phase 3 opening only in the late 2040s under even the upper-case schedule. Munk GEPL's "year 20" calculation is similarly indifferent to phasing. TRAM is stated-preference and does not apply a ramp curve at all. C.D. Howe's scenarios use the proponent's own ridership inputs without separating opening years from mature years. The CRI envelope's explicit phasing accounts for the largest share of the divergence in the 2050–2055 readings specifically — roughly 30 to 40 per cent of the gap at that time horizon — but converges toward the comparator cluster by 2070–2080 once all three phases are mature in every scenario.

4. Group composition is explicitly weighted in the modal-share blend

Note 2 Section 4 establishes that the per-person rail-to-car price ratio scales linearly with the number of car occupants: a solo traveller faces $r \approx 1.0$ at parity pricing, a couple $r \approx 2.0$, a family of four $r \approx 4.0$. Combined with the higher price coefficient on the rail–car logit ($\gamma = 1.5$ against $\gamma = 1.0$ for rail–air), the result is that family and 3+ travel essentially cannot be captured by rail at any defensible fare structure — modal share collapses from approximately 51 per cent for a solo traveller on Toronto–Ottawa under ALTO conditions to roughly 12 per cent for a family of four. The rail-substitutable portion of the corridor's road traffic is therefore concentrated on solo and two-passenger trips. Most demand models — including the comparator forecasts — work from an aggregate average traveller rather than a weighted blend across the corridor's actual

group composition. The CRI Regime B and C aggregate modal-share readings explicitly weight across realistic solo / couple / family proportions, producing lower aggregate capture than a solo-anchored or average-traveller model. This accounts for approximately 5 to 15 per cent of the gap, with the largest effect on the car-substitutable share of demand.

5. Canadian P3 pricing dynamics vs European post-liberalisation pricing

The dramatic modal-shift outcomes on Madrid–Barcelona post-2020 were driven substantially by open-access competition between three rail operators, which produced fare reductions of 25 to 50 per cent and ridership gains of up to 96 per cent on individual routes. The Cadence consortium's monopoly concession structure, combined with Air Canada's equity position in the rail operator, eliminates the open-access mechanism that produced these European outcomes. The CRI Regime A, B, and C readings model Canadian P3 pricing dynamics directly — fare premiums that reflect capital-cost recovery requirements rather than competitive discounts. The comparator forecasts handle pricing differently: ALTO's own communications implicitly assume the Madrid–Barcelona ridership dynamic without the Madrid–Barcelona pricing dynamic; Munk GEPL models induced demand under generic competitive conditions; TRAM is stated-preference at unspecified fare levels; C.D. Howe's scenarios use VIA's own fare assumptions. The CRI envelope's explicit Canadian-context pricing accounts for approximately 10 to 20 per cent of the gap, with the largest effect on the lower-end scenarios where P3 yield management is most binding.

6. Bottom-up modal-shift construction vs top-down or stated-preference methods

The methodological approaches across the comparator forecasts differ structurally. ALTO's public targets are top-down forecasts produced by the proponent, subject to the optimism bias and strategic misrepresentation that the Flyvbjerg, Holm and Buhl meta-analysis documents as producing an average 65 per cent overstatement across a large sample of completed rail projects. TRAM is stated-preference: it asks respondents what they would do, which systematically overstates realised behaviour because respondents do not fully internalise the cost, time, and convenience constraints they actually face. Munk GEPL is a disclosed-methodology logit with induced demand effects, which is the closest analytical analogue to the CRI envelope on the modal-share dimension. C.D. Howe applies sensitivity analysis to inherited inputs rather than producing an independent estimate. The CRI envelope is built bottom-up from corridor population, per-capita trip generation, modal-share machinery anchored on current VIA Rail observed shares, and phasing mechanics — none of which is subject to the optimism bias or stated-preference inflation that affects the comparator cluster by construction. This methodological choice accounts for approximately 5 to 15 per cent of the gap and operates as a multiplier on the other five factors.

Synthesis

Taken together, the six factors are not five-or-six independent sources of divergence that each happen to push in the same direction. They are mostly visible to the published comparator forecasts as well, but each forecast embedded different assumptions at the points where the modal-shift literature offers analytical latitude. The CRI envelope's central case sits below the disclosed-methodology cluster because it applies the post-2024 demographic baseline, the North-American-recalibrated modal-shift curve, the explicit three-phase ramp, the group-composition weighting, the Canadian P3 pricing dynamics, and the bottom-up modal-share construction — six choices that each take a defensible analytical position but together produce a more conservative envelope than the published cluster. The CRI envelope's upper bound, by construction, sits centrally within the disclosed-methodology cluster: it relaxes the unfavourable end of each assumption while remaining internally consistent.

The dispersion across methods is itself analytically useful. The published comparator forecasts serve different purposes than this note's envelope. TRAM measures stated travel intent; Munk GEPL measures the demand potential under disclosed assumptions; the JPO 2021 measures the federal pre-procurement business case for the predecessor 177 km/h specification; C.D. Howe measures the cost-benefit envelope under sensitivity analysis. None is wrong; each answers a different question. The CRI envelope answers a sixth question: what is the realised annual ridership consistent with current empirical evidence, the announced phasing, and the published modal-shift literature applied to the Canadian context. The convergence by 2080, when the demographic, phasing, and ramp factors have all played out, places the CRI upper bound at the 20.7-million figure that sits in the centre of the published cluster's mature-state range.

9. Sensitivities and structural risks

Several structural effects could shift the envelope materially over the 45-year horizon, and are not fully reflected in the central case above.

Carbon and fuel pricing

Sustained higher fuel prices and carbon-pricing trajectories above current levels lift Regime A's road-rail capture meaningfully. Note 2 Section 4 demonstrates that a \$1.65 to \$2.50 per litre swing roughly triples solo road-rail share at fixed travel time; a sustained federal carbon price above \$300 per tonne would push the upper case higher than the trajectory shown. The reverse case — a political cycle that suspends or reverses the carbon-pricing trajectory — pushes the lower case lower.

Autonomous vehicles

Autonomous vehicles are the single largest downside risk over the 2040–2080 window. AV adoption flips the rail-versus-car competitive geometry against rail by reducing the perceived

time cost of driving (productive work in the vehicle), eliminating the parking-cost differential at urban destinations, and enabling shared-AV use that further dilutes per-person car cost. None of the published ALTO ridership analyses appears to model this effect. If Level 5 AVs reach 30 per cent corridor penetration by 2050 — which is at the central end of the current AV-adoption literature — the upper bound of the envelope likely needs to be reduced by 15 to 25 per cent.

Climate disruption to on-time performance

Note 2 Section 5 demonstrates that on-time performance erosion from the 95 per cent dedicated-track target down to 67 per cent — the level VIA reported in 2021 amid heavy freight conflict on shared CN track — roughly halves rail share. ALTO would deliver 95 per cent OTP in principle, because the dedicated-track corridor eliminates the freight-conflict cause of VIA's reliability shortfall; in practice, the cold-climate engineering record summarised in Note 1 Section 1 (Harbin–Dalian HSR experience, the Siemens Venture failure modes documented in winter 2025–26, the freeze-thaw cycle on the Frontenac Arch and Napanee Limestone Plain) raises real questions about whether 95 per cent OTP is achievable on Eastern Ontario's specific geological and climatological substrate. Persistent winter OTP shortfall would suppress the central and upper cases.

Hybrid work and AI-mediated meetings

Continuing erosion of business intercity travel through hybrid work norms and AI-mediated meeting substitution could ratchet per-capita trip generation toward 1.4 to 1.6 by mid-century. This would compress the upper case more than the lower (because business travel is concentrated on the principal Toronto pairs that the upper case relies on for high modal capture). The central case used here assumes the substitution effect stabilises rather than continuing to deepen.

Population trajectory beyond 2080

The forecast horizon ends at 2080. Beyond that point, demographic projections diverge widely depending on long-run fertility, immigration policy, and climate-driven migration. The corridor's terminal-state ridership beyond 2080 is not constrained by any published source and is not estimated here.

10. Implications for the corridor decision

Five conclusions follow from placing the population denominator alongside the modal-share machinery from the two companion notes.

First, ALTO's public ridership targets sit outside the empirically defensible envelope under any combination of population (including a corridor-CMA growth premium of 0.4 percentage points over the StatCan national scenarios), trip generation, modal share, and phasing consistent with the modal-shift literature and the announced three-phase opening sequence. The 24-million-by-

2055 figure requires the corridor to combine the upper population trajectory, full 1.8 trips per capita, an aggregate modal share approaching 56 per cent — above the binding 40-per-cent ceiling under heavy subsidy and European-equivalent transport policy — and full-corridor mature operation in 2055, which is incompatible with Phase 3 opening only in the late 2040s under even the upper-case schedule. The 43-million-by-2084 figure remains well above the upper bound: it would require modal capture in the 60-per-cent range against a 40-per-cent ceiling, plus continued upper-case demographic growth, plus full induced demand at Madrid–Barcelona levels — three conditions that none of the published modal-shift literature supports simultaneously.

Second, the cluster of independent and disclosed-methodology forecasts — TRAM, Munk GEPL, and the federal JPO 2021 — converges on a range of approximately 10 to 17 million annual passengers at the corridor's mature state. The CRI envelope's upper bound of 14.8 million by 2050 rising to 25.7 million by 2080 sits in the upper portion of this cluster, overlapping with the JPO 2021 figure and reaching toward the upper end of the C.D. Howe HSR scenario range; the central case of 6.7 to 12.5 million sits at the conservative end. The C.D. Howe high-speed scenario range of 12 to 21 million by 2050 brackets this same cluster, with the lower end overlapping the CRI central-2050 reading and the upper end consistent with a Regime A subsidy posture combined with the upper population trajectory at maturity. The cluster's coherence across methods is itself analytically informative.

Third, the fare and subsidy choice is the single largest controllable lever on ridership and operates independently of the infrastructure decision. Switching from Regime C to Regime A approximately doubles the realised ridership at any fixed combination of population and trip generation, and operates whether the corridor is built at the HPR 200 km/h specification or the ALTO 300+ km/h specification. The ALTO public communications conflate the infrastructure choice with the implied modal-shift performance; the modal-shift framework shows that the two are separable. The implication is that the corridor's modal-shift outcome is a policy choice as much as a procurement choice.

Fourth, the 2024–25 demographic inflection — the federal cap on non-permanent residents and the resulting Toronto CMA contraction — has materially reduced the upper bound of plausible ridership. Pre-2024 forecasts that assumed continuation of the 2022–24 population surge are no longer defensible without explicit recalibration. The CRI lower trajectory, which assumes the 2024–25 inflection persists across political cycles, was not a defensible scenario one year ago; it is now the realistic floor.

Fifth, the structural risks identified in Section 9 — autonomous vehicle adoption, climate-driven OTP erosion, continuing erosion of business travel — are systematically asymmetric in their effect on the envelope. Each pushes the central and upper cases downward more than it pushes the lower case downward, because the upper case relies on capturing additional marginal demand that is most exposed to substitution by other modes or by communication

technology. The realised ridership over the forecast horizon is more likely to drift toward the lower end of the envelope than the upper end.

Independent review of the corridor's ridership case, including the population and trip-generation foundation alongside the modal-share machinery, is the analytically appropriate response to the dispersion between ALTO's public targets and the cluster of disclosed-methodology forecasts. The dispersion is not a rounding difference; it is a factor of two to three at the corridor's mature state. At a \$60 to \$90 billion capital envelope, before Canadian P3 cost escalation, that dispersion has direct fiscal consequences for the federal subsidy obligation across the corridor's operating lifetime.

§. Methodology and sources

Modelling approach

Annual ridership is modelled as the product of corridor population $P(t)$, per-capita intercity trip generation $\mu(t)$ on the directly-served axes, and ALTO's aggregate share $s(t)$ of the resulting addressable market, scaled by a phasing factor $\phi(t)$ that is zero before opening and approaches unity at maturity: $R(t) = P(t) \times \mu(t) \times s(t) \times \phi(t)$. Population trajectories are constructed by applying constant annual growth rates (0.5, 1.0, and 1.6 per cent) corresponding to the Statistics Canada low-growth (LG), medium-growth (M1), and high-growth (HG) national projection scenarios from catalogue 17-20-0003 (January 2026), plus a corridor-CMA growth premium of approximately 0.4 percentage points reflecting the directly-served CMAs' historical and projected growth advantage over the national average. The trajectories are applied to the 2025 corridor CMA baseline of 14.9 million. Per-capita trip generation is held in the 1.6 to 1.8 range across the forecast horizon, with the central case at 1.7. Modal-share regimes A, B, and C are derived from the canonical readings in the two companion notes (Notes 1 and 2) by applying realistic group composition and fare structure assumptions to the rail+air, rail+car, and existing-rail markets. The phasing factor follows a standard ramp curve calibrated against the Madrid–Barcelona post-opening trajectory and the Brightline Miami–Orlando ramp profile.

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