

🚂 Feasibility Analysis: Proposed Passenger Rail Service in Central Washington

Prepared for: Integrated Travel

Prepared by:

Alfia Ashraf

Anuradha Dixit

Nihada Abdul Nasser

Ksenia Shvets

Analytics Capstone – INFO 588

Montclair State University

December 2025

🎯 Executive Summary & Immediate Call to Action

The proposed passenger rail service along the Cascade and Columbia River Railroad (CSCD) corridor, connecting Oroville/Okanogan to Wenatchee, is highly feasible and is justified primarily by significant transportation equity and healthcare access gaps in rural Central Washington.

Key Findings and Justification

- **Essential Demand Driver:** Ridership will be driven by essential travel—specifically, older adults, low-income households, and individuals requiring specialized medical care in Wenatchee—rather than traditional daily commuting.
- **Access Crisis:** Northern towns (Oroville, Tonasket, Omak, Okanogan) face travel times exceeding two hours to Central Washington Hospital. This is a severe barrier to specialized care.
- **Equity Gap:** Communities like Tonasket have a 17.0% rate of households without a vehicle, substantially higher than the state average.
- **Economic Opportunity:** Tourism provides a strong, predictable seasonal boost to ridership, particularly in Chelan and Omak, which complements the year-round essential travel base.

Drive Times Along the CSCD Corridor



Recommendation & Call to Action

Recommendation: The Integrated Travel Leadership Team should immediately proceed to Phase II of the feasibility study, focusing on detailed operational, engineering, and capital cost analysis for the Northern Corridor Alignment (Wenatchee to Oroville).

Immediate Next Step	Justification
Secure Engineering Review	To provide required infrastructure cost estimates for station construction, track upgrades, and ADA-compliant design.
Prioritize Northern Route	To maximize social return on investment by serving communities with the highest transit dependency and longest medical travel times.

📚 Project Context, Objectives, and Corridor Scope

Project Overview and Mandate

This report assesses the feasibility of developing a passenger rail service in Central Washington to address mobility constraints that limit healthcare access and economic opportunity in rural communities.

- Corridor: Cascade and Columbia River Railroad (CSCD) line.
- Proposed Route: Connecting major communities (Oroville, Okanogan, Omak, Tonasket, Brewster, Pateros) to the regional hub of Wenatchee.
- Analytic Approach: The assessment uses a hybrid predictive approach combining Descriptive Analytics, GIS Spatial Mapping, and a customized Gravity Model to overcome the challenge of limited historical rail data.

Core Objectives

1. Evaluate Transportation Equity: Quantify transit dependency and vehicle access disparities across the corridor towns.
2. Assess Healthcare Mobility: Determine the impact of rail on reducing travel friction to specialized medical services in Wenatchee.
3. Estimate Ridership Potential: Predict baseline demand from essential travel and seasonal demand from tourism using a customized model.
4. Recommend Alignment: Justify the optimal route prioritization based on social and economic impact.

The Mobility Challenge (Okanogan County)

Okanogan County has significant disparities compared to the Washington State average, creating a strong rationale for the rail project.

Metric	Okanogan County	Washington State	Justification for Rail
Population Age 65+	22.9%	17.3%	High Senior Need: Requires reliable, non-driving transport.
Poverty Rate	18.5%	9.9%	High Transit Dependency: Need for affordable travel options.
Disability Rate	13.2%	9.6%	Access Priority: Requires ADA-compliant, safe mobility.

Demographic and Socio-Economic Drivers of Demand

This section details the specific community characteristics that drive the predicted essential ridership, confirming the high social need for the project.

High-Need Communities: Vehicle Access and Poverty

Several corridor towns exhibit critical levels of transit dependency, where rail service becomes a necessity, not a convenience

Town	Population 65+ (%)	Poverty Rate (%)	% Households Without Vehicle
Tonasket	25.9%	16.5%	17.0%
Oroville	19.8%	29.2%	8.5%
Omak	17.2%	22.0%	3.4%
Okanogan	21.4%	11.9%	2.6%
Wenatchee	17.3%	14.1%	7.4%

Observation: Tonasket's 17.0% rate of vehicle-less households is a key indicator of essential ridership potential and underscores its need for a public transport lifeline. Conversely, lower-need areas like Pateros and Chelan have near-zero rates, meaning demand there will be driven by convenience or tourism.

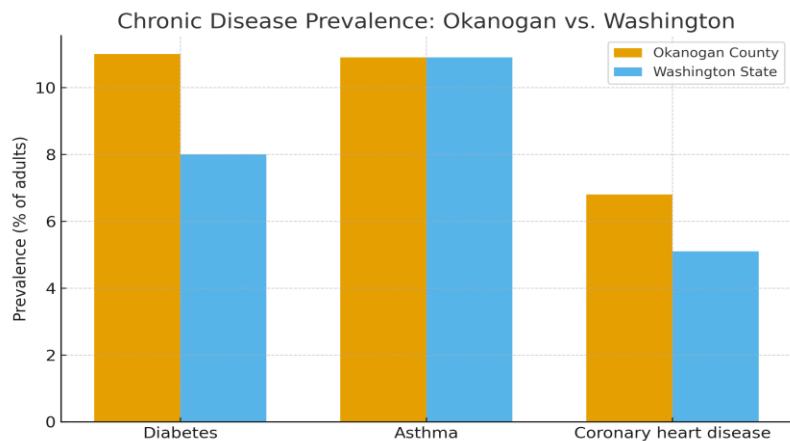
Key Ridership Segments

- Seniors (65+): High population share in Okanogan County necessitates reliable transportation for medical appointments and services.
- Low-Income Residents: Need affordable access to employment and education centers in Wenatchee.
- Students: Comparable youth and young adult population to state averages indicates potential ridership to Wenatchee Valley College and other opportunities.

Healthcare Access Crisis: The Primary Justification

The most compelling finding is the severe barrier to specialized healthcare, which strongly supports the rail line's feasibility and equity alignment

The Specialized Care Gap



Corridor towns rely on Critical Access Hospitals (Mid-Valley, North Valley, Three Rivers) that offer only basic care. All specialized services (cardiology, surgery, neurology) require travel to the 198-bed Confluence Health - Central Campus in Wenatchee.

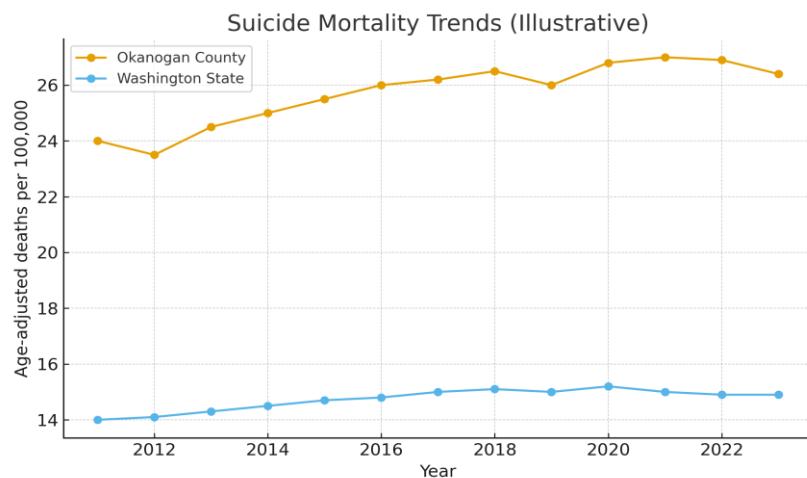
Unacceptable Travel Times

Existing car travel times create a major health equity issue, particularly from the northern corridor.

Town (Origin)	Travel Time to Wenatchee Hospital	Finding
Oroville	2 hours 28 minutes	Heaviest time burden and highest risk.
Tonasket	2 hours 08 minutes	Severely limited access for routine/specialized care.
Omak	1 hour 57 minutes	Critical two-hour burden zone.
Okanogan	1 hour 39 minutes	Essential travel demand due to high senior population

Implication: For transit-dependent, older, or disabled residents, a 4+ hour round trip on limited buses or personal vehicle is not sustainable for frequent or critical medical care. Rail offers a scheduled, safer, and predictable alternative, particularly during winter conditions.

Public Health Outcome Data



Okanogan County exhibits concerning health indicators that may be linked to access challenges:

- High Suicide Rate: 26.4 per 100,000 (vs. 14.9 state average).
- Above-Average Diabetes: 11% prevalence (vs. 8% state average). The lower-than-average Preventable Hospitalization Rate is hypothesized to mask a hidden need, as distance may limit initial access to preventive and primary care.

Predictive Analysis: The Hybrid Model Approach

Due to the lack of historical rail data, a Hybrid Predictive Approach was used, combining four analytical tools to produce a confident, context-specific demand forecast.

Customizing the Analytical Framework

Method	Purpose	Key Customization
Gravity Model	Estimates year-round essential travel demand	Customized with Healthcare Burden Scores (chronic illness, disability, senior population) to reflect regional reality.
Forecasting	Estimates seasonal demand and event-driven peaks	Integrated Tourism Attraction Weights (lodging tax, event attendance) for Chelan and Omak
GIS Mapping	Visualizes and quantifies geographic friction	Defined the Two-Hour Medical Travel Burden Zone as a predictive factor.
Descriptive Scoring	Provides demographic and socio-economic context	Differentiated essential travelers (high need, low access) from discretionary travelers (tourism).

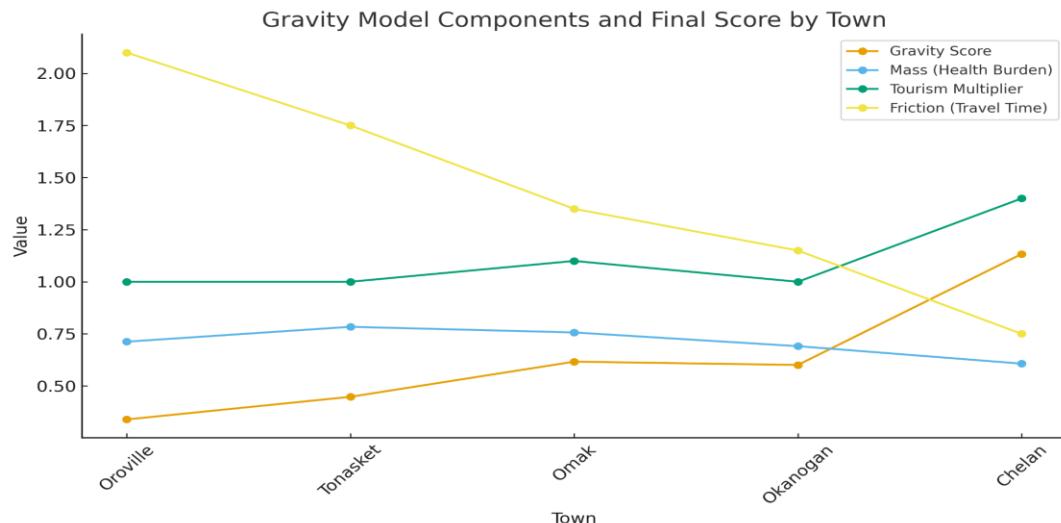
Analytical Insight: The Convergence of Models

Omak and Tonasket consistently appeared as high-demand towns across all models, driven by essential mobility needs. Chelan's demand, conversely, only becomes significant when tourism multipliers are applied, matching its real-world profile. This convergence strengthens confidence in the predictions.

Gravity Model Results and Ridership Priorities

The customized Gravity Model helped quantify relative demand by town, using Mass (Health Burden), Attraction (Wenatchee/Tourism), and Friction (Travel Time).

Gravity Model Components and Final Score by Town



Interpretation of Model Results:

1. Chelan's Strong Score: Driven almost entirely by the Tourism Multiplier (high attraction) and short travel time (low friction).
2. Northern Town Demand (Omak/Okanogan): Show consistently strong scores due to a combination of significant healthcare needs (Mass) and moderate friction.
3. Friction Barrier: The longest travel times create the highest friction for Oroville and Tonasket, demonstrating the physical barrier that the rail line must overcome to unlock demand

The model reinforces that healthcare-driven mobility is the core, year-round demand, while tourism creates strong, but seasonal, ridership peaks.

Prioritization Implication

The gravity model, combined with the GIS analysis, validates the strategic decision to prioritize the northern corridor (Oroville, Tonasket, Omak, Okanogan) because it addresses the greatest combined challenges of high need, low access, and long travel friction.

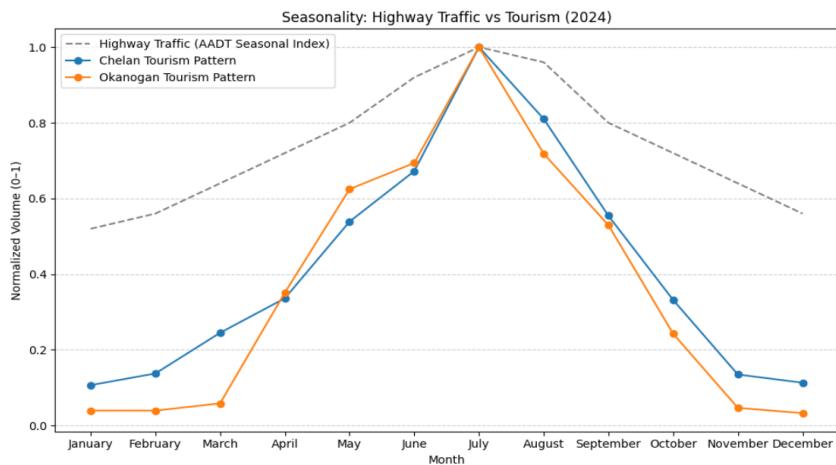
💰 Tourism and Economic Development Potential

While essential travel forms the ridership base, tourism provides the vital financial uplift and economic justification, particularly during the peak season.

Tourism as an Economic Pillar

Tourism is a central economic pillar for communities in Central Washington, including Chelan, Omak, and Winthrop. In the feasibility framework, tourism is a supportive ridership contributor—it strengthens financial sustainability but does not replace the year-round healthcare-driven demand that forms the core justification for passenger service. A passenger rail line provides an alternative travel mode for visitors seeking scenic routes, wine country excursions, and outdoor recreation. Evidence from comparable rural rail corridors across the

United States suggests that tourism-driven ridership can provide substantial support for overall service sustainability. Rail travel also appeals to travelers who prefer not to drive long distances or who wish to avoid winter road hazards.



Observation: Tourism patterns peak sharply from June through August, correlating directly with highway traffic, indicating a strong seasonal opportunity for high ridership.

Summer Ridership and Revenue Potential

Conservative seasonal scenarios project 30,000–89,000 summer riders, generating approximately \$0.5M–\$2.2M in revenue during the peak season. This seasonal demand strengthens the financial feasibility of year-round service that primarily supports essential healthcare trips.

Table 4.1. Tourism-Based Summer Ridership and Revenue Scenarios

Scenario	Mode-Shift Capture Rate	Estimated Riders	Estimated Revenue (\$18–\$25 RT)
Low	5%	30,000	\$0.5M – \$0.7M
Base	10%	60,000	\$1.1M – \$1.5M
High	15%	90,000	\$1.6M – \$2.2M

Seasonal Scenic Train Opportunity

In addition to regular passenger service, the corridor also presents a high-potential opportunity for a seasonal scenic train. Comparable excursion railroads, such as the White Pass and the Napa Valley Wine Train, demonstrate that scenic service can generate strong, high-margin summer revenue within a focused operating window. The CSCD corridor offers similar advantages, with lakefront recreation, wineries, and major regional events forming a natural market base. Conservative scenarios project 20,000–30,000 scenic riders annually, generating approximately \$1.7–\$3 million in additional revenue. This seasonal service would not replace essential healthcare-driven demand but would strengthen the financial sustainability of year-round operations.

Table 4.2. Phase-2 Scenic Train Ridership, Average Fare, and Estimated Revenue

Scenario	Riders	Avg. Fare	Estimated Revenue
Low	20,000	\$85	\$1.7M
Base	25,000	\$85	\$2.1M
High	30,000	\$95	\$3.0M

Projected Economic Benefits

Successful rural rail corridors across the US show that tourism-driven ridership supports long-term service sustainability.

- Increased Visitor Spending: Direct injection of revenue into local restaurants, shops, and lodging.
- Job Creation: Through rail operations, station staffing, and expanded tourism-related services.
- Enhanced Regional Branding: Promoting Central Washington through the unique appeal of scenic rail travel.

Seasonal Variation

Forecasting models identified a strong and consistent tourism spike from June through August. Towns like Chelan experience dramatic increases in visitor activity, while Omak benefits from short-term surges during major events like the Omak Stampede.

Key Takeaway: The service design must incorporate seasonal scheduling flexibility (e.g., more frequent weekend/summer service) to capture peak tourism revenue while maintaining essential weekday service for medical trips

Infrastructure, Station Design, and Route Alignment

Successful implementation relies on prioritizing infrastructure investment in the highest-need areas and ensuring universal accessibility.

Route Prioritization: The Northern Alignment

Given the convergence of demographic need, healthcare access gaps, and predictive model results, the Northern Route (Wenatchee to Oroville) is the highest-value configuration.

- Highest Social Impact: Serves the greatest concentration of seniors, low-vehicle households, and residents with the longest travel times to medical care.
- Maximizes Trip Potential: Optimizes for both essential medical trips and northern tourism traffic (e.g., Omak/Winthrop access).

Critical Station Design Requirements

Station design must be built around the needs of the target ridership—older adults, disabled persons, and low-vehicle-access communities.

Design Priority	Function	Target Ridership Segment
ADA Compliance	Ramps, tactile paving, accessible ticketing, priority seating.	Seniors and riders with disabilities.
Multimodal Integration	Safe pedestrian infrastructure, bike storage, seamless links to local bus/paratransit services	Low-income and transit-dependent residents
Sheltered/Heated Waiting	Protection from severe Central Washington winter conditions.	All year-round, essential travelers.

Risks, Limitations, and Comparative Benchmarks

While highly feasible, the project carries quantifiable risks and must be viewed within the context of similar successful rail corridors.

Risks and Limitations

The current analysis focuses on demand justification and equity. The next phase must mitigate the following:

1. Cost Estimates: Detailed engineering studies are required to quantify costs for track upgrades and new station construction.
2. Freight Coordination: Track availability must be assessed and negotiated with existing CSCD freight operators.
3. Seasonal Uncertainty: Tourism-based ridership is inherently seasonal, requiring financial planning to cover off-peak operational costs.
4. Data Granularity: Future forecasting would benefit from more detailed origin-destination data to refine exact passenger counts.

Comparative Corridor Benchmarks

Comparison with two existing rail systems validates the CSCD corridor's dual-demand strategy:

- Amtrak Cascades (WA): Demonstrates that regional corridors can build steady ridership when aligned with a broader mobility network—just as CSCD aligns with healthcare and tourism needs.

- White Pass & Yukon Route (AK): Illustrates that tourism-driven rail can be highly profitable but is concentrated within a narrow seasonal window. This confirms that tourism will not sustain the line year-round.

The benchmarks validate the hybrid predictive strategy that balances essential year-round, healthcare-driven demand with a seasonal tourism revenue stream.

Project Conclusion and Alignment with Strategic Goals

The Feasibility Analysis confirms that the proposed passenger rail service in Central Washington is not only financially and operationally justifiable, but is also a necessary investment to meet core organizational and public policy goals.

Strategic Alignment: Integrated Travel Mission

The rail system directly supports Integrated Travel's mission by enhancing transportation equity for underserved communities.

- Equity: Provides a vital lifeline for seniors, low-income residents, and disabled populations who currently face long, often impossible, travel times to essential services
- Access: Significantly reduces the crippling two-hour medical travel burden for northern towns, improving access to specialized healthcare.
- Economic Sustainability: Leverages the region's strong tourism sector to create a dual-purpose system with both social and economic returns.

Final Summary of Findings

Priority	Finding	Justification
Highest Ridership Segment	Healthcare-driven essential travel	High proportion of seniors, disability, and low vehicle access in northern towns.
Highest Value Route	Northern Corridor (Oroville to Wenatchee)	Addresses the greatest combination of transit need and longest travel friction to care
Key Risk	Capital Cost and Freight Coordination	Requires detailed engineering studies and CSCD operator agreements.

Final Recommendation

The analysis strongly warrants proceeding to the detailed engineering and financial planning stage (Phase II) for the Northern CSCD Rail Corridor. This investment promises to be a

transformative resource for Central Washington, mitigating long-standing socio-economic and health access disparities

REFERENCES

- Amtrak Media Relations. Amtrak Sets All-Time Ridership Record in Fiscal Year 2024: 32.8 Million Customer Trips and \$2.5 Billion in Ticket Revenue. Amtrak Press Release, December 2024. <https://media.amtrak.com/2024/12/amtrak-sets-all-time-ridership-record-in-fiscal-year-2024/>
- Boray, T., Hegazi, M., Busche, H., & Lovegrove, G. (2024). The Economic Feasibility of (Re-)Introducing Tram-Trains in Canada: Okanagan Valley Electric Regional Passenger Rail. Sustainability, 16(10), 4081. <https://doi.org/10.3390/su16104081>
- Bureau of Transportation Statistics (BTS). *America on the Go: Long-Distance Transportation Patterns*. U.S. Department of Transportation, 2003. https://www.bts.gov/archive/publications/america_on_the_go/long_distance_transportation_patterns/entire
- County Health Rankings (2024). Washington State: Diabetes prevalence; Preventable hospital stays. <https://www.countyhealthrankings.org>
- CDC PLACES (2022). County-level model-based estimates for current asthma and coronary heart disease prevalence. <https://data.cdc.gov>
- Federal Highway Administration. *Long-Distance Multimodal Passenger Mode Choice*. U.S. Department of Transportation, 2016. <https://www.fhwa.dot.gov/policy/modalchoice/modalchoice.pdf>
- Mid-Valley Hospital & Clinic (2024). Community Health Needs Assessment (2024–2027).
- NIMHD HDPulse (2025). Mortality tables, Suicide (2019–2023), Washington counties. <https://hdpulse.nimhd.nih.gov>
- State Department of Revenue. Table L3: Lodging and Tourism Receipts by County, 2023–2024. Washington State Government, <https://dor.wa.gov>
- U.S. Government Accountability Office. (2023, May 16). Health care capsule: Accessing health care in rural America (GAO-23-106651). <https://www.gao.gov/assets/gao-23-106651.pdf>
- U.S. Census Bureau (2019–2023). American Community Survey (ACS) 5-year estimates. <https://data.census.gov>
- U.S. Census Bureau. DP05: ACS Demographic and Housing Estimates, 1-Year (2024) for Pierce County (County 47), Washington, and Washington State. data.census.gov, https://data.census.gov/table/ACSDP1Y2024.DP05?g=050XX00US53047_040XX00US53
- Washington State Department of Health (2025). Death Data & Injury Death Dashboards (Washington Tracking Network). <https://doh.wa.gov>
- Washington State Parks and Recreation Commission. Visitation Reports, 2023–2024. Washington State Government, <https://parks.wa.gov>
- Washington State Tourism. Tourism Regeneration Grant Recipients, 2024. State of Washington Tourism, <https://stateofwatourism.com>
- Washington State Department of Transportation (WSDOT). *Traffic Counts (AADT) – Current*. WSDOT Geospatial Open Data Portal, 2024. [WSDOT - Traffic Counts \(AADT\) Current | WSDOT Geospatial Open Data Portal](https://www.wsdot.gov/transportation/traffic-data/traffic-counts-aadt-current)
- Washington State Department of Transportation and Amtrak. *Amtrak Cascades Annual Performance Report, 2024*. WSDOT Rail, Freight, and Ports Division, Olympia, WA.

<https://wsdot.wa.gov/sites/default/files/2025-04/2024-Amtrak-Cascades-Annual-Performance-Report.pdf>

- Washington State Department of Transportation. “*Public Transportation Grant Programs and Awards: Consolidated Grant Program.*” WSDOT, 2024, <https://wsdot.wa.gov/business-wsdot/grants/public-transportation-grants/public-transportation-grant-programs-and-awards/consolidated>.
- White Pass & Yukon Route. *Official Site of the White Pass & Yukon Route Railway*, White Pass & Yukon Route Railroad, 2025, <https://wpyr.com/>