

Evaluating Transit Accessibility and Service Quality Improvements From New and Planned Projects Using General Transit Feed Specification (GTFS)-Derived Frequency and Ten-Minute Service Areas

Broderik Craig---GIS 6450 Final Project---December 2, 2025

Background

Access to public transit depends on two factors working together: walking access and service quality. Riders must be able to reach stops within a comfortable walking distance, and the service at those stops must be frequent and reliable enough to be useful. Traditional service area maps emphasize coverage but ignore whether the transit provided is high-, medium-, or low-frequency.

This project integrates GTFS-derived stop-level headways with Network Analyst service areas to evaluate how well the existing network performs during peak travel periods, and how proposed transit projects may improve both the extent and quality of accessible transit.

Research Question

How do proposed transit projects change the spatial extent and frequency-quality of walk access to transit during peak travel periods?

Methodology

GTFS Frequency Analysis:

Calculated average weekday headways for each stop from 8–9 AM, representing a peak travel hour. Stops were classified into frequency tiers:

- High (≤ 10 min)
- Medium-High ($\sim 10\text{--}20$ min)
- Medium ($\sim 20\text{--}30$ min)
- Low ($\sim 30\text{--}60$ min)
- Very Low (no trips in window)

Service Area Modeling:

Generated 10-minute service area polygons for each frequency tier using Network Analyst with a walking speed of ~ 3 mph.

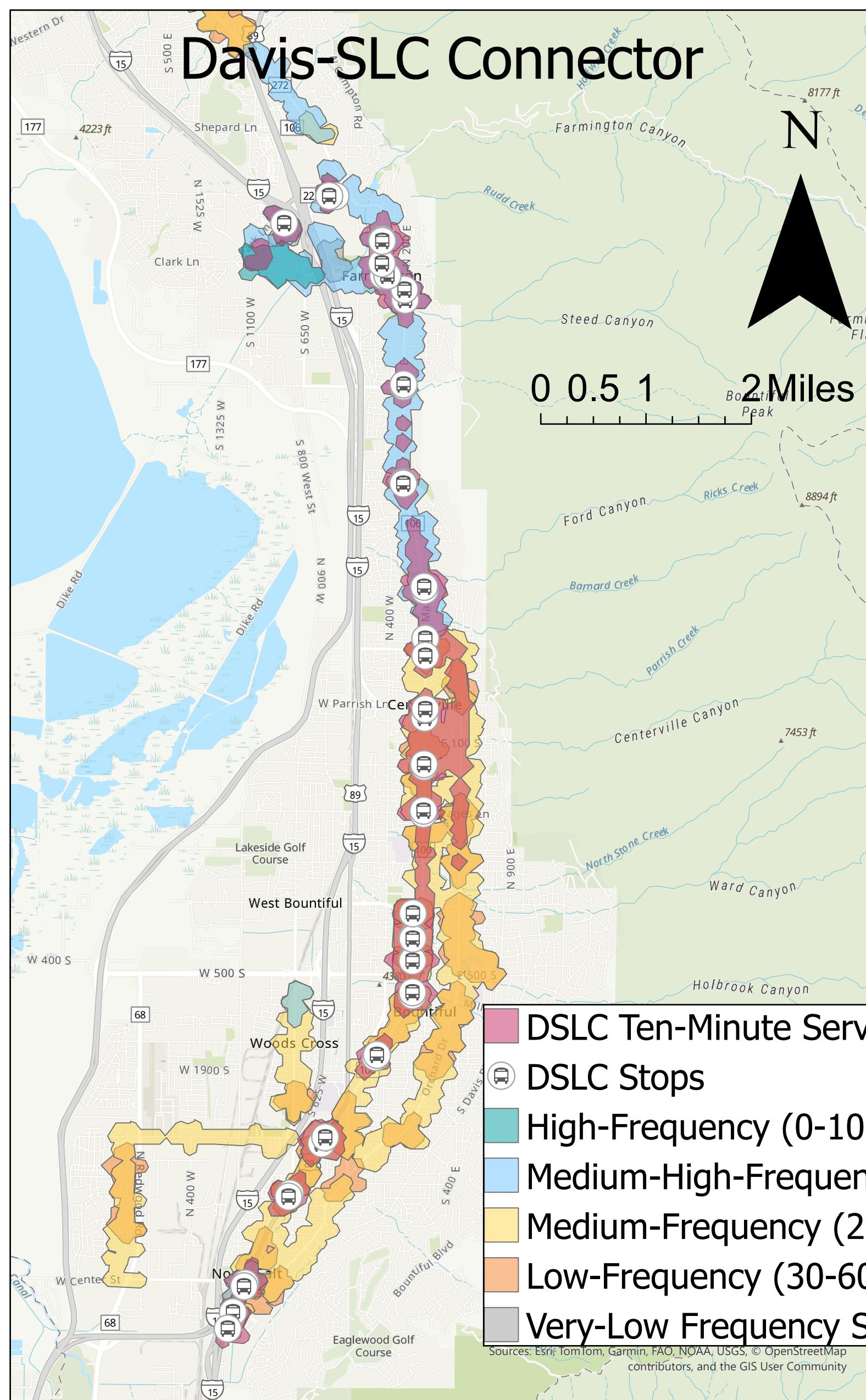
Data

GTFS (UTA, HVT) — stops, stop_times, trips, calendars

Street Network — road/sidewalk centerlines for walking accessibility

Proposed Projects — conceptual stop locations and alignments

Basemap — Esri/USGS imagery and vector streets



Analyzed Projects

Davis–Salt Lake City Connector

A proposed frequent-service corridor linking Davis County to downtown Salt Lake City to improve regional connectivity and provide a more reliable alternative to commuter traffic.

MidValley Express (MVX)

An east–west frequent transit corridor through central Salt Lake County designed to fill a major connectivity gap and improve access to key mid-Valley destinations.

High Valley Transit SR-224 Bus Rapid Transit

A planned high-frequency BRT line along SR-224 that enhances reliability and mobility between Kimball Junction, Park City, and key resort-area destinations.

