**Insight 1: Peak Demand Growth on Local and Rapid Routes**

* **Observation:** Both *Local Route* and *Rapid Route* show steadily increasing passenger counts in forecasts.
* **Actionable insight:** These routes should be prioritized for capacity expansion—either adding more vehicles or increasing frequency during peak hours.
* **Why it matters:** Planning for growth prevents overcrowding, improving rider experience and reducing delays.

**Insight 2: High Uncertainty on Light Rail Demand**

* **Observation:** Light Rail forecasts exhibit wide prediction intervals, meaning demand is less predictable.
* **Actionable insight:** Implement flexible scheduling or reserve backup vehicles on Light Rail to quickly respond to unexpected demand changes.
* **Why it matters:** Avoids both over-provisioning (wasted cost) and under-provisioning (crowding and dissatisfaction).

**Insight 3: Stable or Declining Demand on School and Peak Services**

* **Observation:** Forecasts for *School* and *Peak Service* routes show flat or decreasing passenger trends with narrow confidence intervals.
* **Actionable insight:** Consider optimizing or reducing service during off-peak times, reallocating resources toward routes with growth or uncertainty.
* **Why it matters:** Efficient resource use cuts operational costs without impacting rider satisfaction.

**Insight 4: Weekends Show More Volatile Demand Across Routes**

* **Observation:** Prediction intervals tend to widen over weekends, suggesting more variable passenger behavior.
* **Actionable insight:** Plan for flexible weekend operations—possibly dynamic scheduling or demand-responsive services.
* **Why it matters:** Helps balance operational costs with service quality during unpredictable periods.

**Insight 5: Potential Negative Passenger Forecasts Indicate Data or Model Limitations**

* **Observation:** Some forecast intervals dip below zero, which is unrealistic for passenger counts.
* **Actionable insight:** Refine data preprocessing or adjust model parameters (e.g., use log transformation or set a floor at zero) to improve forecast realism.
* **Why it matters:** More accurate forecasts build confidence in decision-making and prevent misallocation of resources.