Forecast Report

Draft

Alaska Department of Transportation & Public Facilities

and

Municipality of Anchorage

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EAST Anchorage Study of Transportation
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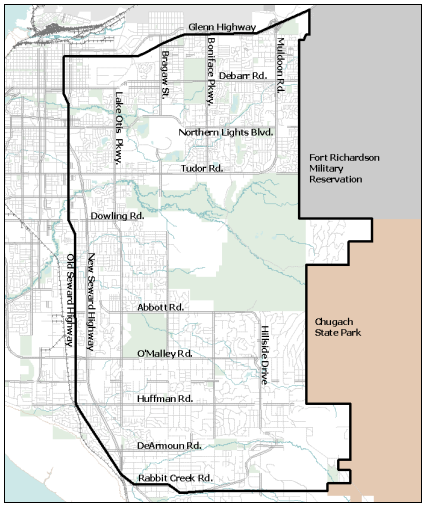
Please send comments by **February 14, 2003** to:

Carla SlatonBarker
HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, Alaska 99503
phone: (907) 274-2000
fax: (907) 274-2022
email: cslatonb@hdrinc.com

Introduction

The objective of the East Anchorage Study of Transportation . . .

Develop long-range solutions to maintain and enhance future travel mobility within and through East Anchorage.



East Anchorage Study Area

The focus of the Forecast Report

Forecast and analyze future traffic conditions in East Anchorage.

Study Overview

State and local officials have commissioned the East Anchorage Study of Transportation (EAST) to examine transportation improvements for the East Anchorage study area[1]. EAST will identify current transportation problems and forecast future transportation demands and deficiencies through the year 2023, and then develop approaches to improve our ability to travel safely and efficiently within and through the East Anchorage area. The study will focus on accessibility, mobility, and public safety throughout the study area, as well as seek to alleviate traffic congestion at major eastside intersections. The end product will provide technical findings as the basis for planning and programming future public transportation, sidewalk, trail, and road improvements. Findings from EAST will be used, in part, to prepare Anchorage's long-range transportation plan (LRTP).

Work completed under EAST will occur in the following analytical phases:

- Transportation and Mobility Data Gathering and Analysis
- Problem Identification and Study Objectives
- Alternative Development and Evaluation
- Study Recommendations

Focus of the Forecast Report

Understanding future development patterns and their affect on demand, supply, and performance of the transportation system is critical. The recently adopted comprehensive plan serves as a starting point for looking at future development patterns within and surrounding the study area. The newly completed Anchorage Transportation Model has been used to develop future travel demand and traffic forecasts. An evaluation of the forecast model results is presented in this memo to illustrate the future transportation conditions anticipated within the study area.

The key objectives of this report include:

- Developing a picture of future transportation and land use conditions in East Anchorage.
- Using the "Anchorage 2020 Comprehensive Plan" as a basis upon which to build the future scenario.
- Integrate background data and analysis into the future scenario forecasts.
- Share forecasts and analysis results with the public and decision-makers.

[1] Defined as the geographic area bounded by the Glenn Highway to the north, Rabbit Creek Road to the south, the Old Seward Highway to the west, and the Ft. Richardson Military Reservation and Chugiak State Park to the east.

- ***Introduction***. The introduction section contains an overview of the study and the forecast report.

- ***Forecast Methodology***. This section presents an overview of the forecast and analysis methodology.

- ***Future Traffic Conditions.*** This section of the report contains information on the forecast of average daily traffic levels anticipated in Anchorage in the year 2023.

- ***Segment Level of Service Analysis.*** This section of the report provides an analysis of the future traffic conditions to determine where travel demand and traffic levels strain transportation system capacity.

- ***Intersection Level of Service Analysis.*** This section of the report contains a level of service analysis of select intersections in the East Anchorage study area.

- ***Appendix A: Land Use Allocation and Growth Assumptions (MOA and HDR 2002).*** Appendix A outlines adjustments and growth assumption input into the Municipal traffic model based on Anchorage's new comprehensive plan.

- ***Appendix B: Intersection Traffic Analysis.*** Appendix B contains data sheets from the Intersection Capacity Utilization (ICU) Analysis of selected Anchorage Intersections.

Forecasting Methodology

The key tool used to predict how East Anchorage's transportation system will perform in the future is a regional traffic model. A traffic model is a computer program designed to simulate travel behavior and characteristics by comparing the demand for transportation (the need to travel) to the supply (the available transportation network). The demand for transportation is based on an area's unique development features. Socio-economic data (i.e., the number and types of jobs or households in the area) and land-use information (i.e., the quantity, type and location of land use development) is input into the model. The model interprets this information to simulate travel in the area, including the number of trips made and the routes taken.

The traffic model to be used for this study is the Municipality of Anchorage's (MOA's) TransCAD traffic model. The traffic model was updated to reflect changes in land use in the future, transit service levels, and pedestrian system improvements called for in the Anchorage 2020 Comprehensive Plan (See page 4). Future population and employment forecasts and land use assumptions based on the comprehensive plan were also input into the model. The model was also updated to reflect People Mover route restructuring and increased transit frequencies (See page 5). Once the updated information was incorporated, future traffic volumes on arterial and collector roadways were projected.

The future traffic conditions were analyzed to determine the anticipated level of service given the available roadway network. The roadway network assumed for the analysis was the "committed" roadway network. The committed roadway network included roadways that are already built or improvements for which environmental clearance has been approved. Traffic volumes were analyzed based on the evaluation methodologies and criteria established for the project and described in the "Evaluation Criteria Report (DOT&PF & MOA, November 2002). Intersection analysis was performed using a planning level analysis methodology based on Intersection Capacity Utilization that is part of the Synchro traffic simulation software, and tailored to Anchorage intersections.

Among the key elements of the analysis are:

- An analysis of the forecast conditions.
- A combination of methods to analyze future conditions.
- Identification of anticipated future transportation problems and needs.
- Sharing the results of future conditions analyses with the public and decision-makers.

Future Land Use and Pedestrian Conditions

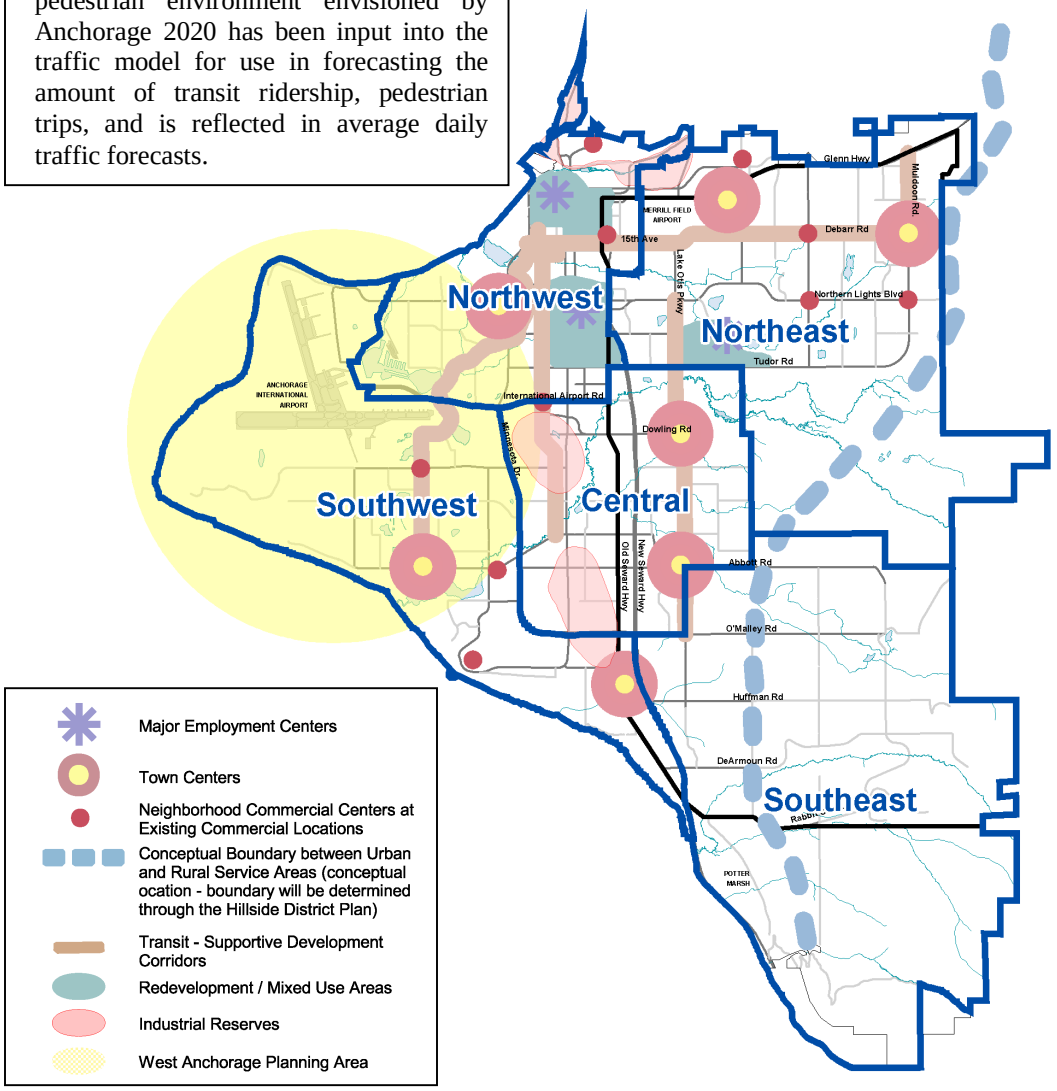
In many ways, Anchorage 2020 has created a dynamic, leading edge, policy framework for guiding growth and development within the Anchorage Bowl. The document's Land Use Policy Map "sets the direction for the preferred form of long-term growth and development in the Anchorage Bowl" (MOA February 2001, p. 50). This map identifies locations in Anchorage where major new urban elements would be located—providing policy guidance on the distribution and density of housing and employment land uses. Assumptions for each policy areas have been translated into the traffic model to help predict our future travel patterns.

The plan's vision, which has been reflected in the traffic model, is mix of retail, public facilities, and residential areas supported by transit and a high quality pedestrian environment. Development of town centers and transit development corridors in particular will promote mixed use, higher density development, public transit, and improved pedestrian connections. Appendix A provides a thorough overview of the policy and growth guidance from Anchorage 2020 and how those assumptions have been translated into the model.

The traffic model predicts that over 50,000 pedestrian trips will be made per day in 2023. Analysis of the forecast results suggests that overall vehicle miles traveled will drop by about 2% with implementation of the Comprehensive Plan policies. Such a drop is attributable to the changed land use, transit, and pedestrian environment put forth by Anchorage 2020.

Anchorage 2020 Policy Map

The land use, housing, employment, and pedestrian environment envisioned by Anchorage 2020 has been input into the traffic model for use in forecasting the amount of transit ridership, pedestrian trips, and is reflected in average daily traffic forecasts.



Future Transit Conditions

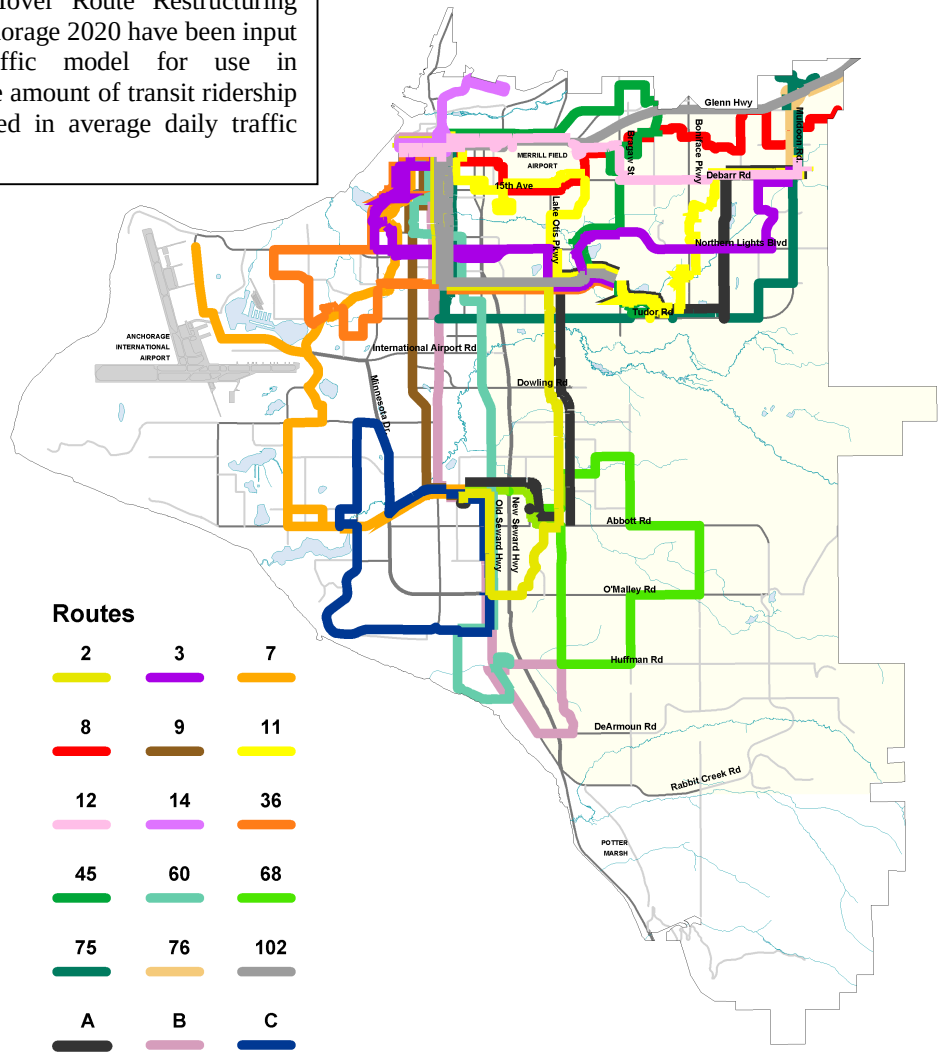
The traffic model forecast is based on both the Anchorage 2020 Comprehensive Plan transit assumptions and the People Mover Route Restructuring Plan routes (right). As such, the assumptions built into the model include the proposed transit development corridors, town centers, and increased transit frequencies.

By the year 2004, People Mover has established a goal that the new bus system will carry on average approximately 13,900 weekday passengers within the Anchorage Bowl. The 1999 statistics show that the system was carrying 10,728 average weekday riders. This goal represents a 23% increase in ridership over the five-year period or 5% growth annually.

In comparison the 2023 transportation model is predicting an average daily ridership of 21,000 passengers (an increase of 10,300 passengers over 1999 levels). This represents a 96% increase. As part of Long Range Transportation Plan, the Municipality has established as a goal, achieving a 200 percent increase in ridership. A target for the EAST alternatives analysis phase will be to explore transit ridership by an additional 10,000 riders.

People Mover Route Restructuring Routes

The routes and service frequencies from the People Mover Route Restructuring Plan and Anchorage 2020 have been input into the traffic model for use in forecasting the amount of transit ridership and is reflected in average daily traffic forecasts.



Future Traffic Conditions

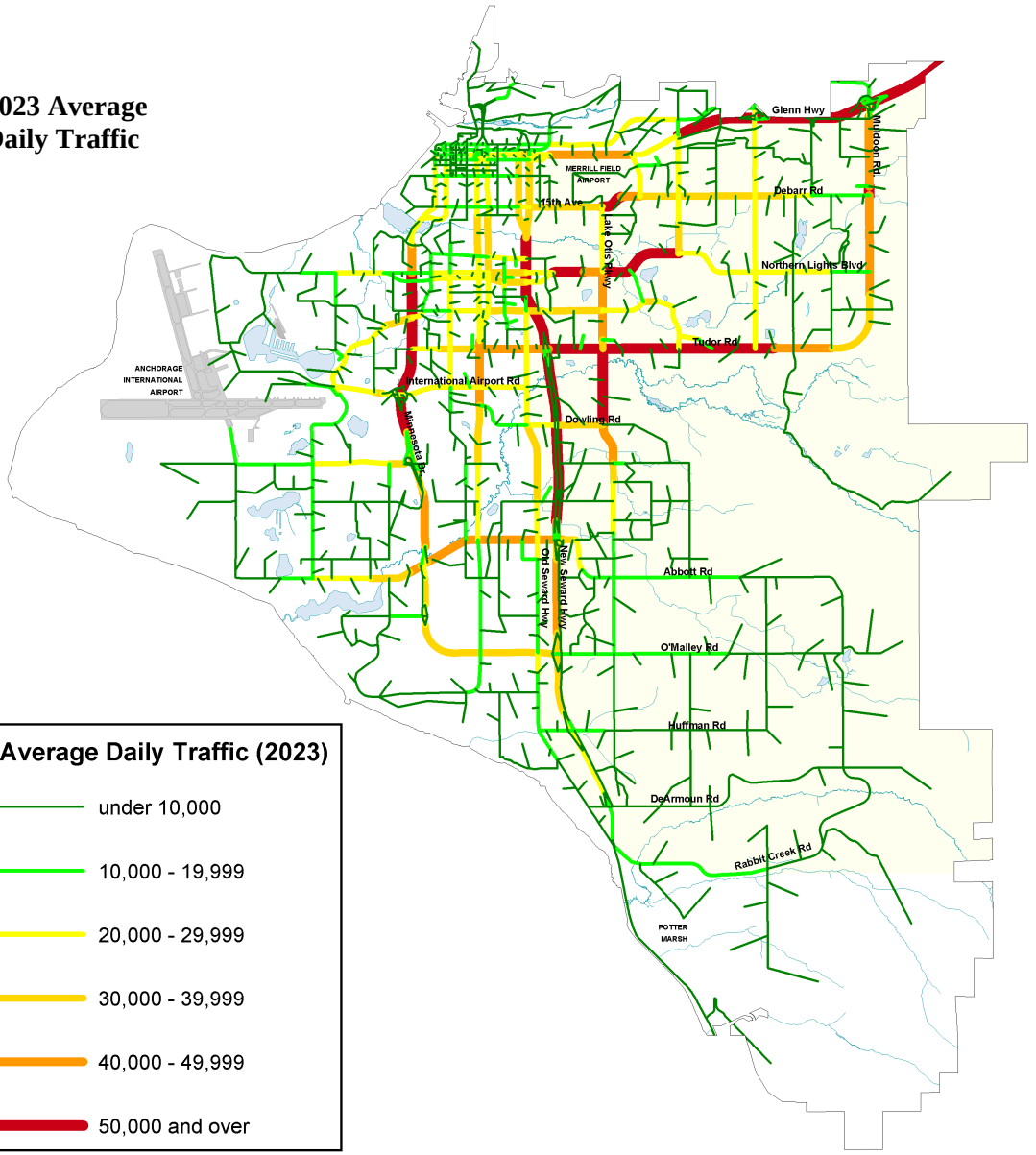
2023 Average Daily Traffic

The figure to the right depicts 2023 average daily traffic volumes generated by the MOA's TransCAD model and based upon land use and economic growth factors from the Anchorage 2020 Comprehensive Plan, and the committed roadway network.

Key east-west travel corridors include Tudor Road, East Northern Lights Boulevard, Debarr Road, and Glenn Highway. Significant north-south corridors within the study area include New Seward Highway, Lake Otis Parkway, and Muldoon Road; outside the study area, parts of Old Seward Highway and Minnesota Drive facilitate north-south travel

Heavy volumes of traffic use these roadways as commuters travel westbound to work in the mornings and eastbound returning home from work in the evenings. By 2023, Glenn highway, Tudor Road and New Seward Highway in the study area are all forecast to carry 50,000 or more vehicles per day. Traffic volumes along Muldoon Road are forecast to exceed 40,000 vehicles per day. The Glenn Highway, New Seward Highway, and Tudor Road are predicted to carry the greatest volumes of future traffic, with average daily traffic volumes between 70,000 and 80,000 vehicles per day.

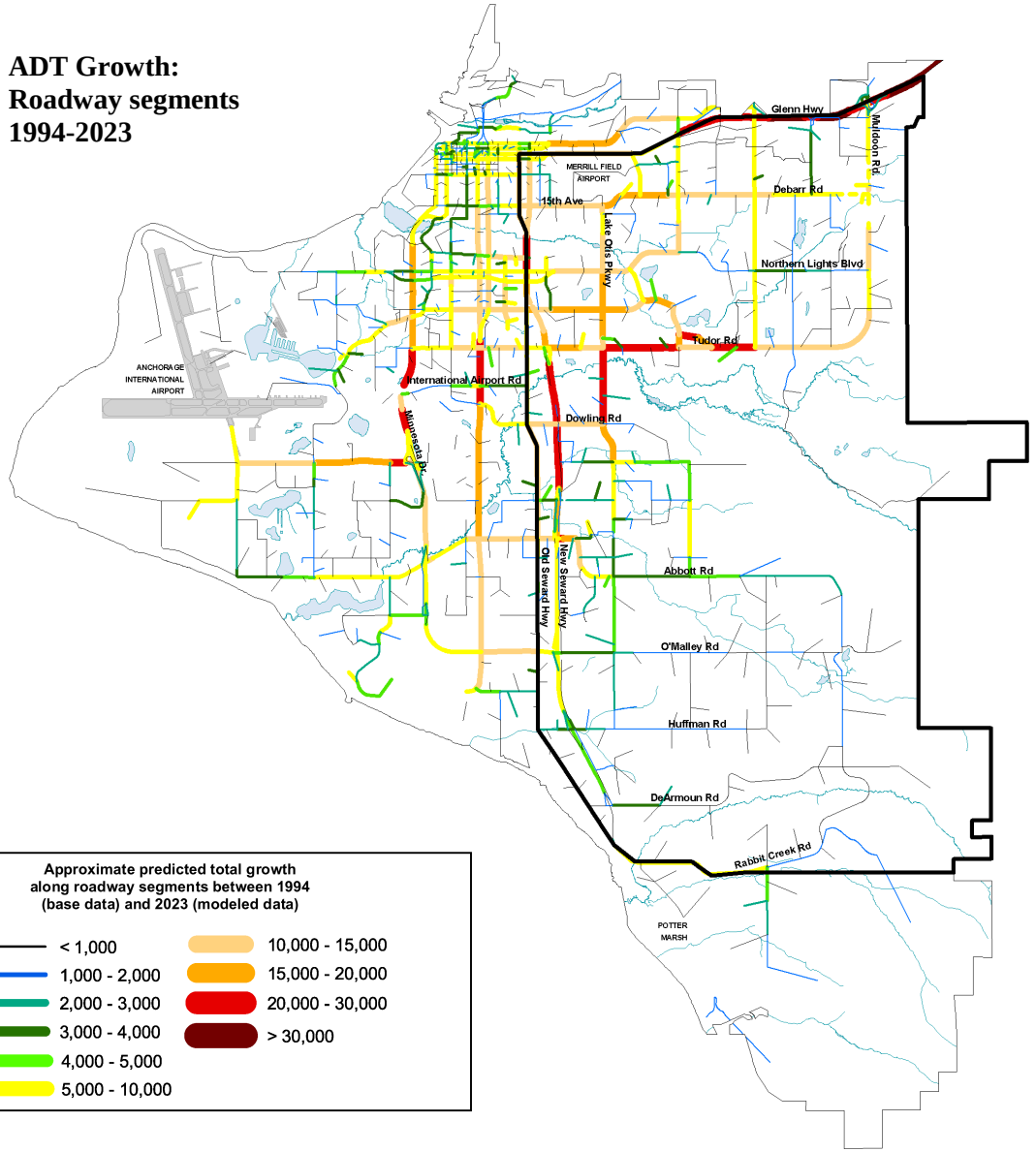
2023 Average Daily Traffic



Traffic Growth on Roadway Segments, 1994-2023

The figure to the right shows the total forecast growth in average daily traffic on roadway segments within the Anchorage Bowl. Roadways with the highest increase in daily traffic volumes are Tudor Road, E. Northern Lights Blvd., Debarr Road, and Glenn Highway. Traffic volumes along north/south roadways including New Seward Highway, Lake Otis Pkwy, and Muldoon Road, C Street and Minnesota Drive are also forecast to grow by as much as 20,000 to 30,000 vehicles per day or more.

Growth in traffic volumes is sustained and reinforced by growth in land uses into the future, particularly continued residential growth to the north and east of Anchorage that is supported by the employment centers in the Anchorage Bowl. As alternatives to address future growth emerge through the study process, they will need to consider opportunities to maximize the efficiency of the existing transportation infrastructure, increase its person-carrying capacity and foster land use patterns that are sustainable in the long term and conducive to all modes of travel.



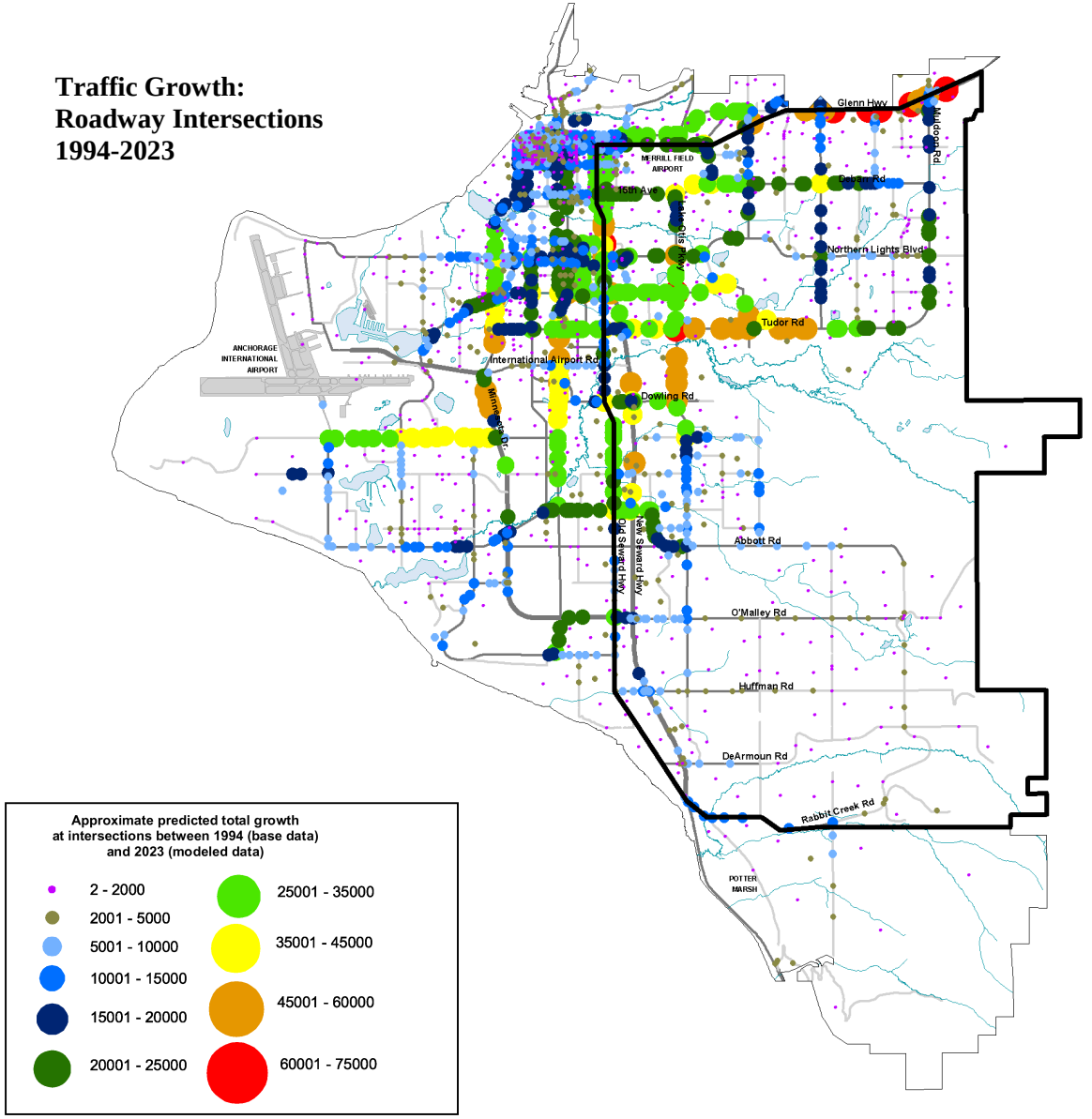
Traffic Growth at Intersections, 1994-2023

The figure to the right shows the total forecast growth in average daily traffic at intersections between 1994 and 2023. Intersection growth was calculated by adding the increment of forecast traffic growth between 1994 and 2023 from the segments entering each intersection node. As such, this does not represent a true intersection volume, but provides a reasonable indication of where traffic growth is predicted to occur and the magnitude of that growth.

The magnitude of growth at intersections along Glenn Highway, Tudor Road and Lake Otis Parkway will require significant increases in capacity to maintain acceptable operating conditions and alleviate congestion. Where major arteries intersect, such as at Lake Otis Parkway and Tudor Road, extraordinary solutions will be required to accommodate the significant growth through these intersections. Intersections identified to have the most significant increase in traffic growth, the highest levels of traffic, and that will present the greatest challenge to future mobility are:

- Lake Otis Pkwy. and Tudor Rd.
- New Seward Hwy. and Northern Lights Blvd.
- Glenn Hwy. and Boniface Pkwy.
- Glenn Hwy. and Muldoon Rd.

Traffic Growth:
Roadway Intersections
1994-2023



Segment Level of Service Analysis

Level of service refers to a standard measurement used to reflect relative traffic flow conditions on a scale of A to F, with Level of Service (LOS) A representing free-flow conditions and LOS F representing severely congested conditions.

Long Range Transportation Plan Goal: *Provide a roadway network that operates at a Level of Service (LOS) D or better for 95% of projected 2023 travel demand. (MOA, April 2001, p. 11)*

Level of Service - Defined. Level of service (LOS) is a qualitative measure of the operational efficiency of intersections or roadway segments, based on quantitative analyses of traffic volume and capacity**.** The MOA has established LOS D as the acceptable operating threshold for roadways and intersections within its jurisdiction. Levels of service E or F indicate unacceptable conditions with operational problems or capacity deficiencies. Areas projected to operate at LOS D are areas of concern. If growth at these intersections is higher than predicted, problems could occur at these locations in the future.

LOS Definitions

A	Free flow with low volumes of traffic and speeds controlled by the speed limits.
B	Stable flow, but drivers have reasonable freedom to select speed and land of operation.
C	Stable flow, but most drivers are restricted in their freedom to select speed or change lanes.
D	Approaching unstable flow with little room to maneuver.
E	Volume at capacity, unstable flow with momentary disruptions and stops.
F	Forced flow, stops, low speeds.

Source: AASHTO, 2001 and ITE 1992

Level of Service – Measurement. Roadway level of service can be measured in terms of the volume of traffic a roadway is carrying compared to its theoretical capacity to accommodate that volume. The table to the right depicts the LOS thresholds measured in terms of average daily traffic for arterials that include intersections controlled by traffic signals; the table immediately below it depicts the LOS thresholds for uninterrupted highways and freeways. LOS thresholds presented in these tables are based on an average of several different LOS criteria developed by Florida's Department of Transportation (FDOT) and modified for Anchorage's conditions. The ADT values provide a planning level relationship between the number of lanes along a particular roadway and the general LOS that can be expected. It should be noted that the LOS thresholds for one-way streets would be approximately 40% higher than those listed in the tables.

Signalized Arterial LOS Thresholds Measured in Average Daily Traffic

Lanes	Divided	Level of Service				
		A	B	C	D	E
2	Undivided	--	3,100	8,200	13,800	15,300
4	Undivided	4,300	11,000	18,700	24,000	27,500
4	Divided	4,800	18,500	25,700	35,100	41,500
6	Divided	7,300	25,600	32,900	48,000	49,500
8	Divided	9,400	33,300	42,800	62,600	64,300

Source: HDR

Uninterrupted Highways and Freeways LOS Thresholds Measured in Average Daily Traffic

Lanes	Divided	Level of Service				
		A	B	C	D	E
2	Undivided	2,000	7,000	13,800	19,600	27,000
4	Divided	22,000	36,200	51,700	65,400	73,800
6	Divided	34,100	55,700	79,500	100,700	113,600
8	Divided	48,700	79,900	113,400	142,300	160,000
10	Divided	61,600	100,900	143,400	179,800	202,000
12	Divided	74,400	122,000	173,200	217,300	244,200

Source: HDR

2023 Segment Level of Service

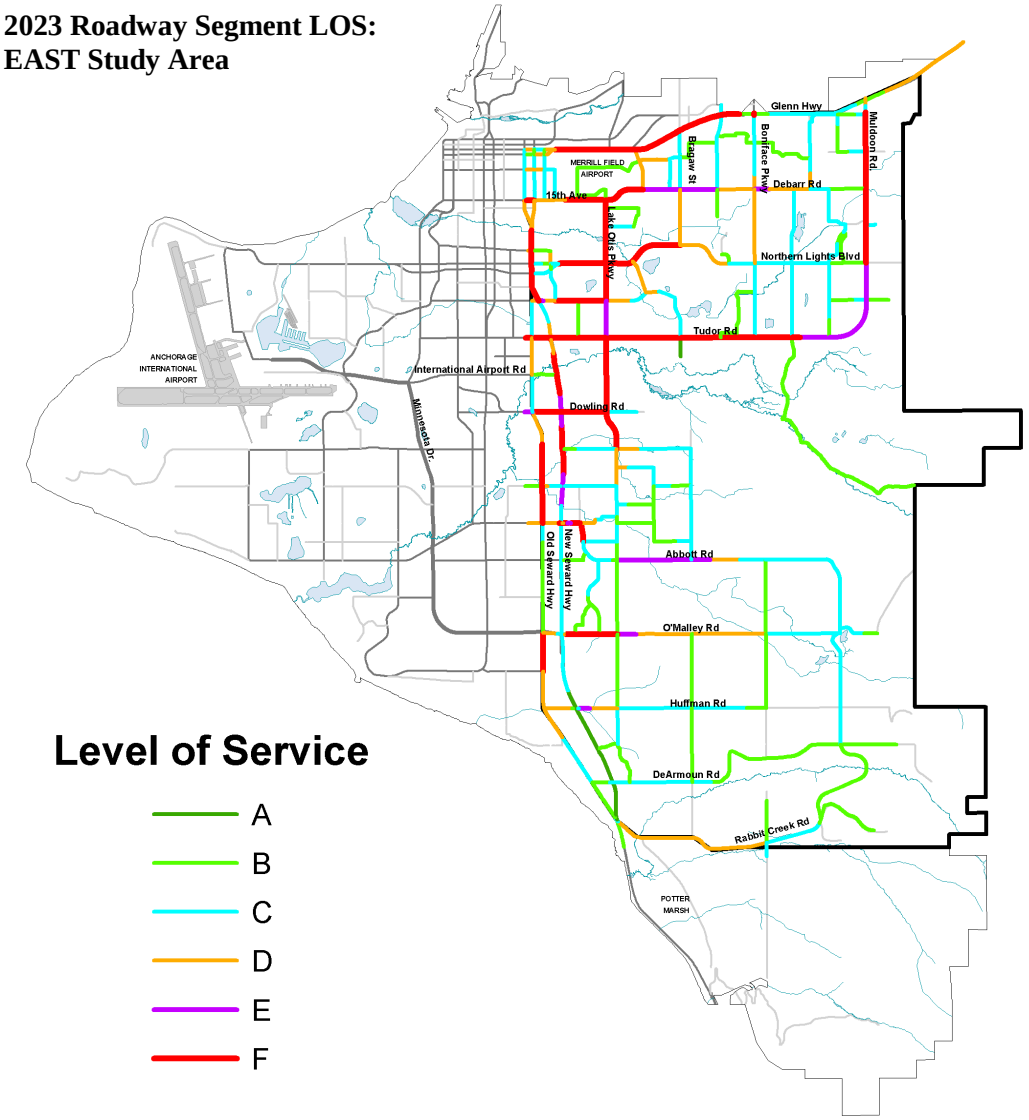
The figure to the right shows the 2023 roadway segment level of service within the project area. The segment level of service analysis is based upon the traffic volume forecasts from the MOA's regional traffic model for the entire Anchorage Bowl (see page 4) and the LOS tables on page 7. The model included those roadway improvements that already have secured funding (C Street Dimond Blvd to O'Malley Rd. and Dowling Road from Old Seward Highway to Lake Otis Pkwy.).

Based upon the LOS threshold established by the MOA, any roadway segment operating at a LOS below D is deemed to be operating at an unacceptable level. As shown in this figure: without roadway improvements or other changes, ten (10) east/west roadways and four (4) north/south roadways are projected to have segments operating at unacceptable levels of service by the year 2023 including:

LOS F (Failing)
- Glenn Highway
- Debarr Road
- E. Northern Light Blvd
- E. 36th Ave.
- Tudor Road
- E. Dowling Road
- O'Malley Road
- Muldoon Road
- Lake Otis Parkway
- New Seward Highway
- Dimond Blvd.

LOS E (At Capacity)
- Abbott Road
- Huffman Road

2023 Roadway Segment LOS: EAST Study Area



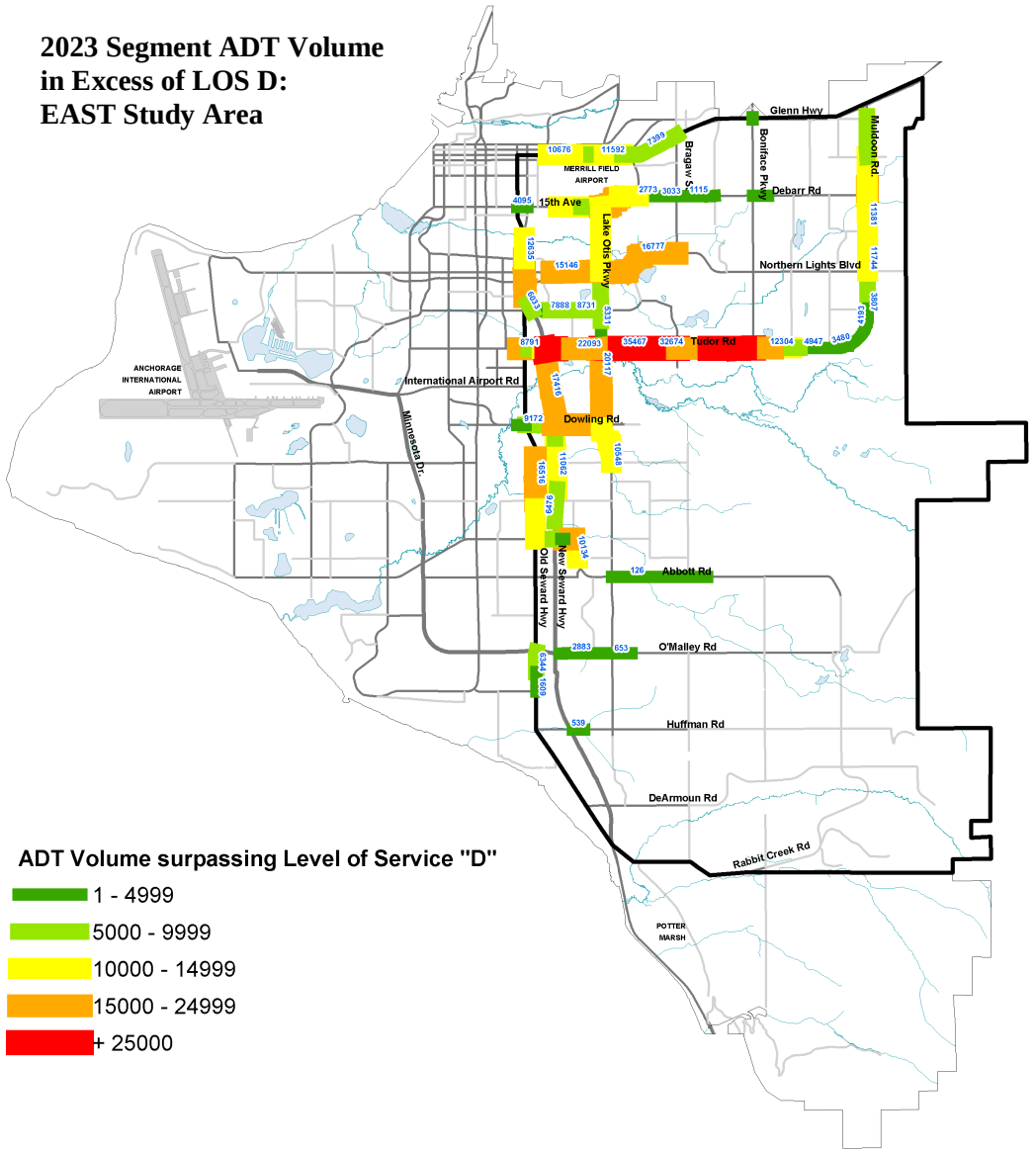
2023 ADT: Amount Over Capacity

As mentioned earlier, the MOA has established a minimum goal of achieving a roadway level of service of at least D. The figure to the right represents the increment of average daily traffic the roadway segment is forecast to carry in excess of level of service D within the study area. This figure shows not only the primary problem areas east of and including the New Seward Highway but also the potential magnitude of the capacity deficiencies.

The highest deficiencies are anticipated along Tudor Road, which is forecast to carry more than 25,000 vehicles per day in excess of its level of service D capacity. Segments along New Seward Highway, Northern Lights Boulevard, and Lake Otis Parkway, are all predicted to have segments, with volumes exceeding level of service D capacity by as much as 35,000 vehicles per day, while Muldoon Road, Glenn Highway and Debarr Road are forecast to have segments with traffic volumes in excess of level of service D capacity by 5,000 to 15,000 vehicles per day.

Based upon future growth in the area and the forecast increments of traffic growth in excess of threshold capacity levels, significant enhancements to the transportation network and the person-carrying capacity of the East Anchorage transportation system will be necessary to maintain acceptable levels of service in 2023.

2023 Segment ADT Volume in Excess of LOS D: EAST Study Area



Intersection Level of Service Analysis

Long Range Transportation Plan Goal: *Improve non-project arterial intersection capacity by 15% for at least 5 intersections per year. (MOA, April 2001, p. 11)*

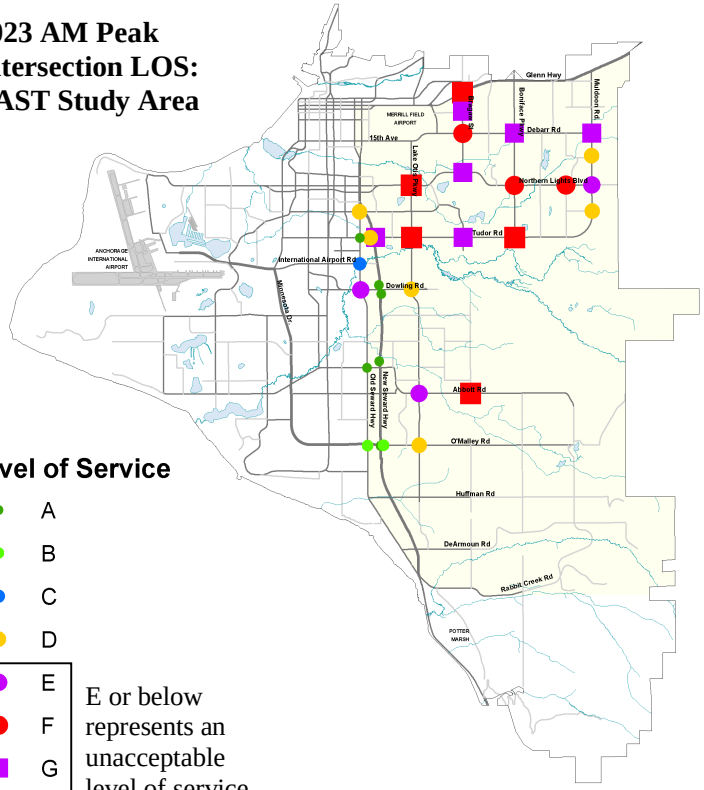
Intersection Level of Service – Defined. To evaluate how well roadway intersections are functioning, a methodology based on "Intersection Capacity Utilization" has been used. Intersection Capacity Utilization (ICU) is a planning level method for calculating intersection level of service by evaluating the critical traffic movement volumes compared to lane capacity at an intersection. The methodology is well suited for traffic planning purposes but does not provide the detail necessary for operations or signal timing design. The analysis will provide a reasonable indication of those intersections where congestion would be expected if no improvements occur.

ICU	LOS	LOS Definitions
0 to 0.60	A	The intersection has no congestion. A cycle length of 80 seconds or less will move traffic efficiently. All traffic should be served on the first cycle. Traffic fluctuations, accidents, and lane closures can be handled with minimal congestion. This intersection can accommodate up to 40% more traffic on all movements.
>0.60 to 0.70	B	The intersection has very little congestion. Almost all traffic will be served on the first cycle. A cycle length of 90 seconds or less will move traffic efficiently. Traffic fluctuations, accidents, and lane closures can be handled with minimal congestion. This intersection can accommodate up to 30% more traffic on all movements
>0.70 to 0.80	C	The intersection has no major congestion. Most traffic should be served on the first cycle. A cycle length of 100 seconds or less will move traffic efficiently. Traffic fluctuations, accidents, and lane closures may cause some congestion. This intersection can accommodate up to 20% more traffic on all movements.
>0.80 to 0.90	D	The intersection normally has no congestion. The majority of traffic should be served on the first cycle. A cycle length of 110 seconds or less will move traffic efficiently. Traffic fluctuations, accidents, and lane closures can cause significant congestion. Sub optimal signal timings cause congestion. This intersection can accommodate up to 10% more traffic on all movements.
>0.90 to 1.00	E	The intersection is right on the verge of congested conditions. Many vehicles are not served on the first cycle. A cycle length of 120 seconds is required to move all traffic. Minor traffic fluctuations, accidents, and lane closures can cause significant congestion. Sub optimal signal timings can cause significant congestion. This intersection has less than 10% reserve capacity available.
>1.00 to 1.10	F	The intersection is over capacity and likely experiences congestion periods of 15 to 60 minutes per day. Residual queues at the end of green are common. A cycle length over 120 seconds is required to move all traffic. Minor traffic fluctuations, accidents, and lane closures can cause increased congestion. Sub optimal signal timings can cause increased congestion.
>1,10 to 1.20	G	The intersection is 10% to 20% over capacity and likely experiences congestion periods of 60 to 120 minutes per day. Long queues are common. A cycle length over 120 seconds is required to move all traffic. Motorists may be choosing alternate routes, if they exist, or making fewer trips during the peak hour. Signal timings can be used to "ration" capacity to the priority movements.
>1.2%	H	The intersection is 20% over capacity and could experience congestion periods of over 120 minutes per day. Long queues are common. A cycle length over 120 seconds is required to move all traffic. Motorists may be choosing alternate routes, if they exist, or make fewer trips during the peak hour. Signal timings can be used to "ration" capacity to the priority movements.

Source: Intersection Capacity Utilization 2000: A Procedure for Evaluating Signalized Intersections. Trafficware Corporation. 2000.

The maps below show the projected intersection level of service for select intersections within the study area projected to occur in 2023 (not all intersections have been modeled). Input data is based on projected traffic volumes forecast by the Municipality of Anchorage traffic model (see page 4), existing intersection geometries, and the "committed roadway network" (i.e. those roadway projects that have been approved through an environmental process). Of the intersections modeled, the poorest performing intersections are predicted to be Lake Otis & Tudor, Lake Otis & Northern Lights, and Abbott Loop & Abbott Rd. Each of these intersections are predicted to be operating at LOS H in both the AM and PM. A number of other intersections are at LOS H in either the AM or PM. These intersections are 20% or more over capacity and could experience congestion periods of over 2 hours during the peak periods indicated by the maps. Long queues and significant delays will be common. It is likely that if additional high volume intersections were to be modeled, they would also be predicted to experience problems.

2023 AM Peak Intersection LOS: EAST Study Area



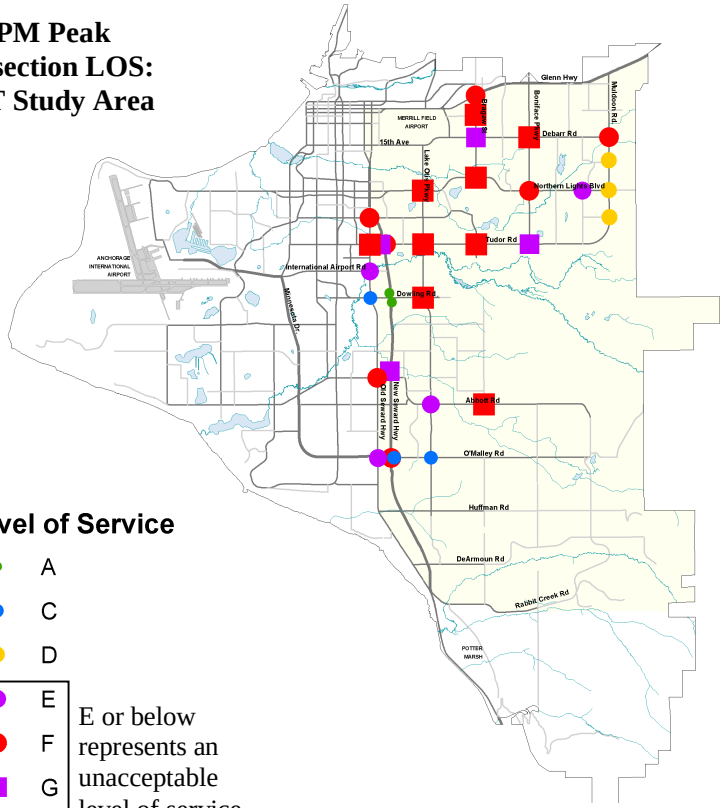
Level of Service

- A
- B
- C
- D
- E
- F
- G
- H

E or below represents an unacceptable level of service.

Note: only modeled intersections within the study area are shown, not all intersection in the study area were modeled.

2023 PM Peak Intersection LOS: EAST Study Area



Level of Service

- A
- C
- D
- E
- F
- G
- H

E or below represents an unacceptable level of service

Note: only modeled intersections within the study area are shown, not all intersection in the study area were modeled.

References

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