

CHAPTER EIGHT

TRANSPORTATION/CIRCULATION

INTRODUCTION

This chapter describes the transportation system and services within the City of Grass Valley. The discussion addresses the street and roadway system, transit services and facilities, pedestrian facilities, rail facilities, and air transportation. This serves to provide a general understanding of the importance of each of these modes and their part in the circulation system for the City.

The information contained in this chapter is based primarily on discussions with the staff of the City of Grass Valley, Nevada County and the Nevada County Transportation Commission, as well as the 1982 *City of Grass Valley General Plan*.

ROADWAY STANDARDS

The existing roadway system in the Grass Valley area is composed of residential streets, collectors, arterials, and freeways. Figure 8-1 displays the Collector, Arterial and Freeway system within the Planning Area for the City of Grass Valley. These roadway classifications were obtained from the City of Grass Valley's 1992 *Functional Classification System Map*. According to City staff, no change in classifications has occurred since that time. However, Sierra College Drive has been constructed. This facility is also called the Dorsey Drive extension. As Dorsey Drive is classified as a Collector, it is have assumed that its extension (Sierra College Drive) will also be a Collector. Each of these facility classifications is described in the text that follows.

RESIDENTIAL STREETS

All residential streets should be two lanes wide. Turn lanes should not be needed at intersections. Parking may be provided on one or both sides of the street. Topography may limit provision of parking lanes.

COLLECTORS

Collector streets should be two lanes wide. Turn lanes may be needed on approaches to arterials or other collectors. Parking may be provided on one or both sides of the street. Topography may limit provision of parking lanes.

ARTERIALS

Arterial streets can vary in width from two to four lanes plus turn lanes. Parking may be provided on one or both sides of the street, although in general, better traffic operation and increased traffic safety result when on-street parking is prohibited. Driveway connections to

arterials should also be limited for the same reasons. Joint use driveways for adjacent projects should be considered wherever possible.

FREEWAYS

The only freeway within the City of Grass Valley is State Route (SR) 49, also referred to as Highway 49. Caltrans has its own set of design standards for all state facilities.

EXISTING STREET AND ROADWAY SYSTEM

The roadway system in Grass Valley is bisected by Highway 49. This facility provides regional access to the City and is a four lane limited access highway as it passes through the greater Grass Valley community. It currently carries 30,000 to 37,000 Average Daily Traffic (ADT) trips. Interchanges along the Highway 49 corridor are located at McKnight Way, Empire Street/SR 20, South Auburn Street/Colfax Highway/East Bennett Street, Idaho-Maryland Road/East Main and Brunswick Road.

State Highways 20 and 174 are two lane arterials which run generally east-west and intersect Highway 49. Highway 20 carries a traffic volume of between 14,000-15,000 ADT and serves as the second major transportation and truck route out of Grass Valley. Highway 174 is also a major two lane arterial but carries less traffic volume (4,500-6,200 ADT).

The other Arterials in the Planning Area are all two-lane roadways. These Arterials include South Auburn Street, Empire Street, La Barr Meadows Road, Mill Street, Neal Street, Main Street, and the Nevada City Highway. However, sections of Empire Street, Mill Street, and Neal Street also fall in the Collector classification. Brunswick Road is also an Arterial that lies adjacent to the Grass Valley City Limits and within the Planning Area, therefore, it has also been included.

There are numerous two-lane Collectors in the City of Grass Valley. These Collectors include Allison Ranch Road, Alta Street, E. Bennett Road, Bright Street, Butler Street, Dorsey Drive, Empire Street, Freeman Lane, Hughes Road, Idaho-Maryland Road, McCourtney Road, McKnight Way, Mill Street, Richardson Street, Ridge Road, Sierra College Drive, Sutton Way and Whispering Pines Lane. These Collectors typically carry less than 9,000 ADT, with the exception of Sutton Way west of Brunswick, which carries about 13,500 ADT.

The remaining streets in the City of Grass Valley are local residential streets.

EXISTING LEVELS OF SERVICE

To assess the quality of existing traffic conditions, Levels of Service were calculated for Planning Area individual roadway segments. "Level of Service" (LOS) is a qualitative measure of traffic operating conditions whereby a letter grade "A" through "F", corresponding to progressively worsening operating conditions, is assigned to an intersection or roadway segment (see Table 8-3). The City of Grass Valley currently utilizes LOS "D" as the threshold above which mitigation measures must be implemented.

ROADWAYS

One evaluation parameter to assess operations of roadways is to compare daily traffic volumes on area roads to generalized capacity thresholds. These thresholds are based on "typical" peak hour parameters and can be helpful for planning purposes to roughly suggest the daily volume of traffic which might yield various peak hour Levels of Service. These volume thresholds are presented in Table 8-1. It should be recognized that the ultimate capacity of urban roadway segments is generally governed by the operation of adjacent intersections, and that auxiliary lanes at these intersections can have a significant effect on street segment capacity.

**TABLE 8-1
EVALUATION CRITERIA FOR TWO-WAY URBAN ROADWAYS
DAILY LEVEL OF SERVICE**

FACILITY TYPE	LOS "C" ADT VOLUMES	LOS "D" ADT VOLUMES	LOS "E" ADT VOLUMES
Urban Street	V/C 0.71-0.80	V/C 0.81-0.90	V/C 0.91-1.00
Two Lane	10,700-12,000	12,000-13,500	13,500-15,000
Four Lane	21,300-24,000	24,000-27,000	27,000-30,000
Six Lane	32,000-36,000	36,000-40,500	40,500-45,000
Freeways			
Four Lane	25,500-38,300	38,300-49,900	49,900-58,500

Source: Transportation Research Board, Circular 212 and 1985 and 1994 Highway Capacity Manual

Table 8-2 presents the existing daily traffic volumes on roadways within the Grass Valley Planning Area. These daily traffic volumes were conducted by Nevada County as part of their ongoing count program.

Each of these Planning Area roadways presented in Table 8-2 has been assigned a number. These numbers correspond to the roadway count locations that are displayed in Figure 8-2.

As shown in Table 8-2, most of the roadway system in the Grass Valley area operates acceptably. None of the freeway system currently falls below LOS "C". The only Arterials that fall below the LOS "D" threshold are the Nevada City Highway at the Grass Valley City limits and Brunswick Road. One Collector exceeded this threshold, Sutton Way west of Brunswick.

**TABLE 8-2
EXISTING ROADWAY DAILY TRAFFIC VOLUMES LEVELS OF SERVICE**

ROAD	LOCATION	LANES	ADT	LOS
1. State Route 49/20	S of N. Auburn St	4	29,000	C
2. State Route 49/20	S of Bennett St	4	36,000	C
3. State Route 49/20	S of Idaho-Maryland	4	37,000	C
4. State Route 49/20	S of Brunswick Rd	4	30,500	C

ROAD	LOCATION	LANES	ADT	LOS
5. State Route 49	S of Grass Valley	4	21,700	B
6. State Route 49	S of SR 20	4	32,500	C
7. State Route 20	W of Mill St	4	14,200	A
8. State Route 20	W of SR 49	4	15,000	A
9. State Route 174	S of SR 20	2	6,200	A
10. State Route 174	E of Central St	2	4,500	A
11. State Route 174	E of Ophir St	2	5,100	A
12. State Route 174	S of Race St	2	5,400	A
13. State Route 174	E of Empire Mine	2	5,600	A
14. South Auburn St	S of Mohawk	2	7,802	B
15. South Auburn St	N of School Alley	2	6,852	A
16. South Auburn St	N of Whiting St	2	7,139	A
17. South Auburn St	NW of E. McKnight Way	2	8,228	B
18. Brunswick Road	On Overcrossing 49/20	2	26,172	F
19. Brunswick Road	N of Idaho Maryland Rd	2	12,235	D
20. Brunswick Road	S of Idaho Maryland Rd	2	14,504	E
21. Brunswick Road	NW of Loma Rica Dr	2	14,056	E
22. Brunswick Road	NW of E. Bennett	2	10,686	C
23. Empire Street	E of Le Duc St	2	4,923	A
24. La Barr Meadows Rd	SE of E. McKnight Way	2	10,028	B
25. Mill Street	S of Neal St	2	5,786	A
26. Mill Street	NE of Rhode Island St	2	5,750	A
27. Neal Street	E of Church St	2	5,239	A
28. Nevada City Hwy	Grass Vly City Limits	2	14,355	E
29. Allison Ranch Rd	S of McCourtney	2	720	A
30. Allison Ranch Rd	N of North Star Mine Rd	2	665	A
31. Alta Street	N of West Main St	2	4,203	A
32. Alta Street	S of Alta Vista Dr (S)	2	3,587	A
33. Alta Street	N of Alta Vista Dr (S)	2	3,476	A
34. Alta Street	SE of Ridge Road	2	3,380	A
35. E. Bennett Road	E Grass Vly City Limit	2	2,142	A
36. Brighton Street	N of McCourtney	2	3,830	A
37. Brighton Street	S of Chapel	2	2,581	A
38. Butler Street	W of Minnie	2	813	A
39. Butler Street	E of Packard Dr	2	929	A
40. Dorsey Drive	SE of Segsworth Way	2	5,541	A
41. Empire Street	E of Kate Hayes St	2	4,278	A
42. E. Empire Street	E Grass Valley City	2	4,178	A
43. Freeman Lane	N of McKnight Way	2	8,142	B
44. Freeman Lane	SW of Taylorville Rd	2	6,772	A
45. Hughes Road	NW of E. Main St	2	7,852	B
46. Hughes Road	S of Ridge Rd	2	3,872	A
47. Idaho Maryland Rd	W of Brunswick	2	3,570	A
48. Idaho Maryland Rd	E of Brunswick Rd	2	1,918	A
49. McCourtney Road	W of Brighton St	2	8,650	B
50. W. McKnight Way	SW of Taylorville Rd	2	8,882	B
51. Mill Street	N of Bank Street	2	5,399	A

ROAD	LOCATION	LANES	ADT	LOS
52. Richardson Street	E of Alta St	2	1,171	A
53. Ridge Road	W of Ridge Estates Rd	2	5,059	A
54. Ridge Road	N of Hughes Rd	2	7,815	B
55. Ridge Road	S of Hughes Rd	2	7,625	B
56. Sierra College Dr	SE of Ridge Rd	2	3,180	A
57. Sierra College Dr	E of Main Street	2	4,546	A
58. Sutton Way	E of Brunswick	2	9,040	B
59. Sutton Way	W of Brunswick	2	13,661	E
60. Whispering Pines Ln	W of Brunswick Rd	2	1,494	A

Source: kdAnderson Transportation Engineers, 1998.

INTERSECTIONS

An additional evaluation parameter of operations is to analyze intersections. At study intersections, Levels of Service were calculated for different intersection control types using the respective methods in the following sources.

- **Signalized intersections.** Planning method in Transportation Research Board Circular 212, *Interim Materials on Highway Capacity*, 1980.
- **Unsignalized intersections.** 1994 *Highway Capacity Manual* (HCM) Update, Special Report 209.

Each of these intersection methodologies is described below.

- **Signalized Intersections.** Procedures used for calculating Levels of Service at signalized intersections utilize a "critical movement" analysis as presented in Transportation Research Board Circular No. 212. Table 8-3 presents a summary of Level of Service characteristics specific to signalized intersections.
- **Unsignalized Intersections.** For unsignalized intersections, gap acceptance and delay are used for Level of Service analysis. Procedures used for calculating unsignalized intersection Level of Service are presented in the 1994 *Highway Capacity Manual*. Levels of Service at the unsignalized intersections, which are controlled by side street stop signs, are indicative of the magnitude of the delay incurred by motorists which must yield the right of way at an intersection. In addition, an overall intersection delay is calculated which takes into account those vehicles traveling unimpeded through the intersection. From this overall intersection delay, an overall intersection Level of Service can be suggested.

**TABLE 8-3
LEVEL OF SERVICE DEFINITIONS**

LEVEL OF SERVICE	SIGNALIZED INTERSECTION	UNSIGNALIZED INTERSECTION
"A"	Uncongested operations, all queues clear in a single-signal cycle. V/C, 0.60	Little or no delay. Delay 5 seconds/vehicle.
"B"	Uncongested operations, all queues clear in a single cycle. V/C = 0.61-0.70	Short traffic delays. Delay > 5 seconds/vehicle and 10 seconds/vehicle.
"C"	Light congestion, occasional backups on critical approaches. V/C = 0.71-0.80	Average traffic delays. Delay > 10 seconds/vehicle and 20 seconds/vehicle.
"D"	Significant congestions of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. V/C = 0.81-0.90	Long traffic delays. Delay >20 seconds/vehicle and 30 seconds/vehicle.
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). V/C = 0.91-1.00	Very long traffic delays, failure, extreme congestion. Delay >30 seconds/vehicle and 45 seconds/vehicle.
"F"	Total breakdown, stop-and-go operation. V/C > 1.00	Intersection blocked by external causes. Delay > 45 seconds/vehicle.

Sources: 1994 *Highway Capacity Manual*, Transportation Research Board (TRB) Special Report 209; V/C (volume to capacity) ratios ranges from TRB *Circular 212*.

A supplemental traffic signal warrant analysis is also performed to confirm the significance of calculated delays. While the unsignalized Level of Service may indicate very long delays (i.e., LOS "E") for traffic yielding the right of way, traffic conditions are generally not assumed to be unacceptable unless signal warrants are satisfied. Meeting signal warrants signifies that intersection improvements may be warranted, but does not mean that installation of a signal is the only way to mitigate conditions. It is often possible to improve operations with additional lanes or improved geometrics to reduce delays. The signal warrant criteria employed for this study is presented in the *Caltrans Traffic Manual*.

The City of Grass Valley staff selected 29 intersections for analysis. All will be analyzed for peak hour turning movements. Of the 29, 20 will be subject to new traffic counts. Upon completion of intersection data collection, each intersection will be evaluated and a Level of Service determined. Table 8-4 is a template form on which intersection data will be shown.

TRANSIT FACILITIES

Public transit in Grass Valley is made up of "Fixed-Route Services" and "Specialized Services".

- **Gold Country Stage (GCS)**. GCS is a fixed route system which provides hourly service primarily in and between Nevada City and Grass Valley. New routes have recently been added to serve the Highway 20 corridor between Grass Valley and Penn Valley and to serve the Highway 49 corridor between Grass Valley and Lake of the Pines, with connections for Placer County Transit service. In addition, a new route between Grass Valley and Camptonville has been added. Figure 8-4 displays the transit service routes.
- **Dial-A-Ride**. Dial-a-Ride is a demand-based para-transit service operated through a non-profit contract with Durham Transportation, Inc. The California Alta Regional, Inc. subsidizes elderly, handicapped and disabled passengers, but does not directly subsidize the overall operation of the service.
- **Gold Country Telecare (GCT)**. GCT is a private, non-profit organization serving elderly, handicapped and disabled patrons. Passengers are transported by full-sized vans, mini-vans, or station wagons to shopping and medical appointments.

A commuter bus service is currently being considered. This service would be an express bus traveling between Grass Valley/Nevada City and Sacramento. Stops should be limited to major areas of trip productions and attractions.

TRUCK ROUTES

The City of Grass Valley currently has no designated truck routes within the City limits. While truck routes do not exist, trucks are prohibited from traveling on East Maryland Drive.

NON-AUTO FACILITIES

Although bicycle, pedestrian, and equestrian trails have been planned for in Grass Valley, the number of existing trails is limited. The only non-auto trails within Grass Valley are the Empire Mine State Park and the Litton Trail. The Empire Mine State Park trail is approximately 10 miles long and is located near Highway 49 in Grass Valley. The Litton Trail is located west of Sierra College Drive.

The 1996 *Nevada County Master Bicycle Plan* identifies the bike lanes within the City of Grass Valley. However, the City of Grass Valley has not adopted this plan. Currently, the only designated bicycle facilities within the City of Grass Valley are located on Ridge Road from Hughes Road to the Nevada Union High School and on East Main Street from Hughes Road to the Nevada City Highway. These existing bicycle lanes are displayed in Figure 8-5.

TSM/TDM MEASURES

Transportation systems management (TSM) and transportation demand management (TDM) are two strategies that increase the efficiency of the existing transportation system. TSM actions maximize transportation system operating efficiency through low cost, physical improvements. TDM actions maximize transportation system utilization through modification of travel behavior decisions. Specifically, TDM actions attempt to modify travel choices and alter relative transportation prices for different travel decisions. Given the increased demand on public resources and concerns for the environment, Grass Valley can expect demand to increase for the expansion and improvement of existing transportation facilities and programs in lieu of new, capital intensive improvements. The use of TSM/TDM actions will play an important role in meeting this new demand.

Grass Valley does not currently have a TSM program in place.

AIR TRANSPORTATION

There is one general aviation airport in the vicinity of Grass Valley. Located east of Grass Valley on Loma Rica Road, the Nevada County Airpark serves western Nevada County.

The Nevada County Airpark is a small aircraft airport classified in the Airport Reference Code as B-1, meaning it generally accommodates aircraft less than 12,500 pounds and 49 foot wingspan. In 1995, a new runway was built. Construction of this new runway had been identified in the 1990 Nevada County Airpark Master Plan.

RAIL TRANSPORTATION

Currently, no railroad services are provided within the City of Grass Valley.

COMMUTATION

The 1990 Census reported transportation-related information, including such items as place of work, means of transportation to work, travel time to work, and private vehicle occupancy (1990 *Census of Population and Housing*, Summary Tape File 3).

Of 3,609 workers (who were Grass Valley residents) 16 years of age and older, 3,096 (86%) worked in Nevada County, while 492 (14%) worked in another California county, and 31 worked out of State. Ninety-four persons (2+%) worked in Sacramento.

The average travel time to work for all commuting Grass Valley residents was 17 minutes. Homeowners reported an average of 1.73 vehicles available, while renters averaged 1.31 per housing unit.

The 3,609 workers reported the following means of transportation to work:

- 2,677 (74%) drove alone
- 471 (13%) carpooled
- 219 (6%) walked to work
- 140 (4%) worked at home, and did not commute at all
- 24 (<1%) took public transportation
- 12 (<1%) rode bicycles