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CITY OF LA GRANDE

TRANSPORTATION PLAN

1981

City of La Grande
Transportation Plan

Prepared by
City of La Grande Staff

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TRANSPORTATION PLAN

INTRODUCTION

The City of La Grande Transportation Plan is intended to provide a means of satisfying the needs of moving people and goods within the La Grande area in a convenient, safe, and efficient manner. The current transportation difficulties are identified and possible corrective measures suggested. Also, future transportation needs and new facility construction are suggested based upon our expected growth patterns and anticipated population increases. Of course, the energy situation worldwide will affect all modes of transportation to an unforeseeable degree. This study largely contends that people and goods will still be moving on our streets by some mode of transportation; so, the analysis and recommendations are valid. However, where certain trends are obvious, an attempt has been made to project the impact on our present situation and probable future needs.

The Transportation Plan is a supplement to the La Grande Comprehensive Land Use Plan and should be used in combination with it and other planning documents for the La Grande urban area.

RECOMMENDATIONS

The following is a list of recommendations, which are not intended to be binding. In most instances, these recommendations are being followed by the City staff for reviewing and designing street projects. There are some instances where implementing ordinances should be altered to give these recommendations the force and effect of law. These instances are noted accordingly. The numerical ranking is not intended to reflect importance.

1. The construction width and right-of-way width of different street classifications should be specified in the subdivision ordinance.

2. Streets which are designated as arterial or collectors should be upgraded to those standards when work on those streets is scheduled.
3. If reducing or eliminating on-street parking is necessary to improve safety, minimize congestion and promote free flowing traffic, then parking should be restricted before any road improvements are scheduled.
4. Efforts should be made, when financially feasible, to pave gravel streets in order to avoid continued maintenance costs of grading, gravelling, and controlling dust.
5. All construction, parking, and planting maintenance should be controlled to the extent necessary to insure adequate, clear vision near intersections.
6. Additional rights-of-way should be required at the time of property development when necessary for the future widening of streets.
7. The construction of sidewalks should be required on all new through streets and programs implemented to construct sidewalks on existing through streets, especially on collectors and arterials.
8. The intersection of Adams and Spruce should be improved to alleviate the congestion for traffic turning north on Adams from the east bound left-hand turn refuge on Spruce.
9. The Willow Street connection between Adams and Washington should be acquired and constructed.
10. Additional parking area in the Central Business District (CBD) should be acquired and constructed.
11. Street maintenance should occur in a timely, economical manner.

GOALS AND POLICIES

Goals and policies for the Transportation Plan were established to help define the wants and needs of the City of La Grande's Transportation System.

GOALS

Achievement of the following goals is necessary to meet La Grande's transportation needs:

1. That a safe, convenient, and economic urban area transportation system be provided.
2. That a rationale for determining priorities in street development and improvement be provided.
3. That highway facilities be developed in such a manner that valuable soil, timber, water, scenic, and cultural resources are not damaged or impaired.
4. That a balanced approach to transportation system development be initiated giving due consideration to all modes of travel.
5. That safe and favorable location of airports and airstrips within the La Grande vicinity be provided.
6. That a convenient and safe means for routing traffic within and through the area be provided.
7. That direct routes be provided between the principal areas of origin and destination of traffic.
8. That residential property be protected from unnecessary traffic.

9. That assistance be given in the proper development of the area's land resources by recognizing the interdependence of street facilities, traffic, and land use.
10. That the streets will be upgraded and maintained in the best condition (economically and physically) possible.

POLICIES

Policy statements are supplements to the goals and are intended to be used as guidelines in interpreting the Transportation Plan and for aiding in other land use planning decisions. Any transportation planning decisions knowingly made that are contrary to the policies should be supported with findings justifying such actions. Policies may also serve as the basis of appealing a transportation planning decision.

It is our policy:

1. That plans for new or proposed improvement of major transportation facilities shall identify the positive and negative impacts in:
 - a. Local land use patterns,
 - b. environmental quality,
 - c. energy use and resources,
 - d. existing transportation system, and
 - e. fiscal resources.
2. That the La Grande Area Street Plan shall classify the area's street system into four basic types: freeways, arterial streets, collector streets, and local streets.
3. That access to freeway facilities in the area shall complement the local street network as much as possible.

4. That the arterial and collector streets shall connect with county arterials and collectors or state highways.
5. That the collector streets shall be located and designed to discourage all traffic except that with an origin or destination within the immediate area served.
6. That street improvements and developments will be prioritized yearly with enough flexibility to allow for adjustments as priorities change throughout the year.
7. That street right-of-way and all other public lands will be considered for park, open space, and other public uses prior to their vacation.
8. That adequate parking facilities be considered so as not to impair social, economic, and/or cultural resources.
9. That roads created in subdivisions and land partitions be designed to tie into the existing road system.
10. That the capacity of a street providing access to new development be adequate to accommodate the additional traffic generated by the development prior to the construction thereof.
11. That all existing railroad crossings have been determined as the minimum necessary at their present locations for the safe, efficient, convenient and direct movement of persons and goods between principal areas of origin and destination of traffic. That they shall be continued and upgraded periodically to maintain safe and swift movement of traffic to all parts of the City. Nothing in this policy is intended to limit or prohibit the authority of the Public Utility Commissioner under Oregon Revised Statute, Chapter 763, with respect to the closure of railroad crossings.

BACKGROUND

La Grande has evolved from a combination of two early influences to establish the City. The first development is the southern portion of town in which the streets were established in a north-south, east-west direction. Then in the mid 1880's, the railroad was built in the Grande Ronde Valley which essentially went in a straight line from Pyle Canyon near Union to Orodell on the west side of the valley and continuing up the Grande Ronde River. This created a situation where La Grande was now a mile from the railroad which caused a rapid development of commercial and residential growth adjacent to and paralleling the railroad. Thus, where the grid pattern of development paralleling the railroad joined the previously established growth pattern at a 45° angle, it created five-way intersections at five locations near the downtown commercial area.

The second major influence to La Grande's transportation facilities occurred about 90 years after the railroad but also represents part of a national transportation network - Interstate 84. The freeway was established north of La Grande's principal development and has to some extent had an impact similar to what the railroad originally caused; i.e. new development. Whereas the construction of the freeway essentially only rerouted through traffic and did not bring in new service, it did move traffic into a new area and out of the previous area which did cause change. The extent and influence of the change created by the freeway is reflected in the policies, priorities, and recommendations contained in this study.

Beyond these two significant influences on the La Grande area transportation network, there are the same advantages and disadvantages existing here as in most cities this size. It should be noted that transportation, i.e. traffic, is a subjective science relative only to those participating at that time. This will be discussed later in this study.

STREET OVERVIEW AND PRIORITIES

OVERVIEW

As can be seen on Map 1, most of the unimproved streets are on the north side of town. This is largely due to new construction which has occurred on the south side of town with street construction mandated. Also, homeowners supported the formation of local improvement districts for street improvements. Attempts have been made to establish street improvement projects on the north side but due to absentee ownership (rentals) and many elderly residents, these improvement projects have lacked the necessary financial backing to be successful. There has also been concern expressed regarding the potential increase in property values, and consequently property taxes, which could result from a street improvement project.

The City has not built streets in established areas. The Subdivision Ordinance requires that streets in new developments be constructed to City standards. The City has operated on special serial levys in the past for specific street projects or repair projects. This is not readily understood by the general public. When conducting a door-to-door survey on the north side of town, the most common complaint was the street conditions. The condition of our streets is the largest transportation problem in the La Grande area.

STREET CONDITIONS

The streets in La Grande were evaluated in order to rate their condition. This was necessary in order to develop an inventory of what is needed to improve our transportation system and eventually develop priorities for doing so. The streets have been rated good, fair, or poor for each of three street categories in La Grande - asphalt, oilmat and gravel. The following table illustrates the findings:

<u>Asphalt</u>	<u>Oilmat</u>	<u>Gravel</u>
Good: 16.21 miles	Good: 1.49 miles	Good: .39 miles
Fair: 11.43 miles	Fair: 7.79 miles	Fair: 9.5 miles
Poor: .94 miles	Poor: 4.86 miles	Poor: 6.6 miles

The location of these street conditions can be seen on Map 1.

Oilmat or asphalt streets in good condition are either newly constructed, newly reconstructed, or have been overlaid. There are no cracks, raveling, or potholes. The street base is adequate with no evidence of subsidence or rutting. A gravel street in good condition is smooth with packed crushed rock.

Streets in fair condition have a good base but the surface is no longer smooth. Cracking is evident and potholes may be occurring. The surface may suffer from several patching jobs which have settled in varying degrees. A surface treatment ranging from a seal coat to an asphalt overlay is necessary to bring these streets to good condition. A street in fair condition has enough surface defects that moisture is going to begin to seep through and undermine the street base. An asphalt or oilmat street in fair condition will not remain in this condition for very long.

Streets in poor condition have structural problems. The surface is in varying stages of deterioration and the base has failed. The street would have to be reconstructed with the existing street ripped up, a new base constructed, and a new surface laid down.

STREET CLASSIFICATIONS

There are three general classifications used to describe the amount of traffic using a street and the relative advantages of that street in relation to getting from point A to point B. These street classifications are arterial, collector, and local.

Arterial Streets

These streets are designed to carry substantial volumes of fast moving traffic through the City and from one part of the City to another. Arterials should connect major traffic generators such as the central business area to the freeway. Access to abutting property is a secondary function and in some situations, access onto or off of an arterial may be limited to minimize speed differences and turning movements. Parking on arterials is frequently limited. The City arterial classifications connect with county and/or state and federal arterial highways.

Collector Streets

These routes collect traffic from residential or commercial areas and connect to arterial streets. Collector streets lack sufficient volume to be classified as arterials but may warrant conversion to an arterial classification if additional development occurs thus creating more traffic. Route continuity is not essential for collector streets as they serve various areas and connect to arterials in different locations.

Local Streets

These routes are designed to provide access to abutting properties and introduce traffic into the system. It is unlikely that a local street will be upgraded to a higher classification. Local streets have convenient access to collector streets, and their traffic volume is limited to those properties which are adjacent. Through traffic does not travel on local streets as they are herein designated.

PRIORITIES

High Priorities

The projects under this rating are collector or arterial streets. These are the primary routes within and through the City which benefit the highest number of people.

1. Gekeler Lane from 12th Street to U.S. Highway 30 - this is now an oilmat street in fair condition.
2. Division from Second Street west to Umatilla, Umatilla to Harrison Avenue then east to Second Street - these are gravel streets except for Harrison which is an oilmat in fair condition.
3. Willow Street from Adams Avenue to Cove Avenue - This is an oilmat street in fair condition.
4. Twelfth Street from the Hillcrest Cemetery to Gekeler Lane - this is an oilmat street in fair to poor condition.
5. Second Street from "I" to Adams.

Medium Priorities

The streets within this rating all require maintenance and they all service several properties on a daily basis. The projects under this rating are somewhat more argumentative. Criticism may be made when fair-condition oilmat or asphalt streets are being resurfaced and fair- or poor-condition gravel streets are not being improved. This rating was assigned in an effort to maximize the benefit from every dollar the City spends for street improvement. Local Improvement Districts may occur anywhere at anytime and usually occur independent of any additional City subsidy. However, when the City has serial levy money to spend, it should be allocated so that the largest number of people benefit. As the following graphic (Figure 1) illustrates, this means upgrading medium-condition streets to good-condition before improving poor-condition streets to a good-condition status.

A good-condition street stays in good shape for a large portion of its usable life. However, when streets deteriorate to medium-condition, the rate of deterioration increases. The length of time a street stays in medium-condition is less than the time it will exist in high- or poor-condition.

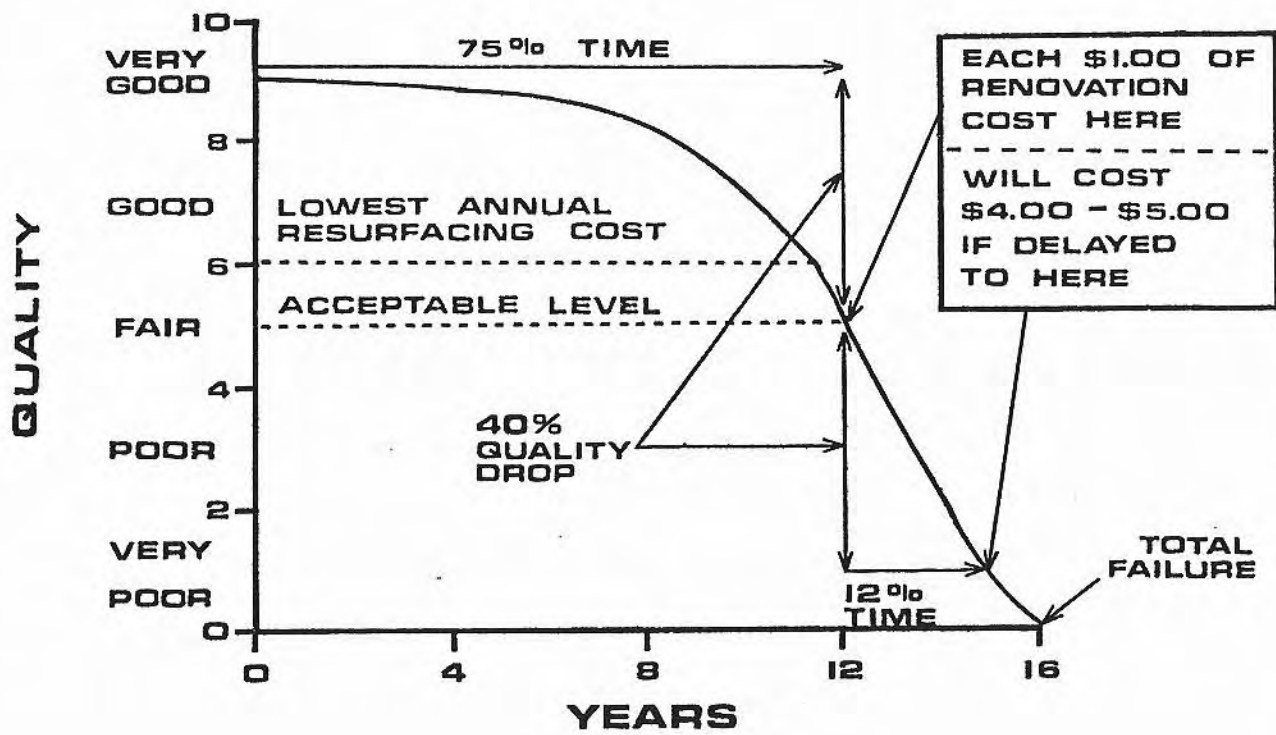


Figure 1
Road Deterioration vs Time

Therefore, to overlay or seal coat the surface of medium-condition streets is more cost effective than spending large amounts of money reconstructing poor-condition streets. To keep the medium-condition streets from reaching a poor-condition status is the focus of these medium priorities.

The primary negative factor involved in this type of street maintenance program is that the medium- and good-condition streets are maintained while the poor-condition streets, requiring total reconstruction, are not improved.

The following is taken from the publication, "American Public Works Association," Economics of Timely Street Maintenance, January 1981. This adequately summarizes the position necessary for timing medium-condition street improvement projects.

We have found that the cost of major maintenance approaches \$20/square yard, and the average cost of resurfacing is slightly under \$5/square yard. Accordingly, these cost figures show that for every dollar spent on timely maintenance, \$4 can be saved in major maintenance.

The difficulty the public works official has in providing timely maintenance is that the general public, often reflected through elected officials, does not perceive the need to resurface a street that appears to be in relatively fair condition. In contrast, the public will readily demand that something be done when the street is in poor to bad condition but at cost four times greater. Economical, timely street maintenance succeeds or fails on the ability of public works officials to communicate with the public.

It is more cost effective to maintain streets in good and fair condition. Streets that fall within the medium-priority category are listed below.

1. Sunset from "C" to "M"
2. Walnut except for new serial levy project
3. Oak from "O" to Washington
4. Cedar from Spring to Washington
5. First Street from "K" to Adams
6. Third from "M" to "O" and Main to Jefferson

7. Sixth from "C" to "J"
8. Seventh from "O" to Washington
9. Eighth from "K" to Washington
10. Ninth from "L" to Washington
11. 12th from Hillcrest Cemetery to Washington
12. 14th from "H" to Washington
13. 15th from "H" to Washington
14. Harrison from Columbia to Second
15. N. Ash from Jackson to Benton
16. "X" Avenue from Second to Spruce
17. May Street
18. "W" from Jackson to Spruce
19. "U" from Greenwood to Spruce
20. "T" from N. Depot to Spruce
21. "S" from N. Fir to Spruce
22. Jefferson from Hemlock to Third
23. Willow from Cove to Highway 82
24. Washington from Alder to Fir and Cherry to 16th
25. Chestnut from Washington to Jefferson
26. Depot from Washington to Jefferson
27. Elm from Washington to Jefferson
28. Fir from Washington to the railroad crossing
29. E. "O" from Cherry to Willow
30. E. "N" from Cherry to Willow
31. Cove Avenue from Portland to Holmes Road
32. Holmes Road
33. East "M" loop to Cove Avenue from Willow
34. Hall Street from Cove Avenue to East "M"
35. Wall Street from East "K" to East "M"
36. Main Street from Alder to Fourth
37. Spring from Foley to Washington
38. Penn from Alder to Washington
39. "O" from Alder to Washington
40. "N" from Foley to Washington
41. "M" from Oak to Fourth and Eighth to Washington

42. "K" from Sunset to Eighth
43. "J" from Second to Sixth
44. "I" from Second to Sixth
45. 20th from Adams to Gekeler
46. Aries Lane
47. Leo Lane
48. Linda Lane
49. Aquarius from Linda Lane to Jupiter Way
50. Jupiter Way

Low Priorities

The projects under this rating are low priority streets but they are not unimportant streets. If unlimited financial alternatives were available, gravel streets would be more important to repair before resurfacing the medium-condition asphalt and oilmat streets which received a medium-priority rating. But with limited financial resources, it is in the City's best interest to spend the limited allocation on projects which maintain the best street conditions for the longest period of time per dollar. Resurfacing streets before the surface deteriorates to the point of allowing moisture to weaken the base, and thus necessitating major reconstruction, is the most cost effective plan.

All current efforts to maintain La Grande's streets are funded from the Street and Road Fund. Proceeds from the state gasoline tax, which average \$150,000 annually, are the primary contributor to this fund. Moneys from water and sewer revenues are also added to the Street and Road Fund and used for repairing the road cuts made when sewer or water taps are installed. In fiscal year 1981-82, \$52,000 was contributed from the General Fund. The tasks accomplished with the Street and Road Fund include: grading gravel streets, plowing snow, sweeping streets, maintaining storm sewers, painting crosswalks, and replacing and maintaining street signs. The money in the Street and Road Fund does not cover street construction or reconstruction, surface treatment such as overlays or seal coating, purchase of new gravel, or alley maintenance.

As can readily be seen, it is essential to secure additional sources of revenue in order to provide street maintenance on a continuing basis. The existing budget, which maintains essential services, does not maintain the City's streets in good condition. This is an important consideration in weighing the need to maintain medium-condition streets, in the interest of cost effectiveness versus the City's efforts to improve streets in low-priority condition.

Due to the substantial cost of constructing new streets from gravel streets, it is not likely that the City will receive many requests to establish a Local Improvement District. It is therefore recommended that a portion of any serial levy moneys be geared toward supplementing a percentage of the Local Improvement District request. In this way, the property owner is paying less of the total cost of the project. The City would directly benefit from the improvement of the transportation system and lower cost of street maintenance, i.e., grading and graveling. Essentially all of the poor-condition asphalt and oilmat streets, which now require reconstruction, and all of the gravel streets are in the low-priority rating.

FUTURE STREET PLANS

As growth occurs, the transportation needs of the City continually change. It is the intention of this plan to prepare for those anticipated changes and, to a large extent, guide development. Whereas, most new streets will be built by the developer creating the need for the street, it is the City's responsibility to require that adequate design considerations are incorporated to insure that existing and future transportation needs are met. Future development will also change some of the classifications given existing streets by creating additional demand or reducing demand in some cases. As upgrading or redesigning of a street is necessary, it is hoped that the City will be in a financial position to accomplish those tasks.

The following descriptions identify those streets which will be necessary to facilitate access for new development to other areas of the City. These streets will be collector streets once the adjacent areas are fully developed.

The description of these areas is not meant to be precise since their location will be dependent upon the location of adjacent property development. There is no significance to the order in which they appear; it will depend solely upon the timing of local development.

1. An extension of Second or Fourth Streets south or east to connect with 12th Street near the vicinity of Sunnyhill II or Highland Hills. Should water service be provided at this elevation, it could accommodate considerable residential development.
2. An east-west connection between Sixth and 12th Streets near "E" Avenue may be desired to aid in the movement of traffic generated by the college and future development at the northwest corner of 12th and Gekeler. It may be desirable to extend this to the east connecting to 20th Street.
3. A connecting link between 12th and 20th Streets south of Highland Hills subdivision may be warranted should subdivision development continue south of La Grande. This is an area where we anticipate additional subdivision development if services can be provided.
4. As the "window area" develops, it will be necessary to extend 16th Street south to Gekeler Lane. At this time the majority of traffic must use either 12th Street, which lies in an established residential area and leads to the Spruce Street intersection, or Fourth Street, which is projected to have a level of Service E by 1990 at its intersection with Adams Avenue. With 16th Street developed as a collector and the completion of the Willow Street extension, direct access to the commercial areas will be gained.
5. Willow Street should be extended across Adams Avenue to connect to 16th Street. This connection is vital to handle the traffic from the "window area" to the central business district and out the Island City strip.

6. Should industrial development occur adjacent to U.S. Highway 30 east of the City, a frontage road would be necessary to prevent multiple accesses onto the highway.
7. A connecting link between East "K" and Gekeler Lane east of the railroad tracks will be necessary to collect the traffic from subdivision activity and move it to either of these two existing streets with railroad crossings.
8. Wall Street should be extended north to Cove Avenue to provide access from developing residential areas to a commercial area. This will alleviate the necessity to use Hall Street adjacent to Willow School and the County Road which connects to Cove Avenue just west of the freeway overpass at a very poor intersection.
9. In order to avoid future railroad grade crossings along the Island City Strip, a collector street should extend east from the May Park area to connect to proposed streets in the Island City Transportation Plan. This will only fulfill its design function if the grade crossing is improved.

PARKING IN THE CENTRAL BUSINESS DISTRICT

The availability of parking (or lack of parking) is subject to locally perceived definitions of what constitutes a good or bad situation. What would be considered a very acceptable situation in Portland may be annoying to local residents. However, an accurate assessment of parking in the Central Business District (CBD) must be relative to the people it serves.

In the early 70's, the downtown businessmen requested that parking meters be removed from the CBD. This may have been a result of the completion of the Grande Ronde Mall on the Island City Strip which has over 600 free parking spaces for its customers. The meters in the CBD were removed and now all of the CBD is patrolled by a police matron who marks tires and tickets those

automobiles who remain longer than two hours. Certain areas were designated for employee parking with permits available from the City based upon the following schedule:

1. Type "A" permit (red card)
 - a. Allows parking in two-hour parking areas and parking-metered areas (per map).
 - b. Cost - \$32.00 per quarter (not prorated)
\$120.00 per year (prorated by month)
 - c. Issue upon payment of permit fee.
 - d. Note on receipt, permit number, name, type and date which permit expires, also on revenue ledger.

2. Type "B" permit (yellow card)
 - a. Allows parking in signed areas only (per map).
 - b. Cost - \$16.00 per quarter (not prorated)
\$60.00 per year (prorated by month)
 - c. Issue upon payment of permit fee.
 - d. Note on receipt, permit number, name, type and date which permit expires, also on revenue ledger.

The selling of permits was to have offset the loss in revenue from removing the parking meters. This has been a fairly accepted program. The large majority of permits sold are the Type B which allow all day parking except on Adams Avenue, Depot Street, and Elm Street. The Type A permit allows all day parking anywhere. Both of the two parking lots in the CBD have

five-hour limits with parking meters. These two lots operate at or near capacity, with employees of the downtown being the largest user group.

There still seems to be a demand for parking in the CBD, both for customers and employees. This vocal expression comes largely from the downtown merchants. The customer does not complain very often for he has the option of shopping elsewhere. Several downtown employees do complain about the availability of parking. The present system does seem to be working; however, there is a perceived shortage of parking spaces. The City conducted a study of parking availability in the CBD in 1978 which indicated at least two parking spaces available per block with a majority of spaces rotating use every hour and a half (Figures 2 and 3). Therefore, parking is available but not always within the same block face as the desired shopping facility. Again, this is a matter of convenience as viewed by local residents. In some larger cities, parking within three blocks of the business to be patronized would be considered adequate.

Employee parking overflows into the residential areas along Washington and Sixth to Eighth Streets which has been of concern to area property owners. The acquisition of property for an employee parking facility would accomplish two things: First, it would take cars out of customer parking places in the CBD and second, it would remove employee cars from the residential properties contiguous to the CBD. Methods of financing have been discussed with the downtown merchants; no preferred choice was found acceptable.

The City, in cooperation with the downtown Merchants Association, should continue to pursue the acquisition of and construction of a centralized parking facility. The zoning ordinance does not require that off-street parking be provided in the CBD for new construction, primarily because there is very little land available for new construction to take place. Any new central parking facility should be designed for at least 40 cars but preferably 60 cars.

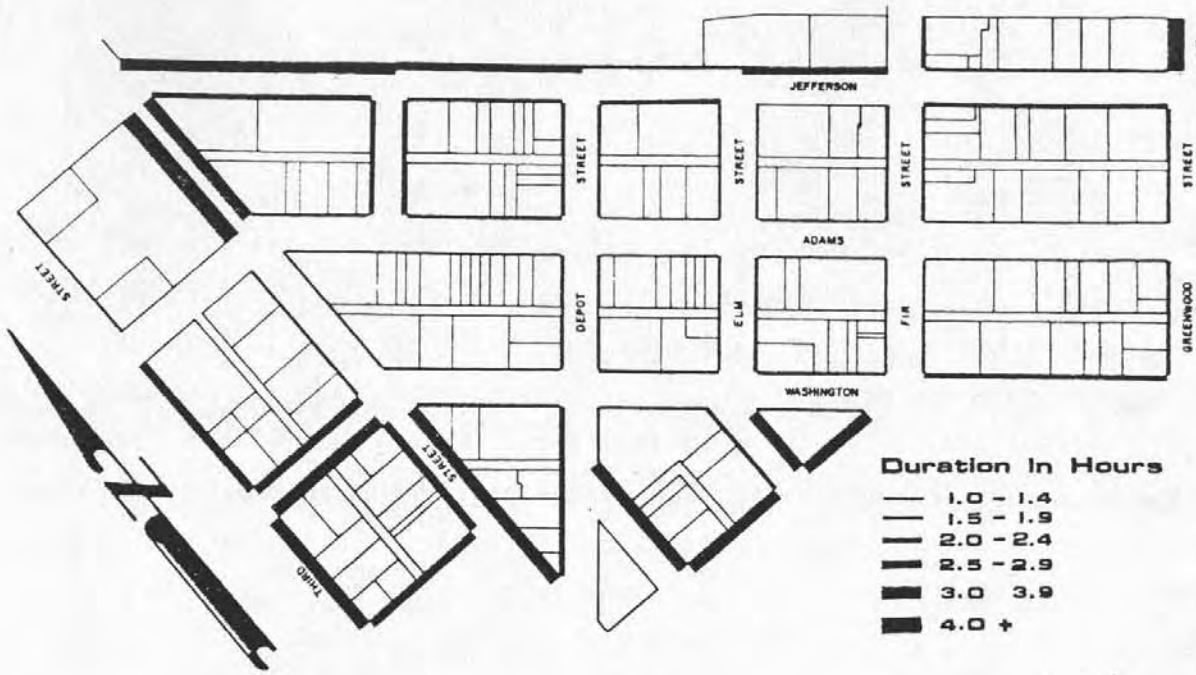


Figure 2
Average Parking Duration Per Hour in Downtown Area

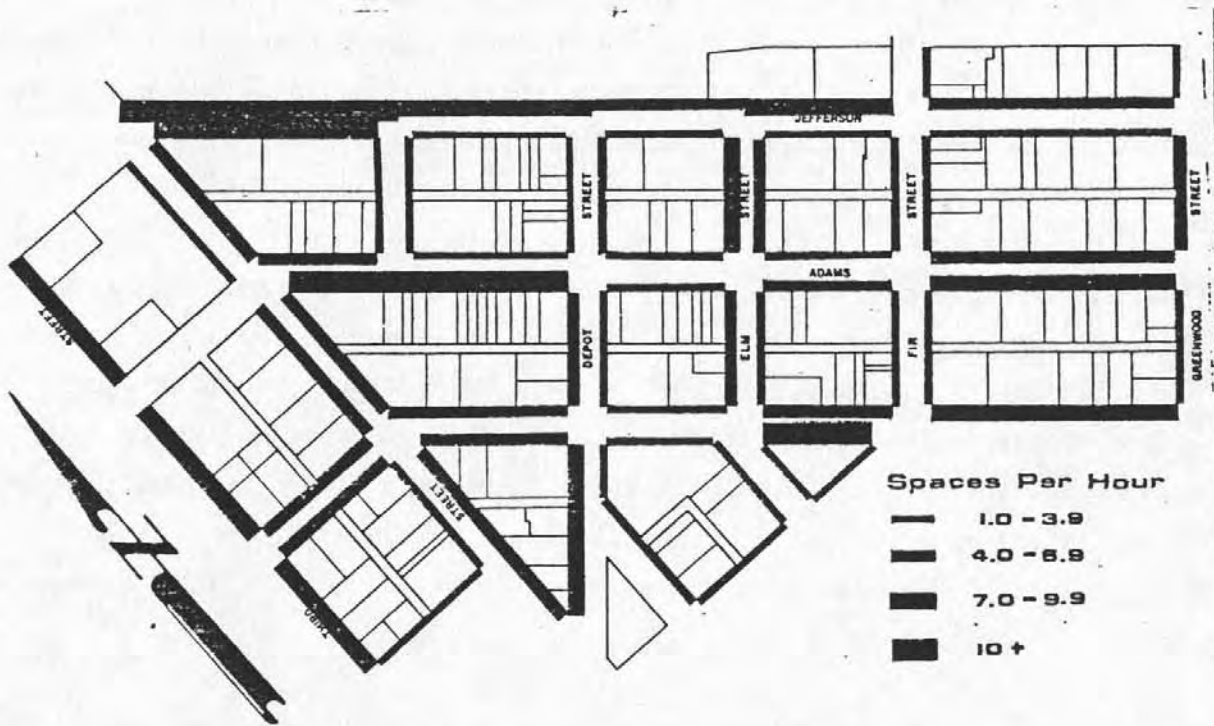


Figure 3
Average Parking Demand in the Downtown Area

RAILROAD CROSSINGS

On September 1, 1976, the Public Utility Commissioner instituted a formal investigation into the protection at crossings and speed of trains at all railroad-highway crossings in the City of La Grande. There were three issues which concerned the PUC staff involved with the study in La Grande: (1) public convenience and necessity of the five La Grande main line grade crossings, (2) adequate protection of the public at the main line grade crossings, and (3) adequate regulation of train speeds at the main line grade crossings. The following discussion on each of the main line grade crossings in La Grande addresses the concerns of the PUC staff.

1. FIR STREET

The 1980 average daily traffic count is 3,287. At the crossing, Fir is a paved, curbed street, 57 feet in width with two lanes of traffic, one in each direction with parking on either side, and has three tracks. Fir provides traffic flow between the Central Business District and the industrial, commercial, and residential areas of the north side and is a major traffic route. There are approximately 60 railroad movements a day over the crossing, causing interruptions of varying length to the traveling public.

From the safe stopping distance (98 feet for 20 mph) the crossing has two blind quadrants and one semi-blind quadrant. The restrictions are caused by buildings in the motorist's line of sight. However, the crossing is protected by automatic signalization which consists of one cantilevered arm with flashing light signal, one flashing light signal, and two multiple track signs. There have been nine accidents, eight involving train-vehicle and one involving a pedestrian within the last 16 years and the PUC's five-year accident prediction is 5.98.

The nearest crossing to the north is the Second Street overcrossing which is approximately 2,800 feet. The nearest crossing to the south is approximately 600 feet at Greenwood Street. Of these two crossings, the Greenwood crossing

would probably be the most logical alternate route for trips now made over the Fir crossing. Such a closure, however, would have some negative effect on emergency service provisions, as well as the inconvenience on the traffic as noted by the difference in ADT between the Fir and Greenwood crossings.

2. GREENWOOD STREET

The 1980 average daily traffic count is 740. At the crossing, Greenwood is paved, curbed, has a 46-foot width with two lanes of traffic, one in each direction, three tracks, and parking on each side. Greenwood provides a link between the Central Business District and the residential, commercial, and industrial areas in north La Grande. Greenwood is the second crossing southerly of the depot and as such has numerous interruptions to motor traffic throughout the day. However, the interruptions are less numerous than at Fir Street.

Most of the vehicles using the Greenwood crossing travel at about 25 mph and the safe stopping distance is 131 feet at 25 mph. From that distance, the crossing has three blind quadrants which are created by buildings in the line of sight of the motorists. The crossing is protected by automatic signalization consisting of two automatic gates, one cantilevered signal with flashing light, one flashing light signal, and two multiple track signs. The automatic gates were just installed this year and in 16 years from 1958 to 1974 there were no accidents, yet the PUC accident prediction is 3.41 with the new gates.

Fir Street crossing is the nearest crossing and is approximately 600 feet to the north. The nearest crossing to the south is the Spruce Street underpass and neither is a good alternative to Greenwood.

3. CHERRY STREET

The 1980 average daily traffic count is 2,070. Cherry Street grade crossing is a paved, curbed street, 52 feet in width with two lanes of traffic, one in each direction with parking on either side. It is a two-track crossing.

The street changes direction at the crossing by 40 degrees from an easterly direction to directly north. The easterly and westerly approaches to the crossing are 5% and 6% respectfully. Cherry Street provides traffic flow between southeast La Grande and northeast La Grande. Railroad activity is generally about 22 train movements daily with some switching taking place across the crossing.

The posted speed on Cherry Street is 25 mph; however, it has been estimated that most of the traffic moves between 25 and 30 mph. The crossing has three blind quadrants and two semi-blind quadrants. Restrictions are due to buildings, trees and shrubs, and the configuration of the road itself. The crossing is protected by automatic signalization and consists of two cantilevered flashing light signals, two automatic gates, and two advance warning signs. The PUC five-year accident prediction is .06 and there have been five train-vehicle accidents at the crossing that involved two injuries.

The nearest crossing to the north is the Spruce Street undercrossing which is approximately 1,200 feet; the nearest to the south is Willow which is 1,200 feet.

4. WILLOW STREET

The 1980 average daily traffic count is 1,572. Willow, at the crossing is a timbered crossing with paved approaches; a roadway 22 feet in width, two lanes of traffic; and has no restriction on parking. However, the shoulders are such that parking is not too practical. The street changes direction at the crossing by 40 degrees from an easterly direction to directly north. The easterly and westerly approaches to the crossing are 5% and 6% respectfully. The Willow Street crossing is a collector of traffic to and from west La Grande and southeast La Grande. Railroad activity is generally about 22 train movements daily with some switching taking place across the crossing.

From the safe stopping distance of 131 feet for 25 mph, the crossing has no sight restricted quadrants. However, the sight distances are less than optimum.

The crossing is protected by two crossbucks, two vehicle stop signs each with a continuously flashing red light directly above each stop sign for added emphasis, and two multiple track signs. The PUC five-year accident prediction is 2.01 and there have been two train-vehicle accidents at the crossing since 1960.

The Cherry Street crossing is the nearest crossing to the north and is approximately 1,200 feet. The nearest crossing to the south is approximately 1,500 feet at the East "K" Avenue grade crossing. Willow Street is proposed to be extended south connecting to 16th Street and Washington Avenue. As 16th Street develops to serve the high density residential development in the "window area," this link will facilitate traffic movement onto Adams Avenue and to the businesses on the Island City Strip.

5. EAST "K" AVENUE

The 1980 average daily traffic count is 492. At the crossing, East "K" Avenue is timbered, with paved approaches; is 24 feet in width with two lanes of traffic, one in each direction; parking is restricted; and the crossing has two tracks. East "K" is paved. East "K" provides access to several commercial and industrial businesses and a few residences. Railroad activity is primarily 22 daily train movements, with little switching taking place across the crossing.

The posted speed is 25 mph; however, the majority of vehicles move over the crossing at about 20 mph. At 20 mph, the safe stopping distance is 98 feet and at that distance the crossing has no sight restricted quadrants. The crossing has automatic signalization which consists of two flashing light signals, two automatic gates, and two multiple track signs. There have been 3 train-vehicle accidents at the crossing since 1960 and the five-year accident prediction by the PUC is .03. The nearest crossing lies about 1,500 feet north at Willow Street.

In summary, the three most used railroad crossings are Fir, Cherry, and Willow which are identified as arterial or collector streets on the street

classification map. When the 16th Street extension is completed to Gekeler and to Adams Avenue, an increased number of vehicles will be utilizing the Willow Street crossing. The "K" Street crossing is scheduled to be paved with the rest of "K" Street this summer as part of a serial levy improvement and Local Improvement District. As property to the east develops it will provide the principal crossing for commuting to downtown and probably warrant a collector status at that time.

The installation of automatic signals and crossing gates are recommended at Willow Street crossing due to its present high use and its forecasted increased future utilization, despite its low accident rate of two accidents in 21 years. Such automatic signals would not only increase the safety of vehicles and pedestrians, but would let the railroad trains increase their exit speed from La Grande. At present the trains are restricted to enter Willow Street crossing at 20 mph when leaving town.

AIRPORT MASTER PLAN

The La Grande Municipal Airport is the only public airport in Union County and, as such, must meet all air traffic demands of the area residents. The City of La Grande has completed a study to ascertain the potential for aviation activity in the county and to provide guidelines for future development of the La Grande Municipal Airport. Also considered were compatibility with the environment, community development, other modes of transportation, and other airports. The specific objectives of the study were to (1) provide an effective graphic presentation of the ultimate development of the airport and of anticipated land uses adjacent to the airport, (2) establish a schedule of priorities and phasing for the various improvements proposed in the plan, (3) present the pertinent backup information and data which were essential to the development of the master plan, (4) describe the various concepts and alternatives which were considered in the establishment of the proposed plan, and (5) provide a concise and descriptive report so that the impact and logic of the recommendations can be clearly understood by the community and by the authorities and public agencies which must administer the improvements proposed in the Airport Master Plan.

The Airport Master Plan for the La Grande Municipal Airport was developed by CH2M HILL, Consulting Engineers. The Master Plan is a supplement to the City of La Grande Transportation Plan.

CITY OF LA GRANDE-UNION COUNTY BICYCLE STUDY

This study, which was completed in June 1979, was directed by Lynn Heckert, Union County Recreation Planner; Ralph E. Lewis, Eastern Oregon State College; and Ronald Perkins, Director of Parks and Leisure Services, City of La Grande. Numerous students, of Eastern Oregon State College's Community Service-Geography Program, conducted much of the field work for this study. Special credit should be given to James Brown, Verna Slane, and Ronald Synan.

RECOMMENDATION

Heavily used bicycle routes should be marked with signs to alert motorists of heavy bicycle usage.

CONCLUSIONS

At this time a bicycle plan for La Grande or Union County is not necessary. An extensive system of bike paths would be a nice addition to the area. However, after study by City and County recreation planners and Eastern Oregon State College's Community Service Program, consultation with the Oregon Department of Transportation, and input from the general public at open meetings, it has been determined that a simple system of signing is the best alternative at the present time.

These conclusions are supported by the following facts:

1. The large sum of money needed to build a system of bike paths is not available. It would be "grand dreaming" to believe otherwise.

2. The local population base is not large enough to warrant an elaborate system of bicycle paths.
3. The bicycling season, due to climate, lasts only a few months.
4. If a shortage of gasoline materializes and a drastic increase in bicycle usage results, the present street system will provide adequate bicycle routes.

La Grande is the only city in the area that is large enough to need marked bicycle routes. The other communities in Union County would be served by the proposed signing of some county roads.

This report includes proposals for both Union County and the City of La Grande. The routes have attached justifications and priorities. Oregon State Class III paths (signing of roads only) are recommended at this time. Planners must be alert for future changes in bicycle activity that would make the conclusions of this report invalid.

A Statement of Need

A bikeway plan is a start towards providing a bicycle travel system for the City of La Grande and Union County. In the past few years, people of all ages have shown increased interest in bicycling. The bicycle is playing a purposeful role in transportation, ecology, recreation and physical fitness.¹

The bicycle as a transportation mode has many advantages to the user. The possible elimination of auto trips by shoppers, college students and staff, school children, walk commuters and others can result in a safer, quieter, and less-polluted region for all.² People across the nation who walk in a

¹City of Seattle, Comprehensive Bikeway Plan, p.1.

²Tempe Planning Department, Tempe Bikeway Plan, 1974, p.25.

Central Business District have found that a trip during the rush hour by bicycle to downtown from a distance of five miles can be faster than automobile, bus, or commuter train.¹

A safer biking environment will encourage a higher utilization of bicycles thereby decreasing the dependence on the automobile with its noise, exhaust, pollution and traffic congestion.² Gasoline shortages are bound to increase adult bicycle usage as a means for getting about.³

The bicycle has been increasing in popularity since 1960. The bicycle industry estimates that about 5% of the potential market has been touched. The prediction is that we will see more bicycles on the road and there will be adults riding them.

In the future, it may be necessary to construct separate bicycle paths within La Grande and Union County. At this time the signing of streets that are heavily used by bicyclists is adequate. If moneys become available and bicycle usage drastically increases, a more elaborate plan may be necessary.

Street Signing Suggestions and Justifications

Routes suggested for signing will be open to criticism by residents, planners and others. These are only suggestions and can be modified with new input or information. However, the basic assumption of bicycling is that bikers will take the easiest street route available which means conflict with automobiles whose drivers will also pick such routes.

It is well known that bikers will not follow signed routes unless they are convenient to follow. Therefore, it is prudent to sign some heavily used auto streets because the bikers will use them anyway. The only way to solve this problem is to construct separate facilities.

¹City of Seattle, Comprehensive Bikeway Plan, p.1.

²City of Seattle, Comprehensive Bikeway Plan, p.31.

³Bicycle Institute of America, Inc., Bike on Hiways, p.3.

The following streets should be signed for a safer biking environment; they are not listed in order of priority.

1. Second Street from "C" Avenue to Black Hawk Trail.
 - a. Only continuous north-south through street transversing La Grande.
 - b. Will serve Middle School and High School students in west La Grande as well as students funnelled in from other areas.
 - c. A central arterial through Central School zone and Riveria School zone.
 - d. Existing overpass has a bike facility.
 - e. Intersects with Black Hawk Trail and points north.
2. Black Hawk Trail from Second Street to Spruce Avenue.
 - a. Peripheral route for north side.
 - b. Low traffic volume except "drive times."
 - c. Intersects with Riverside Park on Spruce.
 - d. Connects with Fruitdale Road to Island City.
3. Fruitdale Road from Spruce Avenue to Hunter Lane from Hunter Lane to Island City.
 - a. Intersects with McAlister Lane and existing bike path by Country Club.
 - b. Funnels students from the Fruitdale area into main arterials.

- c. A scenic peripheral route.
4. Spruce from Black Hawk Trail to "Y" Avenue.
- a. Main route for Greenwood School.
 - b. Main route for Riverside Park.
 - c. Has existing bike path across Grande Ronde River.
5. Highway 82 from Island City to Spruce.
- a. Major east-west collector.
 - b. Wide except near Island City.
 - c. Intersects with May Park Road to Riverside Park.
 - d. Passes close to major business area, Grande Ronde Mall.
 - e. Provides a direct route for High School and Middle School students coming in from May Park and Island City.
6. Spruce Across Adams to Washington.
- a. Existing bike paths in railroad underpass.
 - b. Funnels bikes into arterials on south side including those to Eastern Oregon State College, La Grande High School, Middle School.
7. Washington from Spruce to Second Street.
- a. Major "off main street" arterial.

- b. Connects with 12th Street and Second Street.
 - c. Passes main downtown shopping area.
8. 12th Street from Washington to Gekeler Lane.
- a. Major bicycle oriented housing area.
 - b. Connects with cross campus (EOSC) route.
 - c. Funnels students from high density housing on 12th Street across Cherry to Willow School.
 - d. Passes Candycane Park.
 - e. Connects with Gekeler Lane and recreation route along Foothill Road.
9. Sixth Street from Gekeler Lane to Washington.
- a. Major access to EOSC.
10. Gekeler Lane from Foothill Road to "C" Avenue and Continue along "C" to Second Street.
- a. Provides route from 12th Street subdivisions and high density apartments on Gekeler Lane for Central School, Middle School and High School.
 - b. Provides access to other downtown routes.
 - c. Passes Birnie Park.
 - d. Connects with new suburban growth areas.
 - e. Ties to Foothill Road.

11. Foothill Road.
 - a. Low density, south trending scenic route.
 - b. Eventual link with county-wide bikeway.
 - c. Primarily agricultural, low traffic, paved road.
 - d. Connects with Gekeler and downtown routes.

12. "Y" Avenue Between Spruce and Second Street.
 - a. Leads west to Riveria School or east to Greenwood.
 - b. Residential street with off-street parking.
 - c. Provides a link between major north-south routes (Second & Spruce) on the north side of town.

13. Spruce Street from "Y" Avenue to Highway 82.
 - a. Traverse from Riverside Park to connect with existing facility in underpass.
 - b. Passes Greenwood School.
 - c. Ties in with Highway 82 route.
 - d. Connects with Willow School routes.

14. Cherry Street from Washington to East "N" Avenue and North on Willow Street to Cove Avenue.
 - a. Vital route across Adams and railroad to Willow School from high density housing on 12th Street.

15. Palmer Street from Second Avenue to Cedar and Pioneer Park.
 - a. Necessary side route to Pioneer Park.
16. Washington from Second to 12th Street.
 - a. Major east-west link between two collector routes.
17. Cove Avenue.
 - a. Connecting route to Island City.
 - b. Urban growth area.
18. Monroe-Greenwood-Eighth Street.
 - a. Cross CBD route.
 - b. Connects to EOSC.
19. "N" Street from Washington to Fourth.
 - a. Heavily used artery.

Suggested County Signing

County population will, most likely, never warrant an independent system of bicycle paths throughout the area. However, the signing of some scenic routes alerting automobile traffic to bicycles would be desirable. The following recommendations are in order of priority based on scenic value and population density.

1. Mt. Emily Loop.
 - a. Hunter Lane-Mt. Glenn Road forming a short recreation loop north of La Grande.

- b. Connects with several routes from La Grande via Fruitdale Road, Black Hawk Trail, Spruce Street and Highway 82.
2. Tri-Mountain Loop.
- a. Complete circle of the Grande Ronde Valley.
 - b. Connects most of the valley's towns.
 - c. The entire population would have access to any section of the signed route found desirable.
 - d. The entire route would be about 65 miles and would allow for a leisurely two- or three-day trip.
 - e. Includes Ladd Marsh and other scenic opportunities.

Boise Cascade has suggested they would give the county a long-term lease for a bicycler's campground at Cove. Union County recreation planners should pursue this possibility.

Standards and requirements for bicycle paths are explained in Appendix I.

TRANSPORTATION DISADVANTAGED

The term "transportation disadvantaged" applies generally to the elderly and handicapped. La Grande does not support a mass transit system which these people could utilize; however, there are special services available.

There are four minibusses operated and maintained by the Union County Senior Services Program. These busses are available on a "dial-a-ride" basis to individual seniors. They are also available on a prescheduled basis for regular trips to the noontime senior meals program. One of the minibusses has a wheelchair lift for those seniors who require it. Bus service is also available to non-senior handicapped individuals.

There are two taxicab businesses in La Grande which provide transportation services to a large number of senior citizens. The City budgets for payment of one-half of the cost of the cab fares for senior citizens. If the cab company charges a dollar for an in-town trip for a senior citizen, the City pays 50 cents. This amounts to an annual subsidy of \$6,235.00.

It should also be noted that the City received a Housing and Urban Development Block Grant in 1978 which provided curb ramps in the downtown area, access to the City Library, and handicapped facilities at Morgan Lake Park. Figure 4 indicates the location of designated handicapped parking spaces and completed curb ramps in the Central Business District.

Additional information is contained in Appendix II which is the La Grande Arterial Street Study conducted by Oregon Department of Transportation, Highway Division.

PUBLIC TRANSPORTATION

Rail

For passenger service, the City of La Grande is served by Amtrak. There is a scheduled Amtrak departure both east and west from La Grande every day. The majority of the time, a sleeping car is also provided on the train to accommodate long distance travel.

La Grande does accommodate a main switching yard for the Union Pacific main line serving all of Oregon and Washington. From La Grande there are branch lines that service Enterprise, Elgin, Joseph, Wallowa, and Alicel. In an average month the railroad adds over 700 cars from the La Grande area of products manufactured in La Grande and from the branch line. Also during that time period, an average of 100 cars bring goods to the La Grande and other branch line locations. The La Grande terminal is the crew change location for approximately 376 men.

Bus

La Grande is serviced regularly by Greyhound Passenger Service with three eastbound and three westbound buses departing from La Grande daily. Greyhound also provides a valuable service to La Grande by being able to provide same-day small parcel delivery service to the business and institutional community of La Grande.

Both the bus and rail passenger service have sufficient space to accommodate increased passenger service in the foreseeable future. The cost of utilizing these services to Boise or to the Willamette Valley is comparable to private vehicle operating costs.

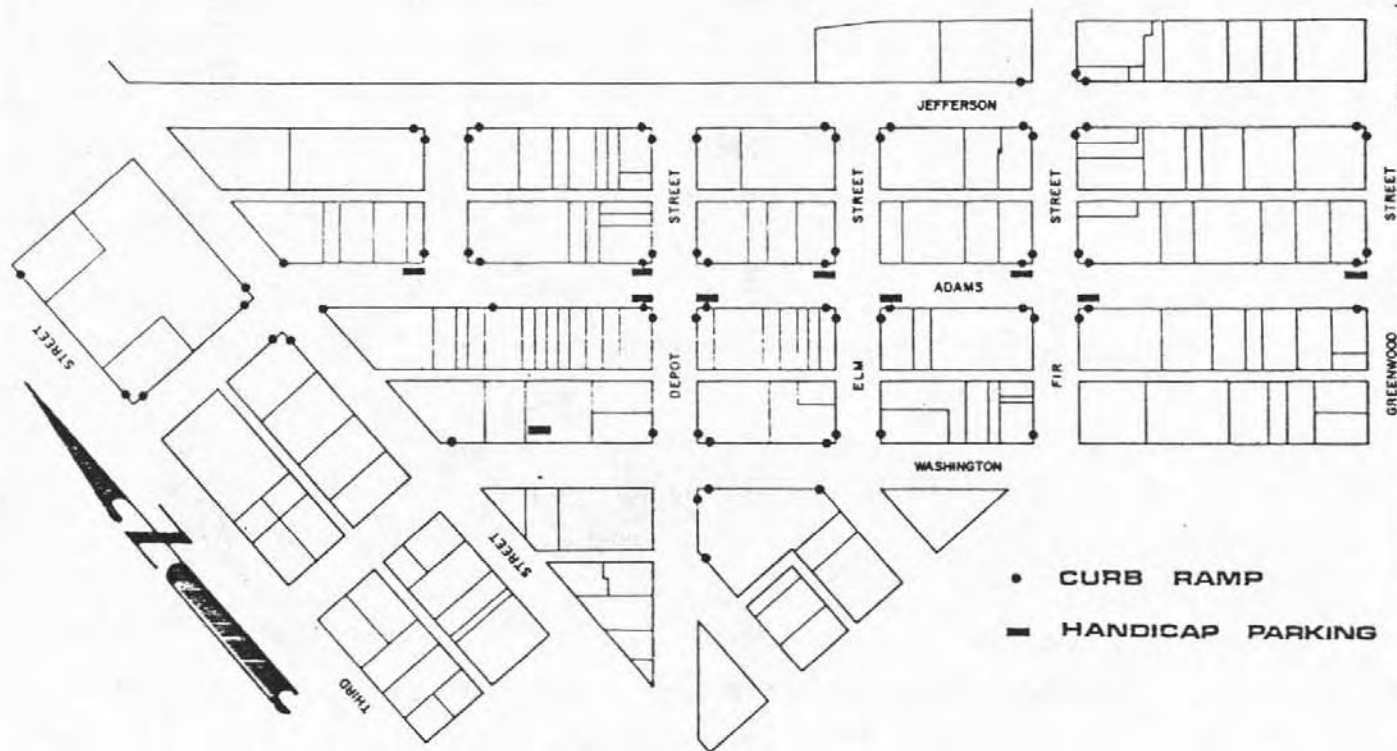


Figure 4
Handicapped Improvements in the Downtown Area

APPENDIX I

STANDARDS AND REQUIREMENTS FOR BICYCLE PATHS

CLASSIFICATION

Much of the information in this Appendix was taken from Bikeway Design, Oregon State Highway Division, January 1974. The Oregon State Highway Division's bikeway classifications are as follows:

Class I - A separated trail for joint use of bicyclists and pedestrians. It may be entirely independent of other transportation facilities.

Class II - A bikeway that is adjacent to the travel lane of motor vehicle traffic, but provides a physically separated through lane for bicycles and pedestrians.

Class III - A bikeway that shares the roadway with motor vehicles. Routes are designated by signing, striping or other visual markings.

As noted earlier the Class III bikeway is probably the most practical for La Grande and Union County at the present. Other path information is included for future informational purposes.

DESIGN SPEEDS

Grades between +3% to -7%, maximum speed limit should be 20 mph. Grades more than -7%, maximum speed limit should be 30 mph.

CURVES

Angle between consecutive tangents 10 or less no curve required.

SUPERELEVATION

No case to exceed .12 feet per second. Maximum .06 feet per foot super-elevated if pedestrians are 50% or more of traffic.

WIDTHS AND CLEARANCE

One-way bikeway minimum is horizontal 6 feet, vertical 9.2 feet. Less than 8.5 used only on approval of local engineers. Horizontal clearance between edge of pavement and obstruction (including highway signs) - 2 feet. Fences, walls, and guardrails can be a minimum of one foot if it is impractical to obtain the standard 2-foot clearance. Standard bridge or other crossing structure width is 12 feet; if special problems are encountered an 8-foot width may be used upon approval of local engineers.

GRADES

Slope is not to exceed .02 foot per foot tangent sections. On long steep uphill grades avoid more than 10%. Excess of 10% tolerable of 50 feet or less.

INTERSECTIONS AND CROSSINGS

Pavement markings, islands, divider strips.

DRAINAGE

Either built into landscape, drains across pavement, tile drains, culverts, or ditches. Special efforts made to keep culverts and ditches clear.

RAILROAD TRACKS, MANHOLES AND GRATES

These must be able to support light maintenance vehicles as well as vehicles at street crossings and driveways. 8,000 pounds limit design, crushed base

equivalent to 8 inches. Bikeway subgrades should be treated with approved soil sterilant. Finish surface must be as smooth as possible; paving is preferred. Always avoid the use of exposed base rock.

BRIDGES

600 pounds per square foot, concentration 10,000 pounds.

GUARDRAILS, FENCES AND CURBS

Fences, guardrails, and other barriers must conform to the clearances specified. Reflectorized post can be installed at bikeway entrances to block entry of motor vehicles.

SIGNING AND SIGNALS

Adequate signing is necessary at all decision points along the bikeway for: (1) informing cyclists of direction changes, (2) confirmatory signs to ensure direction changes comprehended. Route or guide signing must be provided at regular intervals to ensure that: (1) newcomers to route know they are traveling on officially designated bike route, (2) cyclists do not stray.

Warning signs should be used when bikeway crosses roadway or sidewalk, bikeway ends or begins, or where large number of bikers are expected (schools, parks, recreation facilities).

In urban areas motor-directed warning signs should be positioned a minimum of one-half block before bikes are encountered.

For all hazardous conditions for which there are no existing specific bike-directed warning signs, place signs a minimum of 50 feet in advance to provide sufficient response time. It is recommended that stenciled warnings be placed on pavement area at entrances to bikeways and at stops. Where bike speeds are slow, care should be taken in the placement to avoid creating slippery surfaces.

APPENDIX II
OREGON DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
LA GRANDE ARTERIAL STREET STUDY

BACKGROUND

Discussions began late in 1978 between the City of La Grande and the Highway Division to conduct a cooperative arterial street traffic study. The informal agreement was for the City to provide necessary socio-economic data (population, employment, etc.) for a base year and a future year and the State to make traffic forecasts from the City's information.

The selected base year was 1978 and the selected future year was 1990. The socio-economic data was delayed until mid 1979. The delay resulted in the study getting out of synchronization between the two agencies. However, the initial study forecasts have been completed and this report summarizes the results.

SUMMARY AND CONCLUSIONS

1. The current La Grande major street network is generally operating satisfactorily, according to usually accepted criteria and used on a statewide basis.
2. The locally furnished socio-economic data is probably not realistic, in that citywide uniform growth was forecasted.
3. Based on the locally furnished data, the street and highway 1990 deficiencies are relatively modest.
4. The Draft Plan shows mainly proposals that would help development in outlying areas. The relatively few central area street deficiencies are not fully addressed.

5. The forecasted deficiencies can be solved with or without a one-way couplet.
6. One-way couplets have both advantages and disadvantages.
7. The number of alternatives to solve traffic problems are many. Thus, it may be best to eliminate the clearly undesirable ones first, to reduce the scope of the work to analyze the remainder.
8. The modeling system developed by the Highway Division will be kept operational. Future networks and land use plans can be tested.

INFORMATION REQUESTED BY THE CITY

The City presented a future "Build" network for testing, which is called the "Draft Plan." This network contained 22 street proposals. At a later time the City submitted a list of 16 additional proposals or questions, some of which were duplicates of the first 22.

In addition to showing maps and traffic forecasts, this report will address each of the proposals or questions raised, with appropriate comments. The Urban Studies Unit will respond later to any additional requests for comment or clarification to accommodate the City's needs.

SOCIO-ECONOMIC DATA AND MODELS

The socio-economic data was furnished by a consultant retained by the City. Originally, the information contained obvious errors. Even after corrections were made the data was unusual, in that the growth between 1978 and 1990 was forecasted to be uniform throughout the City. This assumption is probably not realistic, as certain areas of the City are already fully developed and future growth is likely to occur where open space now exists. Tables 1 and 2 show 1978 and 1990 socio-economic data as furnished by the consultant and the City. All tables, maps, and attachments to Appendix II are located at the end of this Appendix.

The Urban Studies Unit, Highway Division developed a series of models to generate trips and assign the trips to an agreed-upon major street network for 1978. The models and computer programs used were developed by the U.S. Department of Transportation. The trip distribution model is known as the "gravity model" process.

The 1978 modeled traffic forecasts were compared to actual 1978 traffic counts and a close simulation was obtained. The standard technical tests used to test the reliability of the models are beyond the scope of the report. It should suffice to note that the vehicle miles of travel on the major street network forecasted by the models were 98 percent of the actual vehicle miles calculated from the vehicle ground counts.

The two percent difference indicates very acceptable model performance; a tolerance of ten percent is usually considered very satisfactory.

The uniform areawide socio-economic growth rates to the year 1990 to some degree reduce the capability of the models to forecast traffic "trouble spots" or to pinpoint areas of major concern. However, the models are now functional and will be retained in a working condition by the Urban Studies Unit. If at any time in the future the City should decide to test alternate growth patterns or alternate street networks, this can be done quickly and inexpensively with the existing models. The models should be usable for ten years or more.

LEVEL OF SERVICE, SERVICE VOLUME (CAPACITY) AND LOCAL PERCEPTIONS

Before presenting the details of the La Grande area traffic forecasts, it may be of value to discuss the criteria by which traffic impacts are judged.

The Highway Research Board has defined six Levels of Service (LOS) and their resulting impacts on motorists. The six Levels of Service are labeled "A" through "F." Appendix II-A contains descriptions of the various Levels of Service (LOS) and their impacts on motorists. Briefly, LOS "A" is the best

and LOS "F" the worst. LOS "C" is considered an ideal design level for urban areas. LOS "D" is usually considered satisfactory service during peak hours. Even short periods of LOS "E" may be tolerated during peak hours when weighed against the cost and resulting community disruption that may be necessary to provide a higher level of service.

Accompanying each level of service is a service volume. A service volume is the maximum number of vehicles that can use the facility in 24 hours for a given level of service. In other words, the service volume is the capacity under the specific conditions of a given level of service.

For example, Table 3 shows service volumes (capacity) for certain streets in the La Grande Central Business District (CBD). It can be seen that the service volumes (capacities) change according to the degree of congestion and the resulting impacts on motorists. In other words, more and more vehicles can use a street as the level of service (degree of congestion) gets worse. This is true only up to a point. That point is when the addition of more vehicles causes motorists to slow down to the degree that less vehicles are able to use the street than before. That point is the dividing line between LOS "E" and LOS "F." In Table 3 that point of maximum capacity is in the column under "LOS E."

The capacity of a given street section to carry traffic is controlled by the intersections at the ends of the section. Where intersections are controlled by signals, the amount of available "green" signal time is a major limiting factor to the number of vehicles that can pass through the intersection (i.e. capacity). Where intersections have stop signs, instead of signals, the volume of main stream traffic determines the number of "critical gaps" that will occur to allow stopped-side-street vehicles to enter or cross the intersection. Other major capacity factors are, the width of streets, the number of lanes, whether parking is permitted or not and the vehicle operating speeds.

All of the above and other factors are taken into account in computing service volumes or street capacities at various levels of service. One factor used

in the calculations is the size of the city. It is a known fact that residents of larger, more densely populated cities will tolerate lower levels of service (heavier traffic) than people living in small towns or rural areas. Another way of saying the same thing is that residents of large cities are satisfied with traffic conditions which are sometimes thought to be unacceptable in smaller cities. Therefore, the factor used in the calculations does attempt to account for city size, but perhaps not always satisfactorily.

For the above or other reasons, some local residents may take exception to some of the analysis to follow. However, it may be appropriate to point out that the analysis was done using standard traffic engineering methods as used on statewide basis. It is important that the analysis be done in this manner, because it gives government agencies, such as the Transportation Commission, a reasonably uniform "yard-stick" to assist in making street and highway improvement decisions.

TEST SYSTEMS

Three principal tests have been completed for the La Grande Study, as follows:

1. The calibration of computer forecasting models to closely simulate 1978 actual traffic counts. Several computer "runs" were necessary to complete this work. These models are the basis for future traffic forecasts that were made and will be the basis of any other tests that may be desired in the future.
2. A test was made of 1990 forecasted traffic on the 1978 existing major street network. This was the "No Build" test, showing forecasted traffic volumes and conditions if no street improvements are made between 1978 and 1990.
3. A test was made of 1990 forecasted traffic on a proposed 1990 major street network containing 22 city proposals (the Draft Plan) as mentioned earlier. This was the first "Build" network test. The City may request tests of alternate "Build" networks at a later time.

ANALYSIS OF THE EXISTING MAJOR STREET NETWORK

As mentioned earlier, a consultant retained by the City furnished the socio-economic data. Table 1 and Table 2 show the revised data that were the basis of the traffic forecasts. These data are summarized for the entire study area as follows:

<u>Year</u>	<u>Population</u>	<u>Employment</u>
1978	12,898	4,031
1990	19,346	6,167

Map 1 shows the La Grande Study Area and the traffic zone system for the study. External interview stations are also shown. Motorists were interviewed at these stations to obtain trip information that was used in the traffic forecasting process.

Map 2 shows the 1978 major street network and the 1978 Average Summer Weekday Traffic from actual counts of vehicles. Average summer weekday traffic is shown, because it represents the highest volumes of the year (the worst-case condition), except for the annual peak Christmas shopping day, which is usually slightly higher. The traffic volumes shown by Map 2 are those to which the models were calibrated.

A peak hour capacity analysis was performed using Map 2 traffic volumes. The results are shown by Map 3. All streets not marked by symbols are operating at LOS "C" or better. In general, the calculations show that the La Grande major street network is operating satisfactorily. Only two areas operate during peak hours below LOS "D." Furthermore, all areas shown as operating below LOS "D" are at stop-sign intersections, not signalized intersections. This may be significant as follows.

The Urban Studies Unit used two different methods to analyze the existing stop-sign intersections. The older method showed that the La Grande major street network was operating better than indicated by the newer method.

The differences were slight, but in some cases might seem significant. The newer method showed the current deficiencies at stop-sign intersections as depicted by Map 3.¹

The Urban Studies Unit hasn't had sufficient experience with the newer method for full evaluation. However, so far it appears to make stop-sign intersections seem to be operating worse than they really are. Therefore, the deficiencies shown on Map 3 may not be as bad as shown. In any event, current operating conditions seem to be relatively good according to state-wide criteria. The fact that some streets have narrow lanes (9 feet) may give local motorists the perception of congestion, even though actual volumes indicate good service levels.

Map 4 shows the same existing major street network as used in Map 2 and 3, but with 1990 forecasted Average Summer Weekday Traffic. The 1990 forecast traffic is the direct result of the population and socio-economic data furnished by the City. Map 4 is the "No Build" situation, showing the traffic volumes that can be expected if no street improvements are made.

Because of technical limitations, computer forecasts could not be made for every proposal that the City wanted tested. Where computer forecasts were not possible, forecasts were made by other analytical methods. Furthermore, the degree of forecasting precision by the computer and substitute processes are not completely satisfactory below volumes of 1,000 vehicles per day. Therefore, for all future forecasts the lowest volume to be shown is 1,000 per day. This number should be interpreted to mean any volume from 100 to 1,000. Adopting such a convention will not significantly affect the analysis or conclusions to be made.

Map 5 shows the levels of service that can be expected in 1990, if no street improvements are made. Map 5 is also the 1990 "No Build" condition.

¹ Transportation Research Circular, Number 212, January 1980.

The intersection of Adams and Island Avenue is signalized and was analyzed by methods that the Urban Studies Unit believes are "tried and true." The LOS "E" forecast for this intersection is warranted. The major problem is the lack of an additional through lane on Spruce Street.

Most other deficiencies shown on Map 5 are from analysis of stop-sign intersections. As previously mentioned, this new technical process may be showing stop-sign intersection conditions worse than they actually are. Even so, the La Grande street system would have relatively few deficiencies even with 1990 traffic. In most cases, signalization of the deficient intersection would improve levels of service to LOS "C" or better. Such an intersection is Monroe and Island Avenue. Currently a stop-sign situation, Map 5 shows that this intersection will operate at LOS "F" in 1990 and Map 3 shows that it is operating at LOS "E" now. However, this intersection is on the Highway Division's Six Year Program to be signalized. After a signal is installed, the intersection will operate at LOS "C" or better through 1990.

ANALYSIS OF THE LA GRANDE DRAFT STREET PLAN AND OTHER QUESTIONS

Map 6 is a reduced size copy of the Draft Street Plan submitted by the City for testing. For convenience, the various projects have been numbered one through 22 and these numbers will be used to identify each project in the text.

In the discussions to follow, each project description, question or issue will be numbered and typed in italics. The numbering system is keyed to Map 6 and also to Attachment 1, which will be discussed in a later section. The text will address each question or issue as seems appropriate. It should be noted that the project descriptions are the Urban Studies Unit's understanding of the City's proposals. Slight variations in alignment or location of the project will not materially affect the analysis.

It should also be known that the process by which trips are assigned by the computer is on an "all-or-nothing" basis. For example, if two parallel competing routes are being tested, the computer will assign all trips to

the route with the shortest time path with no trips being assigned to the longer route. This feature is useful as an analysis tool. However, it does require that trips be assigned to the longer route by "hand." Sometimes this is a judgment process.

Map 7 shows the computer forecasts for all of the projects contained in the City's Draft Plan that were feasible to be tested by the computer. The projects or questions not addressed by Map 7 will be analyzed by other methods.

Map 8 shows the resulting levels of service from the volumes shown by Map 7. Map 8 can be compared to Map 5 to see that there is little or no change from Map 5, the "No Build" of the Draft Plan. The Draft Plan proposals seem more geared to land use development than improvement of the relatively few street deficiencies.

Maps 6, 7, and 8 should be used with the following project descriptions and resulting analysis of the "Draft Plan."

1. *A new street to be constructed from Second Street southeasterly to connect to Bushnell Lane south of Gemini Drive.*

This street was computer tested and showed a volume of less than 1,000 Average Daily Traffic (ADT). The low volume may be a result of the previously mentioned uniform growth as applied to all zones by the locally furnished planning forecasts.

The above comment may be applicable to many of the projects to be discussed. However, the full comment is made this one time only. Further remarks will be "the land use comment may apply."

2. *Construct a new facility from Gekeler Lane southerly to connect with the new street described in Proposal 1. This street may use existing Mattoon Street as part of the alignment.*

This project was both computer tested and "hand" analyzed. In both cases the volumes forecasted were less than 1,000 Average Daily Traffic (ADT). The land use comment applies.

3. *Extend "E" Avenue easterly from Seventh Street along the south boundary of the Hillcrest Cemetery to 12th Street.*

Computer testing was not feasible for this proposal. However, it was "hand analyzed." The resulting volume was less than 1,000 ADT. The land use comment applies to a lesser degree, because this facility is closer to the developed sections to town.

4. *Construct a new facility between 12th Street and 20th Street approximately even with "D" Avenue if it were extended to 12th Street.*

This facility could not be computer tested. Hand analysis indicated less than 1,000 ADT.

5. *Extend 16th Street southerly from its present terminus to Gekeler Lane.*

This project was computer tested. The resulting volumes were less than 1,000 ADT. The land use comment applies.

6. *Construct a new facility proceeding southeasterly from Bushnell Lane at the south city limits, to an extension of Grandview Avenue. The new road would then continue on connecting with a southeasterly extension to Foothill-Ladd Canyon Road.*

This project was computer tested and showed less than 1,000 ADT. The land use comment applies.

7. *Construct a new facility beginning about the point the south city limits meets the La Grande-Baker Highway (U.S. 30) at its most*

southerly point. The new construction would then proceed westerly to intersect with Foothill-Ladd Canyon Road.

Also computer tested, this facility received a 1990 assignment of less than 1,000 ADT. The land use comment applies.

8. *Construct a new alignment from Gekeler Lane north to U.S. 30. This new construction may use part of the dedicated street on the east side of the substation on Gekeler Lane.*

Less than 1,000 ADT was assigned to this proposal by the computer. The land use comment applies.

9. *Extend Wall Street north from "M" Avenue to Cove Avenue along a new alignment.*

This proposal was in competition (as far as the computer was concerned) with the existing route via Prospect Drive. The computer assigned all traffic (less than 1,000 ADT) via the new route and none to Prospect Drive. As volumes concerned are low this is not considered a significant matter.

10. *Include Albany Street as part of the 1990 Test System. The section to be included is between Cove Avenue and the Wallowa Lake Highway (ORE 82).*

This proposal is parallel to an existing major street, Portland Street, with the shopping center between the two streets. The computer assigned no trips to the new street. It appears that about 2,000 ADT should be divided between Portland and Albany Streets. Because Portland Street is nearer the population center, it is probable that it will have the greater amount of traffic.

11. *A new alignment from McAllister Lane northwesterly to connect to Gekeler Lane. The new construction would continue paralleling I-84 to connect with an easterly extension of "K" Avenue.*

Traffic on this facility will be mostly from new development close to the new street. As locally forecasted, housing growth is modest the resulting traffic volumes should be modest too; probably less than 1,000 ADT. The route is too out-of-direction to draw much traffic from U.S. 30 or I-84.

12. *Construct a new railroad crossing at Umatilla Street to connect U.S. 30 via Lane Street to Harrison Avenue.*

This proposal was computer tested and showed less than 1,000 ADT. However, the new railroad crossing would provide better access to and from I-84 for the north and northwestern residential areas of the city. It seems certain that the City is aware of problems in gaining new at-grade crossings of railroads.

13. *Build a new facility to connect Gekeler Lane to the "K" Street extension described in Number 11.*

Analysis of the available population and employment data showed that no new street in this area could draw more than 1,000 ADT. The proposal appears more oriented toward providing access for new development. The land use comment applies.

14. *Build a new facility paralleling U.S. 30 on the northeast side of the Union Pacific Railroad between "K" Street and Gekeler Lane.*

This proposal is parallel to U.S. 30 and was assigned no trips by the computer. An analysis of the locally furnished population and employment data indicated that probable volumes would be less than 1,000 ADT. If the area grows more rapidly and a good through route is provided to the commercial area on Island Avenue, a higher volume could be attracted.

15. *Build a new facility paralleling U.S. 30 between Gekeler Lane and McAllister Lane on the southwest side of U.S. 30.*

Because this proposal parallels U.S. 30 it could not be computer tested. It would probably draw less than 1,000 ADT. Current and future forecasted volumes on U.S. 30 are relatively low. Therefore, U.S. 30 should provide sufficient capacity for many years, making proposals 14 and 15 unnecessary from a traffic capacity standpoint.

16. *Build a new facility south from the intersection of Gekeler Lane and U.S. 30 to the proposed facility described in Number 7.*

Due to technical limitations, this project could not be computer tested. Analysis indicates that it would attract less than 1,000 ADT, given the current population and growth forecasts. The land use comment applies.

17. *Construct a new east-west facility in the area of Gemini Drive to connect Bushnell Lane to Grandview Avenue.*

This facility could not be computer tested at the same time as Number 6. However, analysis indicates that it would attract less than 1,000 ADT. The land use comment applies.

18. *Construct a new facility easterly from West Street at approximately the point where West Street crosses May Park Ditch. It is not clear where the project would terminate.*

This proposal was not computer tested as it did not connect to the existing major street network and the termination not clear. However, an analysis of growth projections indicate that it would attract less than 1,000 ADT.

19. *Construct a new facility easterly from Holmes Street. It seems to begin about half way between Cove Avenue and Palmer Avenue and extend easterly toward the urban boundary to an unknown termination.*

Not enough is known about this proposal (and Number 18) to permit much analysis. Both proposals seem to be for land access. Trips generated would depend upon the extent of nearby development. Current growth forecasts indicate that less than 1,000 ADT would be attracted.

20. *Construct a frontage road on the south side of I-84 between Second Street and N. Spruce Street.*

This project could not be computer tested. If constructed, it would improve traffic circulation in the north part of the City. It would probably have less than 1,000 ADT.

21. *This proposal seems to use a part of existing Lake Street and construct or reconstruct Umatilla Street between Lake Street and Harney Street.*

This project could not be computer tested. Analysis indicates that it would attract less than 1,000 ADT. The land use comment applies.

22. *The proposal is to extend Grandview Avenue south near the west side of the Grandview cemetery connecting into the proposed facility described in Number 6.*

Due to technical limitations, this project could not be computer tested. Analysis indicates that it would attract less than 1,000 ADT. The land use comment applies.

.This completes the analysis and comments for the "Draft" Plan.

ADDITIONAL ISSUES AND PROPOSALS ADDRESSED

The remaining analysis and comments will be referenced to Attachment 1, which is a list of proposals posed by the City of La Grande. It will be noted that

the proposals have been renumbered to prevent duplication with the projects from the Draft Plan. Also, five of the proposals are duplicates of proposals in the Draft Plan.

Several of the proposals on Attachment 1 concern conversions of various streets into one-way traffic or a one-way couplet. These proposals are:

23. *Make Washington one-way southbound with Jefferson and Adams to remain two-way.*
24. *Route "through" traffic onto Washington or Washington and Jefferson, rather than Adams from Highways 82 and 30.*
25. *Make Adams two lanes (one-way either direction) with angle parking (in association with 24 above).*
26. *Make Adams one-way northbound and Washington one-way southbound between 4th and Hall.*
27. *Make Adams one-way southbound and Jefferson one-way northbound between 4th and Hall.*
28. *Make Washington one-way southbound and Jefferson one-way northbound between 4th and Hall.*

A general discussion of one-way couplets will be followed by an analysis of the several proposals.

One-way couplets may be useful in that they can increase the capacity of pairs of streets. In most cases, one-way couplets increase safety, although this may not always be the case. In general, rear-end, side swipe, meeting, turning, parking and pedestrian accidents will decrease, especially in mid block sections. Accidents at intersections do not decrease as much and turning accidents from the center lane may increase.

Cities experiencing success with one-way couplets are usually larger cities than La Grande. Frequently, a couplet is several miles long. Couplets seem to work best when there is a substantial amount of through traffic to move through a large Central Business District (CBD).

For this La Grande Study, computer tests were made of simulated traffic passing through the CBD. These tests analyzed the traffic over a specific street section (on Adams) and traced where each trip originated and ended. The results showed that 88 percent of the trips had either a destination or origin in the CBD. This finding is similar to conditions in other Oregon cities; there is simply far less through traffic in CBD's than most people think.

If the models were performing correctly, and there is good evidence that they were, it means that one-way couplets probably would not correct all or most of the perceived problems in the La Grande CBD.

In general, the advantages of couplets are that they distribute traffic left or right to other streets with equal ease.

"Signal timing is simplified. On two-way streets, timing problems arise from too-close spacing of signals, and from multi-phase operations (such as left-turn phase). On one-way streets, signal-spacing is no longer a critical factor, and additional phases are seldom required. Better progression can be provided, even with traffic signals every block, as through a business district grid.

Turning problems are minimized: An intersection of two, four-lane, two-way streets has 44 possible conflicts. If both streets are made one-way, the points of possible conflict drop to only 18. In addition, turns from two lanes are more readily possible, thus adding to capacity.

Greater capacity is also produced by more efficient use of street width. Example: Under two-way operation, a 34-foot street is normally suitable for only one lane of travel in each direction. In one-way operation, three lanes can be used. References from many sources indicate that one-ways substantially improve capacity."¹

¹ Getting the Most from City Streets, Highway Research Board.

One-way couplets also have disadvantages. In some cases a substantial amount of additional CBD circulation or travel is necessary for motorists to get where they want to go. Much additional signing is required and frequently more signals are necessary, all of which are costly. Frequently, one leg of a couplet is a city street without the structural strength to carry heavy traffic. Substantial costs may be associated with bringing such a deficient street up to State standards, if it is to be a part of the State Highway System.

Other problems are that tourists may become confused, especially if the couplet legs are not adjacent. Emergency vehicles may have difficulty in routings. Block circling motorists generally face more red signals. Couplets may encourage duplicate businesses on each leg, such as gas stations and fast food franchises.

In summary, a one-way couplet does provide advantages, but not without cost and other penalties. In larger cities, couplets may be the only practical solution to several problems. In smaller cities couplets may be less desirable, especially when, as appears the case in La Grande, the forecasted problems are relatively small and may be solved by less expensive or less drastic means.

"Many businessmen in the past haven't favored one-ways; some still don't. But, disfavor has diminished with the growing and successful use of one-ways as access routes.

A publication of the U.S. Chamber of Commerce showed that businessmen in 103 of 134 cities favored one-ways after a fair trial.

In Fresno, California, 90 percent of businessmen felt that one-ways were not harmful; 85 percent said they would recommend them.

In Baltimore, some businessmen continue opposition to one-ways despite data showing retail improvements.

In New Haven, Connecticut, a choice between one-way and no parking was developed. Generally, businessmen preferred the one-way. An accident analysis in that city showed graphically that narrow two-way streets were contributing to pedestrian accidents." ¹

¹ Getting the Most from City Streets, Highway Research Board.

In 1959 the Oregon Highway Division published a report entitled A Study of One-Way Street Routings on Urban Highways in Oregon. Some of the material from this Oregon report was incorporated into the 1971 Highway Users Federation for Safety and Mobility report entitled, One-Way Streets.

Appendix II-B is a reprint of a table from the 1971 Highway Users report showing impacts of one-way couplets on 12 Oregon cities. Appendix II-C is a reprint of Page 90 of the 1959 Oregon report, with particular respect to the one-way couplet in Tillamook.

Interesting conclusions can be drawn from the above mentioned information. Traffic actually increased in the CBD's of 10 out of 12 of the cities, after introduction of a one-way couplet. Obviously, some of the increase would be due to traffic growth during the passage of time. However, in Tillamook, for example, vehicle miles increased by 18 percent, a substantial increase in traffic. It should be kept in mind that in Tillamook a significant part of the traffic was U.S. 101 through traffic. In contrast, in La Grande, most of the through traffic is already being bypassed by the I-84 freeway.

Referring again to Appendices II-B and II-C, they show that accident rates are lower with couplets and higher operating speeds are attained, with accompanying time savings. It appears that couplets do provide certain benefits, but may not provide solutions to the problems perceived in La Grande.

The foregoing general discussion of one-way couplets is followed by addressing the issues raised in the city's list of questions, Attachment 1.

Maps 5 and 8 show about the same 1990 street deficiencies with or without the Draft Plan. A preliminary analysis shows that all of these peak-hour deficiencies can be improved to LOS "D" or better by a number of different traffic engineering proposals; the problems can be solved with or without a one-way couplet. The number of alternatives are so substantial that it is not practical for this report to address them all. Perhaps the city's

best interests can be served by eliminating undesirable alternatives in order to "zero in" on the more practical proposals at a later time.

Of the several one-way couplet proposals, Number 26 "make Adams one-way northbound and Washington one-way southbound," seems the best. From a level of service standpoint, the couplet is not needed all the way to Hall Street; the couplet could terminate at Spruce.

Because of the underpass and existing railroad tracks there appears no practical and inexpensive way to use Jefferson as part of a couplet. Furthermore, the expense of bringing Jefferson up to State standards is likely to be formidable. It is suggested that it may be reasonable to dismiss the concept of using Jefferson as one leg of a couplet.

Proposal 23 suggests that Washington be a lone one-way street southbound. If this is done, a substantial amount of the current Washington northbound traffic would shift to Adams. This additional traffic, plus the additional "circulation" traffic caused by the one-way would likely make congestion worse than it is now.

Proposal 24 concerns the routing of through traffic. Earlier it was shown that there is relatively little through traffic in the La Grande CBD. Local motorists will choose their own routes and signing or designation of routes is not very effective. This proposal would change the routes of such few trips that the difference would probably not be noticeable.

Proposal 25 is not practical if Proposal 24 is not effective. Also, angle parking is always undesirable from a safety standpoint. The Highway Users Federation has the following to say about angle parking.

"Angle parking, once common, is no longer in general use in large urban areas because the available capacity of most major streets is needed for traffic movement. However, as reported in many early studies, angle parking on any street, except under special circumstances, is of questionable value because it is more hazardous than parallel parking. A study in 1947 by Smith reported a reduction

in the average number of parking accidents per block from five with angle parking to one after a change to parallel parking. A more recent report by the Utah State Department of Highways presents information on the accident reduction on streets in nine cities where a change was made from angle to parallel parking. The cities ranged in size from 1,600 to 190,000 population. With angle parking there were 513 accidents of all types, including 109 parking accidents. With parallel parking all accidents decreased to 387 and parking accidents decreased to 47."

It will be noted in the above quotation that Utah's change from angle parking resulted in a 60 percent decrease in parking accidents. Over and above the accident problem, there is the loss of capacity on Adams that would result from angle parking. Severe congestion could be expected.

Proposals 26, 27, and 28 have received earlier comment. Although, the existing and future traffic problems can be solved without a couplet, if there is to be a couplet a modification of Proposal 26 seems best. Proposals 27 and 28 are probably not feasible because of the difficulty in connecting Jefferson to Island Avenue.

The remaining proposals are addressed as follows:

29. *Block off some one or more or all of 7th, 8th, 9th, 10th, and 11th at Washington to do away with five-way intersections on Washington.*

Doing away with the five-way intersections would seem to improve safety. However, the Urban Studies Unit has no figures on accident rates on these streets to know if safety is a real problem or not. Analysis shows that there are no existing levels of service problems on Washington. Analysis of future forecasts leads to the conclusion that signals at Spruce Street, perhaps at Fourth Street, and other moderate improvement can result in satisfactory operational conditions in the CBD.

30. *Closing of any one or more of the railroad crossings.*

An April 7, 1978, report was published entitled La Grande: Proposed Street Closures at Railroad Crossings. The City has copies of this report and there is nothing new to add except the following comment. In general, the Oregon Public Utilities Commissioner seemed to agree with the report as far as traffic volumes were concerned, but disagreed concerning costs to motorists. Detailed documentation of how the costs were calculated was supplied to the previous Commissioner, but it is believed that concerns remain, either with the new Commissioner, or his staff.

31. *Simulate large industry locating in each of the following zones (greater than 50 employees): 400, 403C, 403D, 403E, 404A, 404B, and 406.*

This proposal is somewhat vague because "greater than 50 employees" is very open-ended.

In general, a light industrial development of 50 employees would generate about three trips per employee, with 20 percent of the trips occurring in the peak hour. The addition of 150 to even 300 trips (100 employees) on the local street system would not be noticed farther than two or three blocks from the site.

32. *What is the capacity of the major streets within the CBD: Adams, Washington, Jefferson, Hemlock, Greenwood, Fir, Depot, Fourth?*

Table 3, introduced earlier shows these capacities. In addition, Appendix II-D shows capacities for typical streets. These figures can be used for planning purposes.

33. *What is the capacity of each of the railroad crossings?*

Earlier, level of service and capacity were discussed at some length. It was shown that the capacity of a street section is

controlled by conditions at the intersections at the ends of the street section. Table 4 shows the calculated capacities for each railroad crossing, based on existing intersection conditions.

William L. Cranford/Melvin Makin

May 28, 1980

TABLE 1
 PLANNING VARIABLES FOR TRIP GENERATION - 1978
 LA GRANDE ARTERIAL STREET STUDY

Zone	Persons 5-Older	Persons 16-65	Number Autos	Median Family Income	Number Dwelling Units	Total Number Persons	Wood Products	Employment		
								All Mnfg.	Retail & Service	All
21	55	42	50	8,500	25	70	12	85	757	1,400
22	1,641	1,262	1,502	22,000	751	2,103	0	0	335	353
23	1,227	944	1,124	25,000	562	1,574	0	4	205	254
24	129	99	118	11,000	59	165	0	0	485	489
25	205	158	188	8,500	94	263	0	0	189	210
26	533	410	488	11,000	244	683	0	4	27	60
27	1,223	941	1,120	15,000	560	1,568	0	0	132	148
28	325	250	298	11,000	149	417	0	4	137	157
29	29	22	26	11,000	13	36	0	14	4	42
30	86	66	78	10,000	39	109	260	295	5	308
31	242	186	222	11,500	111	310	25	25	13	49
32	524	403	480	9,000	240	672	0	0	175	193
33	836	643	766	9,500	383	1,072	0	0	78	78
34	1,271	978	1,164	10,000	582	1,630	2	8	68	114
35	1,018	783	932	10,000	466	1,305	3	19	57	96
36	719	553	658	11,000	329	921	0	0	70	80
TOTAL	10,063	7,740	9,214	12,131	4,607	12,898	302	458	2,737	4,031

TABLE 2
 PLANNING VARIABLES FOR TRIP GENERATION - 1990
 LA GRANDE ARTERIAL STREET STUDY

Zone	Persons 5-Older	Persons 16-65	Number/ Autos	Median Family Income	Number Dwelling Units	Total Number Persons	Employment			
							Wood2/ Products	All3/ Mnfg.	Retail4/ & Service	All5/ Service
21	83	63	76	14,875	38	105	20	132	1,090	2,145
22	2,462	1,893	2,252	38,500	1,126	3,154	0	0	482	540
23	1,841	1,416	1,686	43,750	843	2,361	0	6	295	389
24	194	149	178	19,250	89	247	0	0	698	748
25	308	237	282	14,875	141	374	0	0	272	321
26	780	615	732	19,250	366	1,025	0	6	39	91
27	1,835	1,412	1,680	26,250	840	2,352	0	0	190	226
28	488	375	446	19,250	223	625	0	6	197	240
29	44	33	40	19,250	20	54	0	22	6	64
30	129	99	116	17,500	58	164	434	457	7	471
31	363	279	332	20,125	166	465	42	39	19	75
32	786	605	720	15,750	360	1,008	0	0	252	295
33	1,254	965	1,150	16,800	575	1,608	0	0	112	119
34	1,907	1,467	1,746	17,500	873	2,448	3	12	98	174
35	1,527	1,175	1,398	17,500	699	1,954	5	30	82	147
36	1,079	830	986	17,500	493	1,382	0	0	100	122
TOTAL	15,080	11,613	13,820	21,120	6,910	19,346	504	710	3,939	6,167

TABLE 2 (Continued)
 PLANNING VARIABLES FOR TRIP GENERATION - 1990
 LA GRANDE ARTERIAL STREET STUDY

Zone	Persons 5-Older	Persons 16-65	Number Autos	Median Family Income	Number Dwelling Units	Total Number Persons	Employment			
							Wood2/ Products	All3/ Mnfg. & Service	Retail4/ All5/	
TOTAL	10,063	7,740	9,214	12,131	4,607	12,898	302	458	2,737	4,031
In-crease 1990	50%	50%	50%	74%	50%	50%	67%	55%	44%	53%

1/ Include pickups, panels and recreational vehicles mostly used as autos.

2/ Standard Industrial Code (SIC) 24-26 and 42.

3/ SIC 19-39 and 42.

4/ SIC 52-67, 70-76, 80-82, and 88-94.

5/ SIC All

TABLE 3
 SERVICE VOLUMES (CAPACITIES) ON MAJOR STREETS WITHIN
 THE LA GRANDE CENTRAL BUSINESS DISTRICT

<u>Street</u>	<u>Section</u>	<u>LOS D*</u> <u>Capacity</u>	<u>LOS E*</u> <u>Capacity</u>
Adams	3rd to Fir	14,700	17,200
	Fir to Hemlock	18,800	22,100
	Hemlock to Spruce	18,800	22,100
Greenwood	Jefferson to Washington	6,900	8,100
Fir	Jefferson to Washington	8,500	9,900
Hemlock	Jefferson to Washington	4,200	5,000
Depot	Jefferson to Washington	6,900	8,100
4th	Jefferson to Washington	12,700	14,900
Jefferson	3rd to 4th	8,800	10,300
	4th to Fir	8,800	10,300
	Fir to Hemlock	9,300	10,900
Washington	4th to Fir	8,800	10,300
	Fir to 12th	8,800	10,300

* LOS = Level of Service

TABLE 4
CAPACITY AT EACH LA GRANDE RAILROAD CROSSING

<u>Railroad Crossing</u>	<u>LOS "D" Capacity</u>	<u>LOS "E" Capacity</u>
Fir	8,500	9,900
Greenwood	6,900	8,100
Cherry	6,300	7,400
Willow	5,700	6,800
"K" Avenue	7,600	9,000

MAP 1
CITY OF LA GRANDE AND VICINITY
(Zone Map)



LEGEND:

- Cordon Line
- Zone Line
- External Interview Station
- 21 Zone Number

MAP 2

LA GRANDE: EXISTING MAJOR STREET NETWORK



LEGEND:

1978 Average Summer Weekday Traffic (in thousands)

MAP 3

LA GRANDE: EXISTING MAJOR STREET NETWORK



LEGEND:

1978 Summer Peak Hour Levels of Service

- LOS "D" 
- LOS "E" 
- LOS "F" 

MAP 4

LA GRANDE: EXISTING MAJOR STREET NETWORK



LEGEND:

1990 Forecasted Average Summer Weekday Traffic Volume (in thousands)
 A volume of 1.0 indicates a daily volume from 100 to 1000

LA GRANDE: EXISTING MAJOR STREET NETWORK



LEGEND:

1990 Summer Peak Hour Levels of Service (LOS)

- LOS "D" ▨▨▨▨▨▨
- LOS "E" ▩▩▩▩▩▩
- LOS "F" ◊◊◊◊◊◊



XX Projects Defined and Keyed to Text

north

ADOPTED
April, 1977

Draft Street Plan

- | | | | |
|--|-----------------------------------|--|----------------------|
| | Interstate | | Secondary |
| | Connection Link to Rural Arterial | | Proposed Street |
| | Minor Arterial | | Proposed Overpass |
| | Collector | | Proposed RR Crossing |

CITY OF LA GRANDE, OREGON

MAP 7

LA GRANDE: PROPOSED 1990 MAJOR STREET NETWORK



LEGEND:

1990 Forecasted Average Summer Weekday Traffic (in thousands)
 A volume of 1.0 indicates a daily volume from 100 to 1,000

Map 8

LA GRANDE: PROPOSED 1990 MAJOR STREET NETWORK



LEGEND:

1990 Summer Peak Hour Levels of Service (LOS)

- LOS "D" 
- LOS "E" 
- LOS "F" 

ATTACHMENT 1
POSSIBLE CHANGES TO BE ANALYZED BY THE COMPUTER
(From City of La Grande)

Proposal Number

- 23 = 1. Make Washington one-way southbound with Jefferson and Adams to remain two-way.
- 29 = 2. Block off some, one or more, or all of 7th, 8th, 9th, 10th, and 11th at Washington to do away with five-way intersections on Washington.
- 5 = 3. Complete 16th from Adams to Gekeler.
- 24 = 4. Route "through" traffic onto Washington or Washington and Jefferson, rather than Adams from Highways 82 and 30.
- 25 = 5. Make Adams two lanes (one-way either direction) with angle parking (in association with 4 above).
- 26 = 6. Make Adams one-way northbound and Washington one-way southbound between 4th and Hall.
- 27 = 7. Make Adams one-way southbound and Jefferson one-way northbound between 4th and Hall.
- 28 = 8. Make Washington one-way southbound and Jefferson one-way northbound between 4th and Hall.
- 3 = 9. Extend "E" through EOSC campus to 12th Street (proposed by Campus Plan).
- 4 = 10. Construct "D" Street between 12th and 16th bordering the cemetery.
- 12 = 11. Construct new crossing at Union (West La Grande).
- 30 = 12. Closing of any one or more of the railroad crossings.
- 31 = 13. Stimulate large industry locating in each of the following zones (greater than 50 employees): 400, 403C, 403D, 403E, 404A, 404B, and 406.
- 9 = 14. Complete Wall Street from M to Cove.
- 32 = 15. What is the capacity of the major streets within the CBD? Adams, Washington, Jefferson, Hemlock, Greenwood, Fir, Depot, 4th?
- 33 = 16. What is the capacity of each of the railroad crossings?

APPENDIX II-A
LEVELS OF SERVICE FOR SIGNALIZED INTERSECTIONS

Level of Service	Type of Traffic Flow	Comments	Maneuverability
A	Free flow	No vehicle waits longer than one red indication.	Turning movements are easily made, and nearly all drivers find freedom of operation.
B	Stable flow	The number of vehicles waiting through one red indication is increased.	Many drivers begin to feel somewhat restricted within groups of vehicles.
C (Desired urban design level)	Stable flow	Occasionally vehicles may have to wait through more than one red indication.	Back ups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so.
D	Approaching unstable flow	Delays may be substantial during short periods, but excessive back-ups do not occur. This level usually considered an acceptable goal during peak hours.	Maneuverability is severely limited during short periods due to temporary back-ups.
E (Capacity is at the division between E & F)	Unstable flow	Delay may be great--up to several signal cycles. Usually, considered unsatisfactory. Short periods of this level may be tolerated during peak hours in lieu of the cost and community disruption of providing a higher level of service.	There are typically long queues of vehicles waiting upstream of the intersection.
F	Forced	Excessive delay. Nearly always considered unsatisfactory. May occur only during p.m. peak hours during summer months in recreational areas.	Jammed conditions. Back-ups from other locations may restrict or prevent movement of vehicles at the intersection under consideration.

APPENDIX II-B

CHARACTERISTIC OF ONE-WAY STREETS AND ACCIDENTS
(OREGON)

	Years in Each Before & After Period	Average Daily Traffic		Study Length Miles	Accident Rate ¹		Percent Change	Severity Rate ²		Percent Change
		Before	After		Before	After		Before	After	
1. Astoria	3	8,700	9,370	.46	61.9	53.2	-14*	654	771	+22*
2. Coos Bay	3	9,980	15,960	.78	49.9	21.8	-56*	476	220	-54*
3. Corvallis	3	8,040	9,325	1.21	48.6	31.2	-36*	495	497	+1*
4. Eugene	1	8,200	6,040	1.86	73.3	37.3	-49*	790	463	-41*
5. Lebanon	3	6,440	8,630	.66	47.8	39.1	-18*	444	338	-24*
6. Medford ³	1	11,680	11,090	2.24	16.8	9.3	-45*	226	99	-56*
7. Pendleton	3	6,430	7,560	1.23	44.4	48.2	+8*	450	433	-4*
8. Redmond	3	4,120	7,240	1.16	30.4	17.9	-42*	294	240	-19*
9. Salem	1	19,600	20,500	3.18	44.1	42.1	-4*	570	418	-27*
10. Springfield	3	14,500	16,800	1.47	26.6	16.0	-40*	407	266	-35*
11. The Dalles	3	8,780	17,300	.74	52.1	34.7	-33*	479	233	-51*
12. Tillamook	3	5,840	6,880	.79	41.4	38.8	-6*	297	572	+92*
Average					41.3	30.2	-27	464	343	-26

¹ Accidents per million vehicle miles
² Casualties per 100 million vehicle miles
³ Installed 1942

* Change not statistically significant
 * Change statistically significant

SOURCE: "A Study of One-Way Street Routings on Urban Highways in Oregon." Oregon Highway Department, 1959, p. 15, 18 (10).

TILLAMOOK

General

US101 was routed through the City of Tillamook as shown in Figure 36 before the Main-Pacific Avenue One-Way Couplet was established. The portion of Main Avenue involved in this study was 0.79 miles in length. Pacific Avenue, a parallel street one block to the east which was later to become a part of the one-way couplet, extended from a junction with First Street on the north to a point just south of 12th Street, an over-all distance of 0.55 miles. The one-block section of First Street considered was 0.04 miles in length. There were no traffic signals on any of these streets.

Considerable construction was necessary to provide a southerly terminus for the one-way couplet. This construction involved the extension of Main Avenue south beyond the city limits to the relocated line of the Tillamook-Pleasant Valley Section of US101, and the extension of Pacific Avenue south to an intersection with the Main Avenue extension. On September 29, 1950, the Main-Pacific Avenue One-Way Couplet was opened to traffic. As shown in Figures 36 and 37, northbound traffic traveled over Pacific Avenue and First Street, while southbound traffic was directed over Main Avenue. Each leg of the one-way couplet is 0.79 miles in length. Signals at the intersections of Main and Pacific Avenues with Third Street were not installed until over a year after the one-way couplet was established.

For comparative purposes, the 36-month period from September 1, 1947 to August 31, 1950 was selected for the "before" period, and the 36-month period from October 1, 1951 to September 30, 1954 was chosen for the "after" period. It will be noted that the "after" period of study started one year after the one-way couplet was established.

Traffic Data

Traffic volumes on Main Avenue during the "before" period averaged 4,815 vehicles per day and ranged from a high of 5,500 just north of Third Street to a low of 4,000 near the south city limits. Traffic on First Street and Pacific Avenue was appreciably lighter. The average daily traffic was 1,365 vehicles, ranging from a high of 2,500 on First Street to a low of 50 on Pacific Avenue near 11th Street. The average daily traffic for all streets combined was 5,835 vehicles, and there were 5,047,073 vehicle miles of travel.

During the "after" period, the average daily traffic on Main Avenue was 3,350 vehicles. Traffic volumes on Main Avenue ranged from a high of 6,000 vehicles per day just north of Third Street to a low of 2,000 near the south city limits. On Pacific Avenue, traffic volumes averaged 3,525 vehicles per day and varied from a high of 6,000 north of Third Street to a low of 2,000 near the south city limits. During the "after" period, the average daily traffic on the one-way couplet was 6,875 vehicles, and the vehicle miles of travel totaled 5,947,507.

During the "before" period it required 3.56 minutes to negotiate the section in one direction. This corresponds to a running speed of 13.3 MPH. After the one-way couplet was established travel time was reduced to 2.14 minutes, and the running speed was increased to 22.1 MPH. This was a savings of 1.42 minutes, or a 40 percent reduction in travel time.

APPENDIX II-D

OREGON DEPARTMENT OF TRANSPORTATION
Project Management and Operations Planning Section

AUTO CAPACITIES PROVIDED BY TYPICAL STREET
AND HIGHWAY FACILITIES

The following assumptions are made in calculating capacities, street widths and minimum right-of-way widths:

10% peak hour	11' travel lanes
10% left and right turns	14' left turn lane
55% to 45% directional split	4' median
5% trucks	1' travel lane to curb
No parking	8' curb to right-of-way line

Type of Facility (Two-Way)	Green Time as % of Cycle Time	Minimum ROW ^{3/}	Curb-to- Curb Distance	Level "C" Capacity	Level "F" Capacity
2-lane arterial - CBD	45%	44'	28'	5,800	8,100 <u>1/</u>
2-lane arterial - CBD	60%	44'	28'	7,600	10,600 <u>1/</u>
2-lane arterial - fringe & suburban	45%	44'	28'	6,900	9,600 <u>1/</u>
2-lane arterial - fringe & suburban	60%	44'	28'	9,300	13,000 <u>1/</u>
3-lane arterial - CBD	45%	54'	38'	7,600	10,600
3-lane arterial - CBD	60%	54'	38'	10,400	14,500 <u>2/</u>
3-lane arterial - fringe & suburban	45%	54'	38'	9,600	13,400
3-lane arterial - fringe & suburban	60%	54'	38'	12,300	17,200 <u>2/</u>
4-lane arterial - CBD	45%	66'	50'	13,300	18,600 <u>1/</u>
4-lane arterial - CBD	60%	66'	50'	17,800	25,000 <u>1/</u>
4-lane arterial - fringe & suburban	45%	66'	50'	17,300	24,200 <u>1/</u>
4-lane arterial - fringe & suburban	60%	66'	50'	22,900	32,000 <u>1/</u>
5-lane arterial - CBD	45%	76'	60'	16,000	22,400
5-lane arterial - CBD	60%	76'	60'	21,300	29,800 <u>2/</u>

APPENDIX II-D (continued)

Type of Facility (Two-Way)	Green Time as % of Cycle Time	Minimum ROW ^{3/}	Curb-to- Curb Distance	Level "C" Capacity	Level "F" Capacity
5-lane arterial - fringe & suburban	45%	76'	60'	20,900	29,300
5-lane arterial - fringe & suburban	60%	76'	60'	28,200	39,500 <u>2/</u>
6-lane arterial - fringe & suburban	45%	88'	72'	25,800	36,000 <u>1/</u>
6-lane arterial - fringe & suburban	60%	88'	72'	34,600	48,000 <u>1/</u>
7-lane arterial - fringe & suburban	45%	98'	82'	30,000	42,000
7-lane arterial - fringe & suburban	60%	98'	82'	39,100	54,000 <u>2/</u>

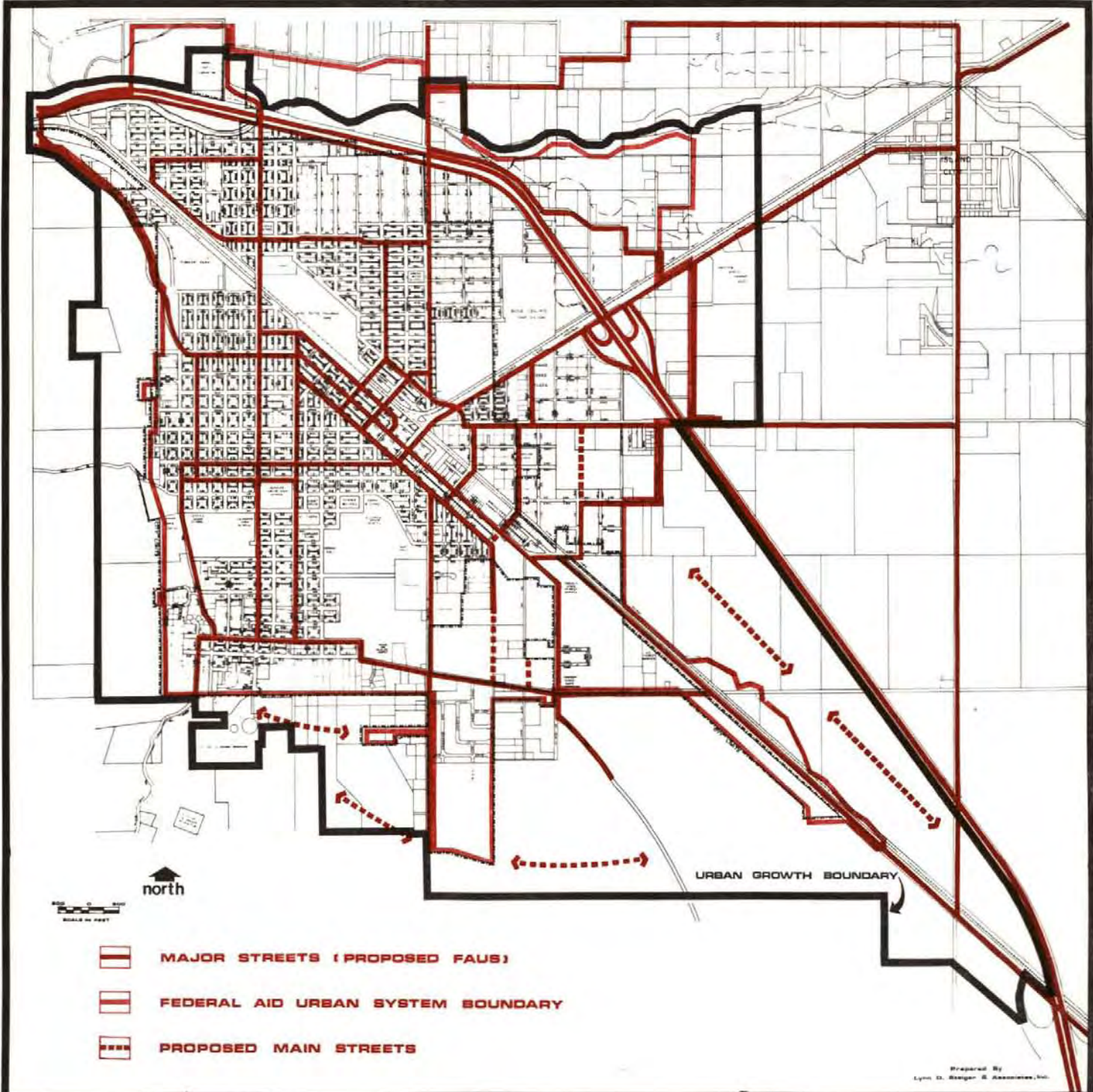
Type of Facility (One-Way)	Green Time as % of Cycle Time	Minimum ROW	Curb-to- Curb Distance	Level "C" Capacity	Level "F" Capacity
2-lane arterial - CBD	45%	40'	24'	8,800	12,300
2-lane arterial - CBD	60%	40'	24'	11,800	16,500
2-lane arterial - fringe & OBD	45%	40'	24'	9,600	13,400
2-lane arterial - fringe & OBD	60%	40'	24'	12,900	18,100
3-lane arterial - CBD	45%	52'	35'	13,500	18,900
3-lane arterial - CBD	60%	52'	35'	18,000	25,200
3-lane arterial - fringe & OBD	45%	52'	35'	14,800	20,700
3-lane arterial - fringe & OBD	60%	52'	35'	19,800	27,700

1/ Assuming negligible left turn activity at signals.

2/ Left turns from the major street may diminish green time available for cross street.

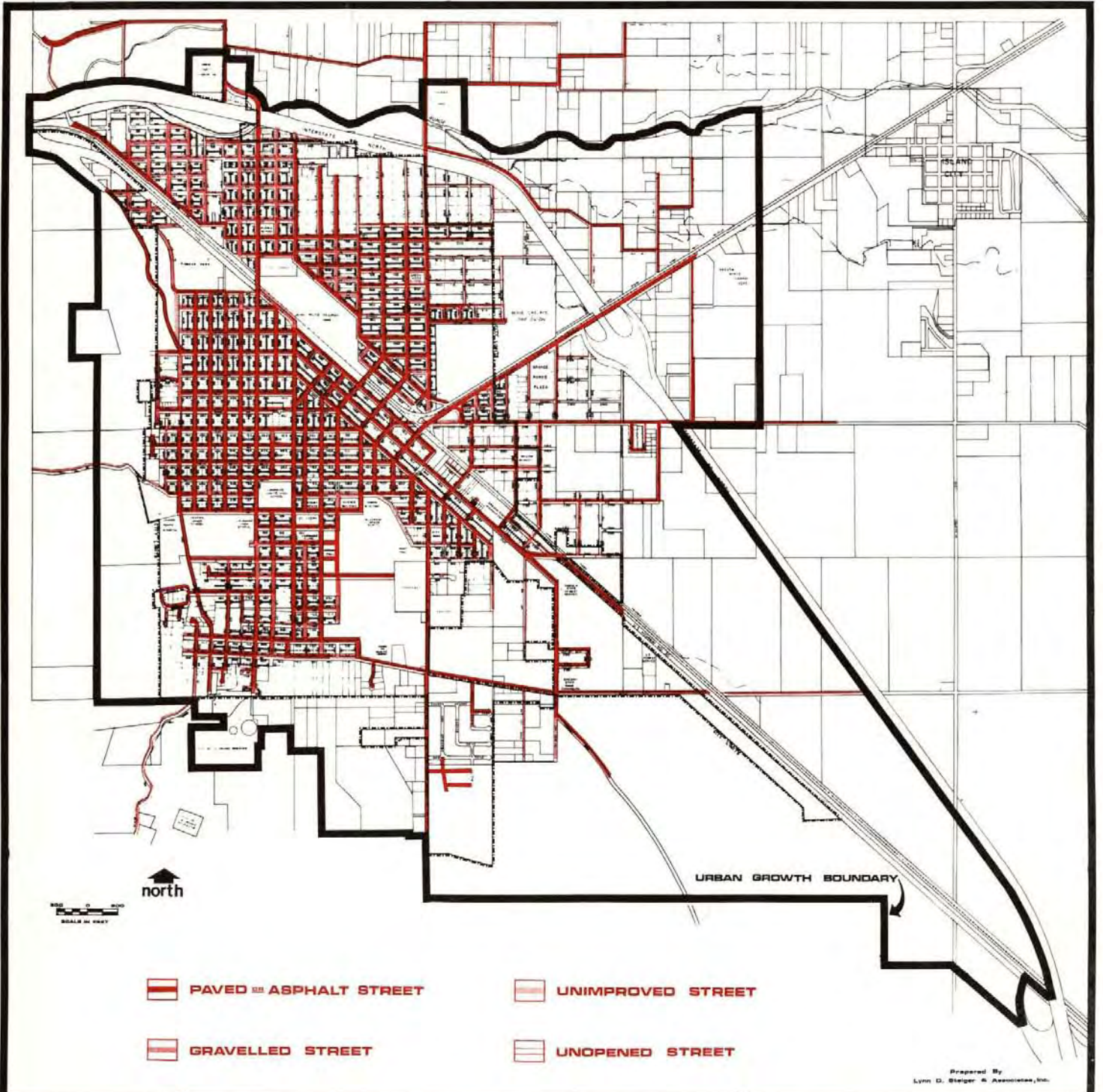
3/ Right-of-way and curb-to-curb distances do not include allowances for bicycle lanes or bus turnouts.

CBD - Central Business District
 OBD - Outlying Business District



TRANSPORTATION PLAN

CITY OF LA GRANDE, OREGON



STREET CONDITIONS

CITY OF LA GRANDE, OREGON