

AN ABSTRACT OF THE THESIS OF

Robert Howard Schmidt, Jr. for the M.S. in Natural Resources
(Name) (Degree) (Major)

Date thesis is presented _____

Title THE IMPACT OF LIMITED-ACCESS HIGHWAYS ON AGRI-
CULTURAL LAND: NATIONAL INTERSTATE ROUTE 5, LINN
COUNTY, OREGON. A CASE STUDY

Abstract approved

(Major professor) */*

This study examines the impact of the recently constructed limited-access highway, Interstate 5, on agricultural land in Linn County, Oregon. More specifically it scrutinizes the quality and quantity of the land relinquished to the highway right-of-way; the effects on field boundaries, connectivity, mobility, drainage, land use, miscellaneous factors, and the attitudes of the farm operators in respect to the highway right-of-way taking.

The analysis reveals that the right-of-way taking for Interstate 5 has made definite inroads on agricultural land, deleting an average of 39 acres of productive farm land per mile, and at the same time leaving 80 percent of the farms parcelled. The right-of-way taking for Interstate 5 had a greater impact on the operation of the average farm than indicated by the actual diminution of productive land. Drainage, connectivity, deformation in size and shape of fields, and unsatisfactory negotiations with the Highway Department were common complaints voiced by the farm operators. Changes

in land use and land value were not advantageous, for the most part, to the farm operator. The large majority of the farm operators in Linn County stated that, "they would gladly take back their original set-up (previous to the right-of-way taking) anytime". On the basis of research findings the author concludes that the benefits for agriculture in the study area are minor in comparison with the detrimental influences brought about by Interstate 5.

In view of the estimate that 80 percent of the mileage of the proposed 41,000 mile National Interstate Highway system will traverse rural lands, and by the fact that the development of limited-access highways of today have had a multitude of effects on agricultural land and farming operations several recommendations are made. It is suggested that: 1) Consideration should be given to the soil quality and capability in planning the alignment of highways; 2) Personable and experienced personnel should be employed by the highway department for appraising and negotiation with farm operators; and 3) that farm operators should avail themselves of opportunities to ascertain knowledge of the ramifications brought about by the highway project.

THE IMPACT OF LIMITED-ACCESS HIGHWAYS ON
AGRICULTURAL LAND: NATIONAL INTERSTATE ROUTE 5,
LINN COUNTY, OREGON, A CASE STUDY

by

ROBERT HOWARD SCHMIDT, JR.

A THESIS

submitted to


OREGON STATE UNIVERSITY

in partial fulfillment of
the requirements for the
degree of

MASTER OF SCIENCE

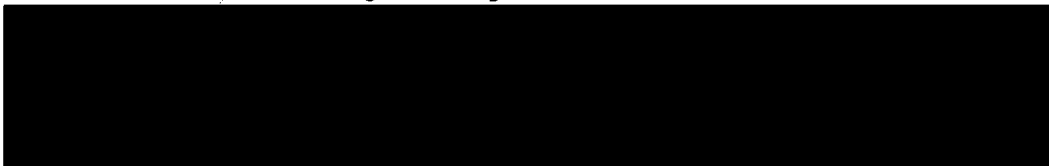
June 1964

APPROVED:




Professor of Natural Resources

In Charge of Major



Chairman of Department of Natural Resources



Dean of the Graduate School

Date thesis is presented _____

Typed by Penny A. Self

ACKNOWLEDGEMENT

The author is especially indebted to Dr. Richard M. Highsmith, Jr., Professor of Natural Resources, Oregon State University, under whose advice this study was originally undertaken, and whose constant interest, guidance, and inspiration made the completion of this thesis possible.

The author also is grateful to Dr. J. Granville Jensen, Chairmen of the Department of Natural Resources, Oregon State University, for his constructive criticism of the manuscript.

I am also indebted to many individuals for the cooperation extended in making this investigation possible. I wish to express my sincere appreciation to the farm operators, and the public servants who gave so generously of their time.

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THE IMPACT OF LIMITED-ACCESS HIGHWAYS ON AGRICULTURAL LAND: NATIONAL INTERSTATE ROUTE 5, LINN COUNTY, OREGON, A CASE STUDY

THE NATURE OF THE STUDY

Since of dawn of history, the urge and necessity for communication and travel have motivated the human race to improve its facilities for transportation. This still continues. Today, the highway is the most common of all connecting links. The development of highways in the United States, stimulated to a marked degree by the growth of motor traffic, has played an important role in transforming the economic and social patterns of American life, especially in recent decades.

Recognizing the need for improved movement of both people and material goods, Congress authorized the National System of Interstate and Defense Highways by passing the Federal-Aid Highway Act of 1944. Federal-aid funds, however, were not specifically authorized by this act for the Interstate System, and were provided only in relatively modest amounts until the passage of the Federal Aid Highway Act of 1956. This latter Act, augmented by the Federal-Aid Highway Act of 1961, authorized the expenditure of approximately 37 million dollars for a long range Federal-aid program for the complete establishment and the modernization of the Interstate System. This tremendously enlarged highway program will be, when completed, the greatest peacetime construction program in history (3 , p. 8). The Interstate System is to become a planned, integrated 41,000 mile highway network. It will link the



Figure 1. The modern design of Interstate 5 stresses safety and time-saving features. This picture, taken north of the city of Albany, typifies the local, rural landscape. Photo Courtesy of the Oregon State Highway Department.

metropolitan areas and industrial centers, serve the national defense, and connect with routes of continental importance in Canada and Mexico. The System will comprise a little more than one percent of the United States highway mileage, yet when completed in 1972, it is estimated that it will carry over 20 percent of the Nation's traffic (3 , p. 8). This Federal-aid program is administered by the Bureau of Public Roads, in cooperation with the individual state highway departments.

The costs of the Interstate Highway projects are paid on a matching basis, the federal government paying 90 percent and the state governments 10 percent.¹ Upon completion, the states are responsible for the administration and maintenance.

The Impact of the System on Land and Land Use.

The design of the new Interstate Highway System is such that limited-access, planned interchanges, separated roadways, improved alignment, flatter curves and grades, and other modern features make these routes remarkably safe and permit uniform and reasonably high-speed travel. At the same time the construction of this network of highways has had and will continue to have a multitude of influences upon the development of the land and communities through which it passes. Little in particular is known about these influences, especially about those which are related to right-of-way taking in agricultural areas. The Interstate Highway

¹ Oregon and 15 other states receive an extra .5% by controlling advertising on adjacent land.

with its new requirements for land, grade, entrance, and exit has far reaching effects on the utility of agricultural land. Not only do these super transit-ways remove large quantities of land from use, but farm connectivity, drainage, and unity can be seriously impaired. One, part, or all of these conditions can totally disrupt the entire economy and operation of a farm.

The impact of the Interstate System on agricultural land and on farming operations is worthy of study since more than 80 percent of the mileage of this system will cut through rural areas (16, p. 60-61). These are the considerations which have stimulated this study. National Interstate Route 5, in Linn County, by its very nature, provides an excellent opportunity for such a geographical study.

The Objectives of the Study

The main objective of this study is to determine the actual effects of a modern designed, superimposed highway (Interstate 5) on the operation, organization, and use of farm land resources. The extent of change in the physical and structural environment is a basic determining factor of these effects. Geographical aspects of the problems are stressed in this study because they are considered important and have been ignored, or treated lightly in much of the previous work. It is therefore the objective of this study to determine the quantity and quality of the land lost to the right-of-way, and the beneficial and detrimental effects on drainage, field boundaries, connectivity, and mobility. It is also the



Figure 2. Interstate 5 connects with routes of continental importance in Canada and Mexico.

objective of this paper to determine the changes in land use; the impact on miscellaneous factors - noise, demands of stalled motorist, reduction of social and natural environment; and attitudes of the farm operators.

Scope of Research

Research procedures involved: (1) the analysis of available background data; (2) assembly of published material relative to Linn County. This included liberal use of aerial-photos and various maps; (3) field investigation of entire route through Linn County; and (4) interviews with highway officials, County officials, and 42 percent (26 of 63) of the farm operators whose property was taken for the right-of-way. A farm interview checklist was used for standarization and completeness of the response voiced by the farm operators. Interview selections were based on a random sampling of farms effected by the right-of-way taking (see Appendix 4, Fig. C for interview locations).

The basic limitation of the study are: (1) the size of the study area - limited to Linn County with a north-south extent of approximately 40 miles in length, and a width of approximately three miles. A highway segment of approximately five miles long will not be considered as it is encompassed by the Albany urban sprawl, thus the total study area is approximately 35 miles in length; and (2) the detail of the analysis - the budget and time restrictions did not allow for a detailed before and after analysis of the following farm management factors: A measure of the changes in costs of crops and livestock production; the impact of farms other than those abutting the highways; or the changes in farm income. It is the opinion of the author that the examples cited in this paper, although limited to that of the study area, represent in their broadest sense, a fairly typical situation of an

agricultural area traversed by a limited-access highway. Further, it is hoped that these examples will provide some insight to better understanding the problems that can and do occur.

National Interstate Highway Route 5, Linn County, Oregon, hereafter will be referred to as "Interstate 5". The owner-operators in the study area who were interviewed will be referred to as "farm operators".

THE STUDY AREA

Western Linn County, the area traversed by Interstate 5, is located in the lowlands of the Willamette Valley. This area is primarily devoted to agriculture. The combination of climate and the variety of soils found in this section of the County provide a suitable base for the growth of a variety of crops, especially grasses and cover-crops. The extensive variety of grasses and legumes adapted to this area have been responsible for seed production developing into a major industry in Linn County. Vetches, clovers, fescues, and especially rye grasses for seed are produced in sizeable quantities. Higher value speciality crops are grown in limited amounts on the newer alluvium soils, particularly in the South Santiam River area north of Albany. Linn County in 1962 accounted for approximately 74 percent of the rye grass seed harvested in the United States. The large production is basically the result of increased demand together with conducive soil and climate combinations.

The study portion of Linn County has a large amount of low quality cultivatable land. Rye grass seed crops have the ability to produce on the poorer soils very nearly as well as on the better quality soils. This has added markedly to the value of these lower quality lands. The climate conditions of this area also are inductive for large production. This valley lowland portion of Linn County has a mild, sub-humid marine climate with a long frost-free season of approximately 200 days. Annual precipitation ranges from 38 to

45 inches with approximately 90 percent received during the nine winter months. This distribution of precipitation with its long, dry summers is an ideal condition for the harvesting of winter crops. The production of livestock, especially sheep, is increasing in importance in the study area since the low return for rye grass seed in recent years has forced the farm operator to seek additional means of income.

Soil Quality and Capabilities

The general productiveness of the land in the Willamette Valley is related to its soil quality and capability. It is therefore important to determine the type of land that was taken by the right-of-way for Interstate 5. The soil types represented in the surveys by the Soil Conservation Service working in cooperation with the Oregon Agricultural Experiment Station of the study area were Willamette, Amity, Dayton, Concord, Woodburn, Chehalis, Newberg, Winkle, Cove Clay, Whiteson, Courtney, Reed, Tangent, Camas, Clackamas, Holcomb, and Wapato. The soils of the United States have been grouped into land capability classes, subclasses, and units to aid in selecting proper usage. This classification is more meaningful for the purposes of this study than soil types. The land capability unit is the most detailed and specific grouping of this classification. The land capability classes divide all land into eight broad divisions. The first three classes include land which can be plowed and cultivated safely without lasting damage if reasonable conservation procedures are followed. Class I land

needs little special conservation treatment. Classes II, and III require increasing degrees of care and supervision. Only the first four land capability classes are found in the study area (see Appendix 4, Fig.B). A generalization of the distribution of land in the study area can be made as follows: The majority of the Class I and II land is found in the area that stretches north of the Calapooya River to the Marion County line. Class III land is predominantly in the area south of the Calapooya River to just north of the Diamond Hill Road interchange. Class IV land is generally found from the Diamond Hill Road interchange, south to the Lane County line.

Approximately 8 percent of the land in the study area consisted of soils in Class I; 31 percent of the land was classified Class II; 10 percent was Class III; and 51 percent was in Class IV (see Table 1). More than 85 percent of the land found in the study area has a dominant limitation of poor soil drainage. This is indicated by the sub-classification "w". The sub-classification "e" indicates the dominant limitation is susceptibility to erosion and is represented in 4.22 percent of the soils. Sub-classification "s" indicates that the dominant soil limitation on 1.23 percent of the land is an outstanding soil characteristic such as shallow effective soil depth, and stoniness (note soil capability sub-classes, Table 1).

An increase in drainage problems since the construction of Interstate 5 was reported by approximately 35 percent of the farm operators. Only 7 percent reported beneficial drainage

Table 1.

| Soil Series | Soil Capability | Percentage | Acreage |
|-------------|---|------------|---------|
| Willamette | I | 7.89 | 105.14 |
| Amity | IIw | 23.86 | 317.71 |
| Concord | IIw | 1.62 | 21.53 |
| | Total of Subclass "w" | 25.47 | 339.24 |
| Chehalis | IIe | 3.23 | 43.03 |
| Newberg | IIe | .99 | 13.20 |
| | Total of Subclass "e" | 4.22 | 56.23 |
| Woodburn | IIs | 1.10 | 14.63 |
| | Total of Class II | 30.79 | 410.10 |
| Clackamas | IIIw | 2.50 | 33.60 |
| Holcomb | IIIw | 1.50 | 20.15 |
| Wapato | IIIw | 5.44 | 72.38 |
| | Total of Subclass "w" and Total of Class III | 9.47 | 126.13 |
| Dayton | IVw | 35.43 | 471.80 |
| Whiteson | IVw | 5.36 | 71.32 |
| Cove Clay | IVw | 5.60 | 74.61 |
| Winkle | IVw | 2.46 | 32.73 |
| Courtney | IVw | 2.18 | 28.97 |
| Reed | IVw | .197 | 2.63 |
| Tangent | IVw | .503 | 6.70 |
| | Total of Subclass "w" | 51.12 | 688.76 |
| Camas | IVs | .128 | 1.7 |
| | Total of Class IV | 51.843 | 690.46 |
| GRAND TOTAL | | 100% | 1331.83 |

Classes based on Standard Soils Survey, 1963
 See Appendix 4, p. 65 for additional soil information.

results. All of the operators who found drainage a problem, reported an increasing height of standing water in their fields over that they had experienced previously. Several farm operators reported flooding of their homes and barns. An examination of climatic data from the time construction began to the present (1957-1963) does not show any appreciable change in the regimen or the total amount of precipitation for this area.

The land of the study area is, in general, very flat and limited by its poor lateral drainage. Shallow surface ditches and tiling are generally of little value as they lack outlets. Drainage is especially troublesome during the winter half of the year when this area receives most of its rainfall. Poor drainage in the soil not only interferes with crop growth and the timely performance of tillage, seeding, cultivation, and harvesting, but also requires increased amounts of fertilizer for proper crop response. The production of livestock is also hampered by poor drainage. Standing water provides an ideal environment for the fungi causing hoof rot, and internal parasites such as the lung worm. These drainage problems have been increased by the construction of the highway, which is perpendicular to the normal drainage - the Cascade Mountains on the east to the Willamette River on the West (note map, Appendix 4, Fig. A). The elevated roadbed provided a suitable base and all weather use, had a damming and ponding effect on runoff. The degree of increased drainage problems varies with location. The farm land on the upland (east) side of the roadbed experienced more problems with drainage than did those on the

downslope (west) side. The State Highway Department has attempted to alleviate the problems of the more critical areas, but most of the fields adjacent to the highway, especially those on the upland (east) side of the roadbed, will always be plagued by increased standing water. Several of the farm operators effected by the more severe drainage problems have received some payment for damages.

Influences of Alignment of the Highway

The prime consideration of the location engineers in planning the alignment of this segment of Interstate 5 was connecting Eugene with Albany, and Albany with Salem (see Fig. 3). It is obvious that this is precisely what was accomplished. The topography of the study area is, in general, very level; the price of land was

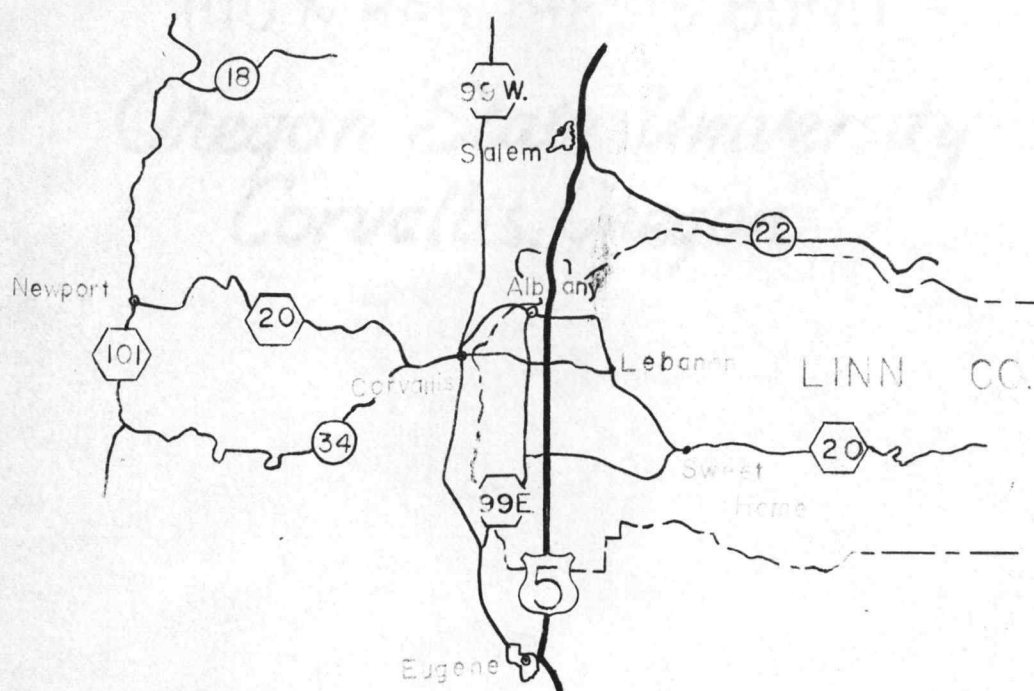


Figure 3

Scale: 1" = 22.5 miles

relatively inexpensive; and the desire line was, for the most part, along the half-section line.¹ In reality, one could contend that these alignment benefits were perhaps more of a side-feature than one of primary consideration. The alignment of the highway through the centers of sections would presumably disrupt fewer farmsteads and require less farmland than if the highway had been constructed on a county road. The study "The Effects on Farm Operating Units on Land Acquisition For Controlled-Access Highways", U.S.D.A., Economic Research Service, Farm Economics Division, indicates (on page 24) that this may or may not be true. It is very difficult to compare the amount of land that would be lost by these two types of alignment. At first glance, it may appear that construction of Interstate 5 on a county road would require less farmland, and fewer farmsteads to be disrupted than would construction of the highway through the centers of sections. As a general rule, when an Interstate highway is placed through the centers of sections in rural areas, service roads are not constructed. When the highway is placed on an existing road or street, service roads frequently are necessary to maintain access of abutting property owners to the system of public roads. Thus, the amount of farmland that must be acquired for a highway constructed on a county road may be as great or greater than that required for a highway constructed along the half-section line. The highway department plans for alternative routes of Interstate 5, were not

¹ A desire line is a line that connects the points of origin and destination.

sufficiently detailed to allow comparison of the land need for each of the alternative alignments.

Influences of Acquisition of the Right-of-way

The State of Oregon has the right to acquire private property for public purposes. Once the plans for the location of Interstate 5 were definite, the necessary rights-of-way were obtained by acquisition procedures. Oregon law restricts the acquisition of excess land for highway rights-of-way, and requires that just compensation be paid to the property owners. Just compensation or the settlement payment is based on the fair cash market value of the property, and reimbursement for damages.¹

Approximately 70 percent of those interviewed reported poor relations and negotiations with the State Highway Department. More than 30 percent of the farm operators settled their disagreements in court. Approximately 55 percent of the farm operators found the compensation settlement fair and adequate. It should be noted that this includes 15 percent of the property owners who settled in court. Compensation paid to property owners whose land was taken for the right-of-way ranged from \$600. to \$52,000. with an average of approximately \$17,000.² There were wide discrepancies concerning property owners beliefs regarding the fairness

¹ The fair cash market value may be defined as that price which would be paid for a property by a willing buyer under no obligation to buy, dealing with a seller under no necessity to sell.

² Seven of the farm operators did not care to disclose the amount received.

of the settlements. Many thought there was little they could do if they were not satisfied. Religion, personal aversion, and lack of ready capital restrained many from contesting the matter in court. Many of the complaints were based on the numerous additional expenses brought about by the highway for which the farm operators had not planned. Other complaints varied from that of a right-of-way agent appearing at the farm on a Sunday afternoon with his wife and children, to "misunderstandings" concerning the location of overpasses connecting their parcelled property. Negotiations and relations with the Highway Department apparently left much to be desired.

An unusual problem involving religion was encountered in the study area, especially in the portion south of Albany. It is here that a number of Menonite families reside. One Menonite farm operator stated that he had not considered the settlement price offered by the State Highway Department to be a fair evaluation of his property. He felt that he was being discriminated against, since it is known that the Menonite religion forbids appearance in a legal court, thus nullifying the possibility of legal action. In order to protect his interests, he secured a special dispensation from the church which permitted him to file suit and appear in court. The original offer from the Oregon Highway Department had been \$7,000. for his land and damages. The court awarded a settlement of \$16,039.

Another example of the way in which hostility can arise is exemplified in the following case concerning the acquisition of

gravel and fill material by the State Highway Department. Construction materials for the highway in the northern half of the county, where this incident occurred, were obtained by the State Highway Department. This policy was changed in the southern part of the County, and here the materials were acquired by the individual contractors. The land owner involved rebelled when the State acquired 13.22 acres of his for gravel; his land was not immediately adjacent to the highway, and the gravel was worth far more than the farm land property price settlement offered. The owner had obtained core samples of this area previous to his knowledge of the right-of-way need, and was aware of the approximate quantity and quality of the gravel. The land was acquired by the State through Condemnation at farmland prices (\$5,800. for 13.22 acres); an estimated \$40,000. worth of gravel was removed by the State Highway Department (based on \$.10 per yard). The State can legally acquire this property at farmland prices. The law states that the date of evaluation of one's property is as of the date of the filling of the action if it is condemnation, or the date upon which an agreement is reached and the intentions of the owner as to future use cannot be considered. There is also the question of the right to acquire land not adjacent to the immediate right-of-way (the land was abutting other property adjacent to the highway which was also acquired for a borrow pit). Perhaps all the proceedings were legal, but much animosity and hostility have resulted over just such actions.

In association with the acquisition and settlement, another problem arises. This is one of taxation. Although no appreciable tax increase was reported in conjunction with Interstate 5, there is the problem concerning the taxing of those parties who received awards through court settlement. The plaintiffs who received settlements through the circuit courts were awarded "just compensation" in a lump sum. Subsequent to receiving their condemnation awards, the plaintiffs filed income tax returns with the Oregon State Tax Commission. These returns, in each instance, reported the condemnation award, allotting a portion thereof as compensation for damages, and not taxable. Upon audit, deficiency assessments were levied by the State Tax Commission based on the entire amount of the condemnation awards being reported income. This is in effect, taxing "severance damages" under the guise of their being income, and appears to be in violation of the Fourteenth Amendment, and section 18 of Article I and section 3 of Article IX. The present situation taxes one group on the same type of compensation for "severance damages" whereby the other group is not. This results in a denial of uniformity of taxation and equal privileges and immunities in violation of the Fourteenth Amendment to the Constitution of the United States, and section 20 and 30 of Article I of the Oregon Constitution. The parties involved are still in the process of expressing their Constitutional Rights through due process of the law.

Another problem exists concerning capital gains. The income received from the settlement must be reinvested within

approximately one year, otherwise it is subject to the capital gains tax. This area of Linn County is what one could "land poor". The farms themselves are for the most part of an economical operating size, and organization is generally as it should be for the production of the traditional agricultural commodities. Compensation payments are, for the most part, far below the cost of buying an entire farm, and buying a part of another farm is virtually impossible as it is economically unrealistic for another land owner to reduce the size of his operating unit below that from which one can obtain a feasible income. This tax is very difficult for the older farm operator who had arranged his farm as he wanted it, and is too old to reinvest in another. It should be noted that it is not only the capital gains tax which causes these involvements, but also the fact that many farm operators lost a noticeable part of their land, and thus reduced their total productivity and hence total income. Investment in another farm for a son or another relative appears to be the most common procedure of handling this situation.

THE HIGHWAY RIGHT-OF-WAY

The right-of-way requirements for Interstate 5, with its wide lanes and limited-access features that stress safety and ease of movement, also remove large acreages of productive land from agricultural use. This loss of land to the highway right-of-way is an important ramification of the total impact of Interstate 5.

The Linn County segment of Interstate 5 can be divided into two parts to facilitate description and clarification of the highway right-of-way: (1) The highway segment north of the Albany area (Millersburg Road to the Marion County line - a distance of 4.69 miles) utilizes two lanes of an older established improved highway (originally constructed in 1948) as two of the four lanes of the Interstate System. This segment has a right-of-way width of approximately 270 feet. (2) The highway segment south of Albany (South Santiam Highway to the Lane County line - a distance of 29.67 miles) was constructed on a completely new right-of-way. This section has a width of 300 feet, although a small segment of the right-of-way in the southern most part of the County has a 320 foot width. The variations in the right-of-way widths are based on the requirements for cuts, fills, slopes, and drainage of the highway. It is interesting to note that there is a great deal of relationship between the land quality and right-of-way widths. The lower-quality lands have the wider widths, and the higher-quality the narrower widths.

The construction of the Linn County segment of Interstate 5, which was completed in August of 1961, has a total of six interchanges (including S. Santiam Highway interchange), 11 overpasses, one underpass, and one roadside rest area (Oak Grove). The construction standards of the Interstate Highway Systems are such that access is restricted to definite points where appropriate interchanges can provide safe access and exit without crossing the main lanes of traffic. Interchanges in rural areas are usually at least two miles and not further than seven miles apart. It is the general consensus of the highway officials that these distances provide adequate access and exit, and at the same time do not defeat the original purpose of the highway. The average distance between interchanges on Interstate 5 in Linn County is approximately 5.5 miles; however, the distance between the Corvallis-Lebanon Highway interchange and the Halsey-Sweet Home interchange, a distance of 11.52 miles, exceeds the average considerably.

Land Removed by the Right-of-way

The considered study right-of-way of Interstate 5 is 34.36 miles in length. This highway right-of-way and its additional construction features removes 1,331.83 acres of land from agricultural use in Linn County, or an average of slightly more than 39 acres (39.05 acres) per mile. The total quantity of land removed by the right-of-way was derived by use of a planimeter, and mathematical computations from maps of Interstate 5 (scales 1":400', and 1":100') obtained from the Oregon State Highway Department.

The interchanges, over and under passes, drainage control ways, borrow pits, construction and maintenance areas, and the roadside park accounted for a total of 120.26 acres of land, or an average of 3.5 acres per mile of highway.

Farms in the study area ranged in size from approximately 125 acres to 1,700 acres. The majority of the individual farms varied in size between 300 and 500 acres with an average of approximately 350 acres. The value of the land taken by the right-of-way for Interstate 5 ranged from approximately \$150 to \$600 per acre depending on the soil capability and improvements. The majority of the land had a sales value of approximately \$200 to \$250 per acre. This indicates that the average farm in the study area represents a sizable land investment of approximately \$80,000 to \$100,000.

The quantity of land taken from the individual farm by the right-of-way is, in general, relatively small in comparison with its total size. The average farm lost 7.7 percent, or 26.95 acres of its productive base to the right-of-way. This loss of agricultural land to the right-of-way taking, for the most part, did not reduce the individual farm size to the point of being uneconomical to operate, but it has decreased the primary means of productivity, and hence, the total income one is able to derive from the property. Perhaps more important than the average amount of agricultural land removed, is the extremes of the acreage taken by the right-of-way. The extremes ranged from 1.65 acres to 130 acres. The acreage rendered for the right-of-way, and the

total farm size did adhere, in general , to the 7.7 percent relationship, although some farm operators were more fortunate than others. Several farms lost approximately a third of their productive land, others lost only one or two percent. Also adding to the impact of the right-of-way taking was the fact that more than one-third of the farms had buildings removed, or made otherwise useless.

Mobility

There are many empirical studies available, particularly on urban and suburban areas, to verify the impact of transportation improvements. A number of these studies tend to emphasize the major advantages of limited-access highways to agricultural areas as being important in decreasing the effective distance and time-cost dimensions to market centers. The decrease in time, distance, and cost may be an advantage provided by the Interstate System in some locations, but all of those interviewed expressed the general opinion that they considered the increased mobility provided by Interstate 5 as little or no actual benefit to their farming operation, or the marketing of their commodities. The major advantage of Interstate 5 to the farm operators in the study area is the use of a better highway, and the rapid transportation of the entire system for trips beyond the local area. The older Highway 99 East parallels the new highway, and although it could not handle the increasing traffic with the ease and the safety of Interstate 5, it nonetheless provided this area with a major transportation artery, and would

have continued to be used if the Interstate highway had not been constructed.

The increased mobility provided by Interstate 5 enhances the opportunities for part-time farming, off-farm employment, and use of migrant farm labor. Public utility companies derive some advantages from the Federal-aid Interstate Highway System. Reduction of easement costs, and the facility with which maintenance and inspection can be accomplished are among the primary advantages. These savings are in turn passed on to the consumer to whatever extent possible.

IMPACT ON THE FARM OPERATION

The ease with which a farm can be efficiently and economically operated is directly related to the unity and organization of the farming operation. The right-of-way taking for a modern designed highway such as Interstate 5 can seriously upset the balance of these factors. The highway right-of-way not only removes productive agricultural land from use, but may cut and divide farms in a variety of ways. This can result in a variety of affects on the total farming operation and the overall plan of the farm.

Field Parcelling and Connectivity

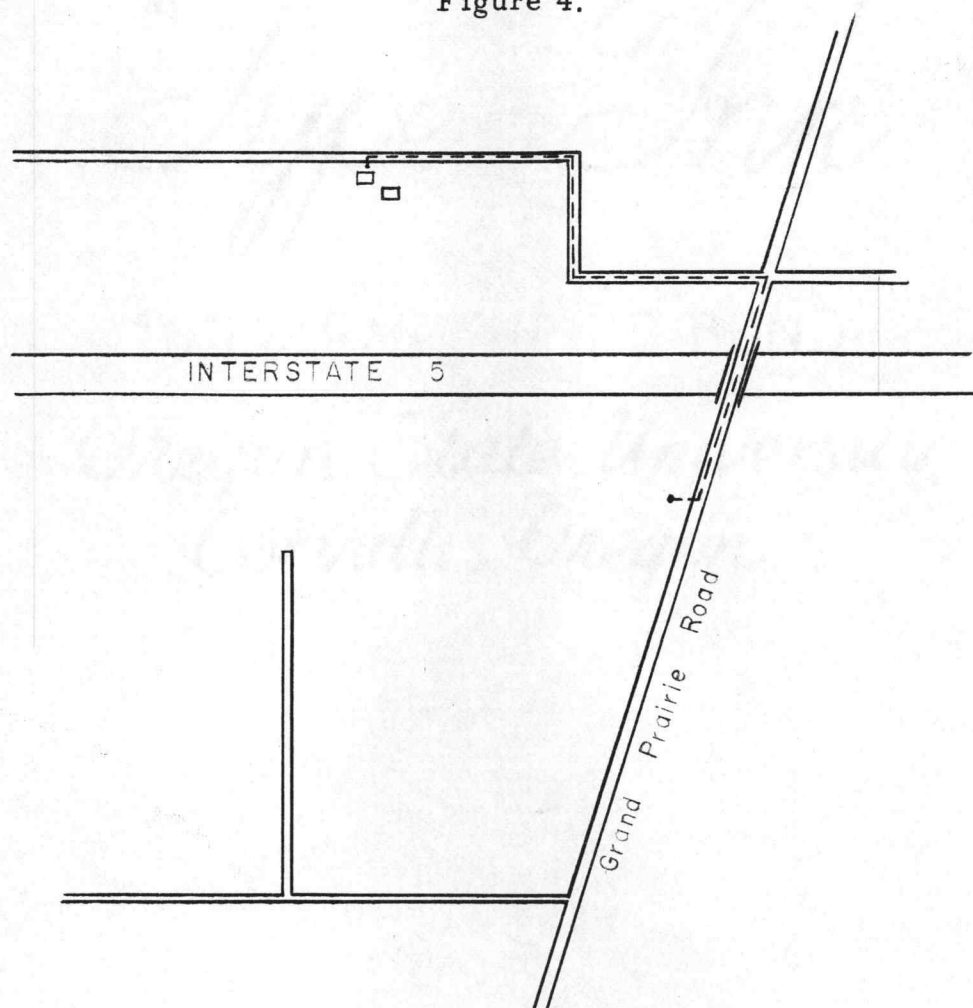
The impact of connectivity on parcelled agricultural land plays an important role in the farming operation. The alignment of Interstate 5 on the half section line resulted in the separation of fields on approximately 80 percent of the interview farms. This division of farm unity by the right-of-way left fields parcelled and/or of an uneconomical and insufficient size for farming. The parcelled fields range in size from 20 to 950 acres, with an average of approximately 230 acres. Access distance to these parcelled fields varied from a practically negligible distance to over five miles each way, depending on the location of the overpasses in relation to the farm headquarters. An average increase in access distance was approximately two miles each way. This increased access distance requires a considerable amount of additional time, money, and inconvenience to shuffle farm machinery back

and forth, inspect crop and field conditions, and to perform the various other tasks demanded of the farm operator. An estimate of the required trips to and from separated parcels was not made because of the difficulty encountered in obtaining an accurate measurement. Most farmers affected by additional travel had considerable difficulty in estimating the number of trips required to the separated fields because the use of the land separated from the farmstead and the changes in land use that occur from year to year on many farms affects the number of trips made. The other 20 percent of the farms affected by the right-of-way taking were never parcelled, that is, the right-of-way removed land only from the very end of the property (for an example see p.28 , Ex. 2).

In order to provide a cleared picture of the variety of ways in which farms can be parcelled by right-of-way taking, four examples are cited. These examples represent both the typical, and the extremes of what has happened in the study area. The "farm number" refers to the location as shown in Appendix Fig. 3.

Example: (1) (See Figure 4 and Appendix 4 Fig. B, 23). This farm represents the most typical type of farm parcelling. Approximately 17.83 acres of land were removed by the right-of-way taking. Access to the parcelled fields resulted in an increased distance (using the Grand Prairie Road) of approximately two and one-half miles each way.

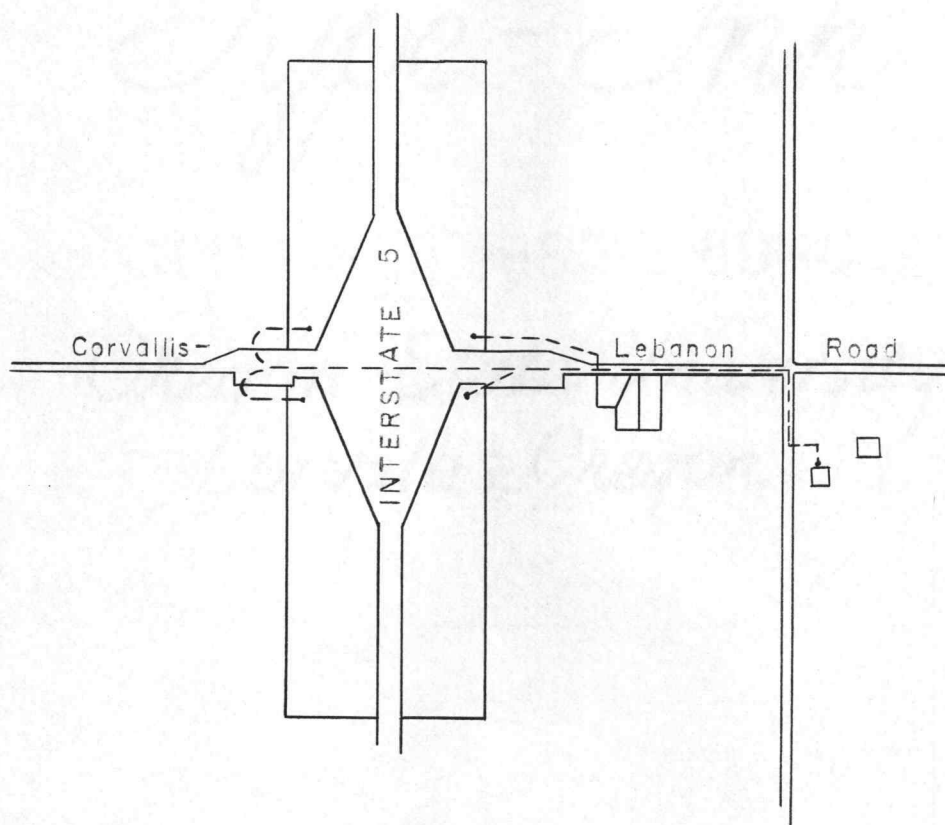
Figure 4.



Scale: 1" = 1 mile

Example: (3) (See Figure 6 and Appendix 4 Fig. B, 19). This farm is located at the Corvallis-Lebanon Highway Interchange. The house and utility buildings were removed by the right-of-way taking, and consequently the owner was forced to re-establish the headquarters of his operation. The right-of-way for the highway and interchange required 50 acres of productive land to be removed from use. Access to the land parcel on the opposite side of the highway resulted in very little increase in distance.

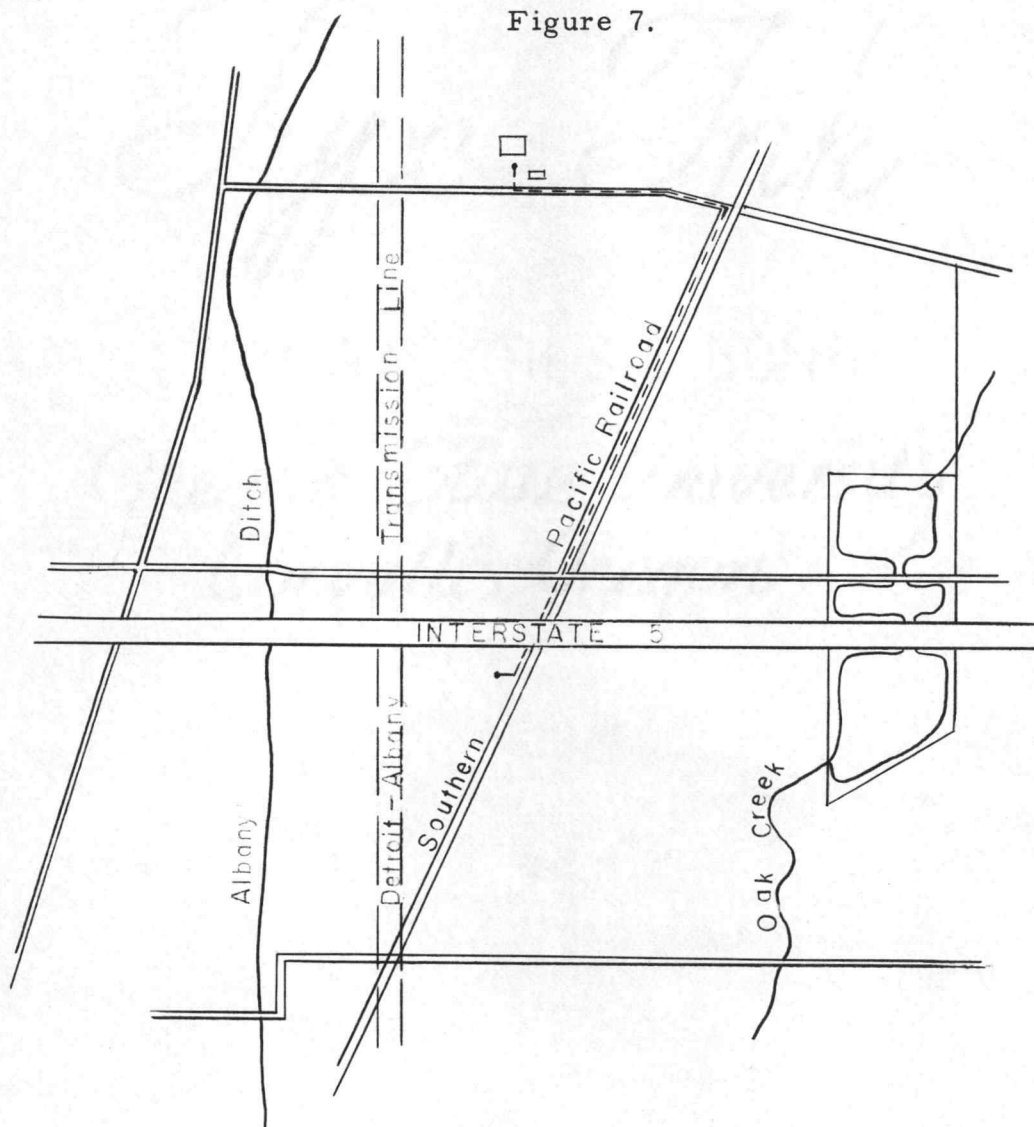
Figure 6.



Scale: 1" : 1 mile

Example: (4) (See Figure 7 and Appendix 4 Fig. B, 21). This farm is an excellent illustration of what can occur when the cultural action of man is exerted. This farm is traversed by a powerline, a railway, an underground gas line, a creek (Oak Creek), and Interstate 5. A 16 foot underpass adjacent and parallel to the creek provides access to the separated parcel. A total of 38 acres were lost to the right-of-way taking; 25 acres of farmland and 13 acres for a borrow pit.

Figure 7.



Scale: 1" = 1 mile

The Impact on Fields

The right-of-way taking for Interstate 5 not only removes productive land from use and parcels farms, but it is also responsible for changes in the number, size, and shape of the fields. There has been very little change in the general organization and ownership pattern of the fields in the study area. This has resulted in the number of fields increasing, and the size of the fields decreasing. These changes increase the costs of operation. Farmers prefer to farm large fields and it is economically sound to do so. Small fields require more turning which increases the time and cost of operating equipment, and often strains the machinery.

Interstate 5 which traverses Linn County on the approximate half section line did not, except in a few locations, greatly disrupt the field shapes. Figures 8 and 9 illustrate examples of detrimental field shaping found in the study area.

Drainage features brought about by the highway can also be a problem in the shaping of fields, although no extensive detrimental reshaping of fields was found as a result of drainage alterations in the study area. A number of drainage channels were rerouted, but it is very difficult to determine if the reorganization of drainage resulted in field shapes being in a poorer condition than before their addition.

Figure 8 of Dever Road provides a good example of what can transpire in a fairly normal situation near an interchange area. The lower, or south-east corner is shaped thusly:

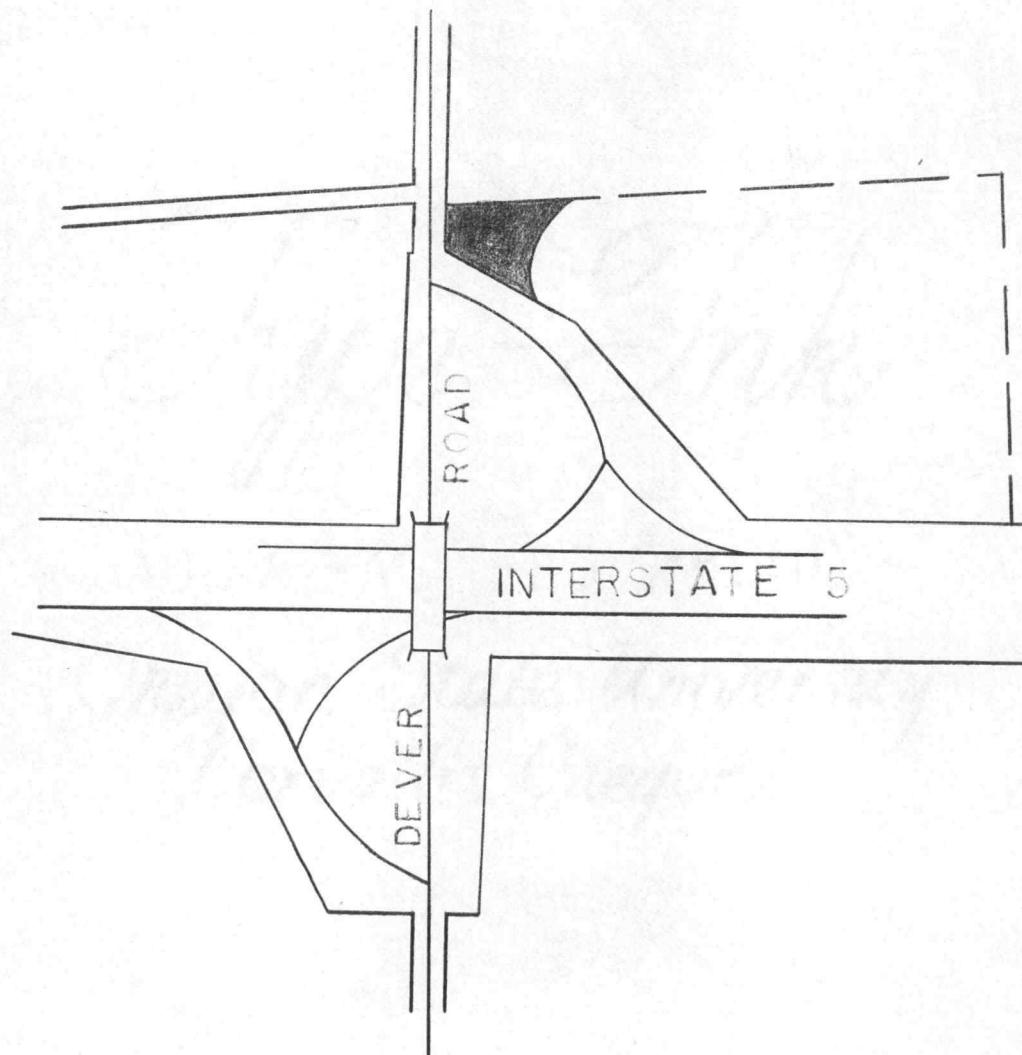


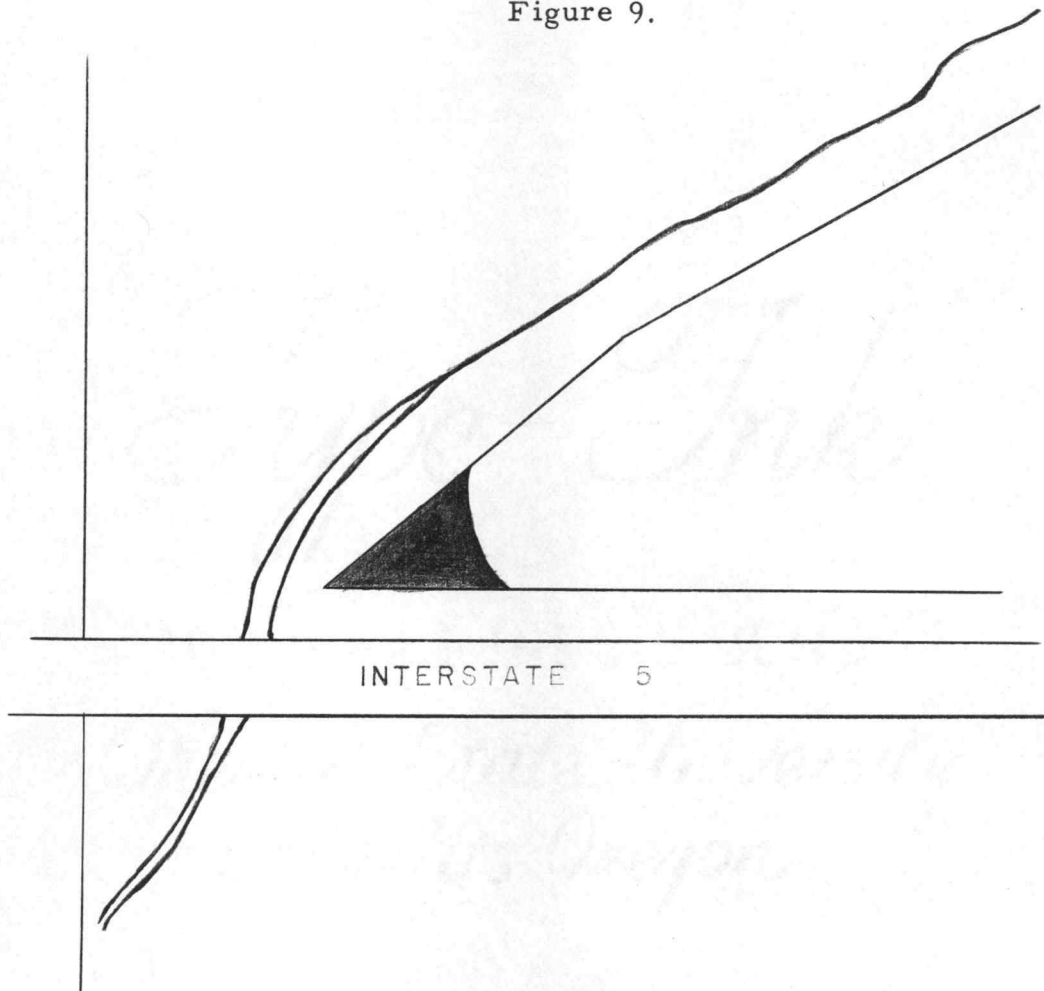
Figure 8.

Scale: 1" = 430'

Odd shaped fields such as this are inconvenient and time consuming to cultivate.

Figure 9 is an example which occurred where Interstate 5 and a creek bed intersect. This resulted in a triangular shaped field:

Figure 9.



Scale: 1" : 1 mile

The area at the tip of the triangle is relatively useless since cultivation machinery cannot operate in such narrow confines. The disuse of land is relatively larger for small fields than for larger fields. Triangular fields also cause extra time and costs to farm.

Alienation of Land Use

Some land uses are notably a product of favorable location. The construction of a modern superimposed highway such as Interstate 5 can play a very important role in altering the economic character and pattern of land use in rural areas. The economic and land use changes may stem from commercial and residential developments, or alterations in farm management. Further, it should be recognized that the examples of alienation in land use cited in this study represents a part of the estimated million acres of rural land in the United States that is converted to residential and commercial uses each year.

The ease of movement and the limited-access features of Interstate 5 concentrate traffic, and by-pass a number of cities and towns. In so doing, the distances between established service facilities for travelers are increased. This creates a demand for new service. The most logical location for these commercial developments is at the areas of access to the highway, the interchanges.

A better understanding of the total concept and impact that a limited-access highway such as Interstate 5 can have on the development and use of land is exemplified by Figures 10, 11, and 12. These Figures illustrate the changes in land use that can take place in a period of three years and eight months. This area is south and east of Albany at what is now the South Santiam Highway Interchange (for location note Appendix 4, Fig. A).



Figure 10.



Figure 11.



Figure 12.

Figure 10 was taken in August of 1957. It is readily discernible that the area was still primarily devoted to agriculture. The second, Figure 11, was taken two years later (Oct. 1959), after the construction of Interstate 5 and the South Santiam Interchange. Figure 12 was taken a year and one-half later than Figure 11 or a total of three years and eight months after Figure 10. The area directly south-east of the interchange now has a large restaurant, and truck sales and service facilities utilizing the land that was previously devoted to agriculture. The land directly south of the residential and business establishments (the lower edge of the picture) is now unproductive, and awaiting future development.

The area diagonally across from the south-east corner (the restaurant and trucking concern) fronting on South Santiam Highway has been sold for a motel site, and is also awaiting development. Information concerning the economic development of these commercial enterprises is presented in Case Study No. 33 and No. 34, Land Economic Survey, Right-of-Way File No. 25482, and No. 25606 (L-2839), Oregon State Highway Department, Right-of-Way Division, Salem, Oregon.

Changes similar to those cited can also be noted at other interchange areas. A restaurant and two automobile service stations have been built at the Corvallis-Lebanon Highway interchange since the construction of Interstate 5 (see Figure 13). The base photograph was taken in May of 1961; the overlay represents the present commercial developments. Also note farm parcelling example no. 3, Figure 6, which delineates the use previous to the



Figure 13.

right-of-way taking.

Automobile service station facilities are also found at the Conners Road interchange north of Albany. Other commercial investments, primarily those concentrated near the interchanges, will no doubt be developed as demand warrants. There is also the possibility of residential subdivisions being constructed in the future as Eugene and Albany continue to develop and expand their periphery of activity.

The changes in land use cannot be considered apart from that of land value. Theoretically, most of the impact of a highway is reflected in the changes of land values. It should be noted that because land transfers are infrequent and many factors affect prices paid for real estate, sales data are often an inadequate measure of the impact. The value of farms in the study area has been decreased, in general, by the advent of Interchange 5. Parcelled fields, and reduction in size and unity of farms were reasons given for decreases in value. The Bureau of Public Roads and the State Highway departments, in cooperation with a number of universities and others, have published various studies that emphasize the monetary advantages enjoyed by land owners when their adjoining farm land is converted to commercial and/or residential use. This economic factor, although worthy of adequate consideration, should be brought into its proper perspective. Interstate 5 will no doubt increase the general commercial productivity and wealth of all Linn County, but in an almost entirely rural area such as Linn County, the percentage of farm owners whose property is presently

in a advantageous location to derive such benefit is relatively small. The primary commercial property is at the location of an interchange. Interstate 5 has six interchanges and 63 farms in the study area. There is an average of approximately 1.5 property owners at each interchange area. This means that roughly 8.5 percent (5.4) of all the land owners are theoretically in a position to convert a portion of their land to higher value commercial property. Only three of the 27 operators interviewed anticipated monetary gains through the conversion of farm land to higher value uses in the near future. In coming years, perhaps within several decades, the areas intermittent between the interchanges may become, to some extent, converted into residential and commercial property as the periphery of suburban activity increases. Several recent studies concerning land economics and suburban development in areas somewhat similar to the study area are: Value Trend Studies, Educational Report No. 3, and Land Economics Survey - Remainder Parcel Studies, Legal and Right-of-Way Division, Oregon State Highway Department, Salem, Oregon.

The advent of Interstate 5, and its relationship to the changes in farm management and in the types of agricultural enterprises carried on within the farm is very difficult to assess as there is a large variety of determining influences. The study area has experienced relatively minor changes in land use since the construction of Interstate 5.

Several farm operators have somewhat alleviated their adjustment problems brought about by the right-of-way taking by

changing from the cultivation of seed crops to the raising of live-stock, especially cattle. This adjustment is particularly effective on the smaller remainder parcels since cattle require relatively little care, and the machinery movement problem is minimized.

The leasing of winter pasturage to ranchers who truck sheep from the more southern portions of the state, has become increasingly popular with the farm owners in the study area in the last few years. This increase, by its very nature, is difficult to identify as a resultant adjustment and/or advantage brought about by Interstate 5. It is the author's opinion that the increase in the leasing of winter pasturage in this area would have continued to expand without Interstate 5. The advent of the highway did not hamper the movement of sheep, but the highway conditions on the old Highway 99 were reasonably adequate so as to not make the movement of large numbers of sheep unfeasible. The volume and organization of this type of operation is, in itself, of the quality to demand expansion.

Changes in land use also are exemplified by the recreation developments such as roadside parks and scenic turnouts. Oak Grove Rest Area located in the southern part of the County represents just such an area. This rest area, although a beneficial amenity to the average motorists, nevertheless removes 22 acres of productive agricultural land from use, and is also responsible for odd shaped fields.

Changes in tenure structure have also taken place in the study area. Judging from the response of the farm operators, the

renting and leasing of property in the study area is increasing. Approximately 25 percent of the operators were involved in a variety of rental and lease agreements, either as a partial tenant or partial landlord, or a combination of both. The word "partial" is used to distinguish the fact that none of the 25 percent of the individual farm operators interviewed were fully a tenant or landlord, but a combination of land owner and tenant, or land owner and landlord. Most of the rental agreements are designed to ease the reorganization and adjustment problems associated with the right-of-way taking. The leasing and the renting of property is especially popular when the remainder parcel is of an insufficient size to farm economically. This also is favorable when the right-of-way has taken a large percentage of productive land from an individual farm. The reduction of productive land from a farm results in a loss of income, and since the farmer has of previous necessity, the time, equipment, and storage facilities for a larger operation, the renting and leasing of more land is often advantageous.

It is considered that these examples of changes in land use and land management, although limited to that of the study area, represent in the broadest sense, fairly typical situations found in most rural areas traversed by an Interstate highway.

Miscellaneous Impacts

The miscellaneous factors are often obscure and overlooked in the light of the more obvious influences such as reduction of land and farm unity. A single factor or a combination of these factors

can play a very important role in the overall operation and general well-being of the individual farm.

The miscellaneous problems attributable to the highway can be summarized as follows: (1) the loss of water rights. Damages may result from the isolation of a remainder parcel from the water supply at the home place. This can also apply to the electrical power needed for well pumps, buildings, and future operational expansion. Water and private electrical lines cannot cross over or underneath an Interstate highway due to the concessions required for construction and safety. This can result in a nearly impossible and/or very uneconomical situation to obtain water and electrical power on the isolated remainder parcels.

(2) Distruption of the overall farm plan. This was a very common complaint by operators whose farms were left parcelled. There are a variety of adverse effects aside from such apparent factors of field access and loss of productive land. Operators, due to the elevated highway blocking their view, can no longer observe all of their property from the home place as they previously could. This requires special trips to the parcelled field(s) on the opposite side of the highway to check on livestock, field conditions, trespassers, fencing, and other general management conditions. The right-of-way taking disrupts the relationship of the entire farm. The disorganization and/or partial removal of houses, utility buildings, barns, farm roads, and field design reduce the economic advantages of not only the farm income, but it is also reflected in the sales price of the farm.

(3) Increased weed danger. This is particularly a problem in the study area as much of the land is devoted to the production of seed crops. The State Highway Department does and will spray along the right-of-way, but the spraying intervals are usually variable, and not sufficiently thorough. The prevention of noxious weeds usually requires additional effort by the farm operator. Several operators reported a serious increase in damage from noxious weeds along the highway. Others reported reasonable results after three or four contacts with the Highway Department. Another problem also exists in that spraying and fertilizing by aircraft is impossible in fields adjacent to the highway since the residue of the sprays and fertilizers may endanger the safety of the motorists.

(4) Fencing. Fencing by the Highway Department to mark right-of-way boundaries was found to be of high quality, and was in general, well received by the farm operators, although several complained that fencing in the vicinity of overpasses and large drainage ways has caused some additional problems related to containing livestock. The costs of farm liability insurance taken by operators also was reported to be increased due to the additional risk of livestock-automobile accidents on the highway.

(5) Noise and Demands of Stalled Motorists. These were common complaints voiced by the farm operators. The degree of exasperation varied with the distance of the home place from the highway. The fairly recent advent of several 24 hour automobile service stations located along the Linn County segment of

Interstate 5 has considerably relieved the solicitation from stalled vehicles. The establishment of commercial facilities such as automobile service stations, restaurants, and other services do in reality, increase the amenities of rural living for the majority of the local populace. Recognition of increased care of access roads, and the availability of 3-phase electricity were other reported benefits prompted by commercial establishments.

(6) The detriment to social and natural environment. A serious reduction of environmental and personal values due to the highway was reported as deleterious by 25 percent of the farm operators. The degree of complaints was again dependent on the location of the individuals home place. Detrimental examples cited by the farm operators were as follows: A grove of trees or some other local beauty spot being replaced by an elevated, four-lane, concrete highway, or perhaps a borrow pit. A wall of fill for an overpass or the elevated roadbed blocking the view of the landscape. A home and service buildings immediately adjacent to one of these fill areas is exemplified by farm 13, Figure 14. This not only detracts from the farm value and the esthetic advantages once enjoyed on the homeplace, but it also impairs the utility of service buildings, and hampers local drainage. The freedom of hunting on one's own property is also reduced. The farmer must now be very careful not to aim his rifle in the direction of the nearby highway. Also reported was the decrease of local wildlife, especially birds. Several farm operators commented that they could not hear the birds even if they were there because of the noise of the passing



Figure 14.

traffic on the highway several hundred feet away. Several other operators reported that they enjoyed watching the passing traffic on Interstate 5.

(7) Interchange need. A number of farm operators stated that an interchange rather than an overpass would be preferred. This complaint was predominant in the area between the Corvallis-Lebanon interchange and the Halsey-Sweet Home interchange, a distance of 11.52 miles. A petition signed by 600 people residing in this area requested that one of the five overpasses be converted to an interchange. The State Highway Department does not feel, and perhaps rightfully so, that there is, as of yet, sufficient need for an interchange in this area.

(8) Other influences. Changes in school bus schedules, and changes of fire districts were also reported as being a disruption of normal routine.

Owner Attitude

The monetary and physical results attributed to Interstate 5 serve to modify social and personal environment of the farm operator. It is recognized that the development of modern transportation corridors represent a needed step toward the future, but there nonetheless exist certain personal goals and values that money cannot buy. This human element is perhaps the most important aspect, and should be brought into proper focus. Anything that disrupts a person's way of living and the entire labor of his life, and reduces the opportunity to achieve his life's goal is infringing upon his

rights as a human being. Most of these farm operators had planned to live their lives on the soil that they and their forefathers had built up and cultivated during their lifetimes. They are now confronted with changes that may completely alter their entire life.

A resume of owner attitudes regarding general overall opinion of the right-of-way taking and its effect on their agricultural operation was compiled during the course of interviewing. Although numerous comments were expressed, two statements can best represent the general consensus of those farm operators that were interviewed. These are as follows: (1) "If the land had to go, we're glad it went for the highway, but we did not care for the Highway Departments' approach". (2) "We did not have much choice, but I would take back my original set up anytime"... Other operators were fairly passive and commented that it was just one of those things. Some added that they were not pleased at all when the highway was first constructed, but recent adjustments in their farming operation, the construction of automobile service facilities, and various other factors had alleviated many of the problems previously encountered. The degree of contentment in reference to the right-of-way taking, very nearly paralleled the total amount of disruption and/or monetary interest that confronted the individual operator. That is, land owners whose property was in a location that promised increased income from conversion to higher value uses (i.e.: farm land to commercial and/or residential uses), or those whose property unity was relatively unaltered (i.e.: removal of land only off the end of their

property, or immediate access to an overpass joining the parcelled property) were, in general, fairly pleased with the overall situation in comparison with those property owners who encountered economic and organizational problems. It was stated by a number of operators, however, that they felt that many of their passive neighbors did not realize that the highway was a permanent structure.

Many of those interviewed hoped that within the next decade beneficial arrangements for reorganization of their farm land could be worked out. That is, buying and trading property so that their farms would be in contiguous units. Some of the farm operators who have made satisfactory adjustments expressed the idea that it was only through relatives and good neighbors that land reorganization was less of a problem. These operators were able to work out agreements with their relatives and neighbors that simplified and removed parcelled fields, and/or alleviated other undesirable reorganization problems associated with the right-of-way taking. Several operators had bought new farms and were planning to move. Others stated they were waiting until their children were out of school before they moved.

As a codicil of the influencing factors that Interstate 5 has had on agricultural land in Linn County, imagine the total impact if the average farm size was 40 acres. The number of farms and farm operators would be more than eightfold what it presently is in the study area. Also, the highway right-of-way would remove a much larger percentage of land from use on the individual farm. This situation would multiply the conflicts and problems of the farm

operators, but in so doing, it also would increase the number, and hence the power of the property owners involved.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the foregoing analysis of the impact of Interstate 5 in the Linn County area, the following conclusions and recommendations are made:

Conclusions

1. The right-of-way taking for Interstate 5 makes definite inroads on agricultural land. Interstate 5 removes an average of 39 acres of farm land per mile leaving 80 percent of the farms parcelled. The national implications are clear when it is recalled that more than 80 percent of the tentative 41,000 miles of the Interstate highways will pass through rural land; therefore, most of the impact will occur in agricultural areas.

2. The right-of-way taking is in conflict with environmental and personal values. Induced problems of drainage, connectivity, and distortion in sizes and shapes of fields, along with dissatisfaction over negotiations with the Highway Department were common complaints voiced by the farm operators. Changes in land use and land value were not advantageous, for the most part, to the farm operator.

4. Cultivable land taken by the right-of-way for Interstate 5 fortunately was mainly of lower quality. The higher the quality of the land, the greater the detriment is to the agricultural base of not only the individual farm, but of the nation as a whole.

5. The right-of-way taking for Interstate 5 had a greater impact on the operation of the average farm than indicated by the

actual loss of productive land, through increasing drainage problems, alienation of land use, etc.

6. The beneficial influences for agriculture in the study area are minor in comparison with the detrimental influences brought about by Interstate 5.

7. A large majority of the farm operators in the study area stated that, "they would gladly take back their original set-up (previous to the right-of-way taking) anytime".

Recommendations

It is recommended that:

1. Personable and experienced personnel should be employed for appraising and negotiating with farm operators. It is the authors opinion that much of the resentment, animosity and expenditure of public money in court room procedure could have been avoided by more tactful consideration on the part of the highway negotiators.

2. The State Tax Commission should standardize the taxing of compensation awards.

3. In planning the alignment of highways, consideration should be given to the soil quality and capability; soil scientist and agronomist should have a voice in decision making. It is not conceivable that modern designed highways can be constructed entirely upon low-quality lands, but it would appear desirable that the land capabilities be considered and low qualities be used when there is an alternative.

4. Farm operators should avail themselves of opportunities to learn about the highway project. The most successful operator is the one who realizes the problems associated with the construction of a limited-access highway, and adjusts his farming operation accordingly.

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MAPS:

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Highway Photographs. Contributed by the Oregon State Highway Department. F. Jeter, Administrator of Photogrammetry. Photos also taken by the author.

APPENDICES

APPENDIX 1

INTERVIEW CHECKLIST

Property location:

Name of present property owner:

Address:

Owner's occupation:

Have you changed your occupation as a result of the right-of-way taking:

Type of enterprise for which the land is utilized:

Acreage rendered for right-of-way taking and/or change in total farm size associated with right-of-way taking:

Were any buildings removed by right-of-way taking?

After land acquisition agreement was land still in separated parcels? _____

If "yes", number of acres separated from headquarters by highway:

Accessibility of separated tracts to farm headquarters (i. e. road, landlock):

Increased distance from farm headquarters to separated tracts (in miles):

Has there been any significant changes in the tax base of the owners adjacent land after the right-of-way acquisition?

Have there been any significant marketing changes owing to the increased mobility of the "highway"? Remarks:

Was settlement price agreeable?

Acquisition price:

Has any real estate transaction other than the Highway Department acquisition taken place after knowledge of right-of-way need? _____

If "yes", has owner altered and/or adjusted to another means of income for reasons associated with building-location of the highway? _____

If "yes", the nature of the enterprise and reasons for:

What additional facilities does the operator enjoy (i.e. fire, police, establishments providing a nearer proximity to entertainment, groceries, automobile facilities, etc.)?

What undesirable features were brought about by right-of-way sectioning other than if parcelling and/or acquisition price settlement were involved (i.e. triangular and/or odd shaped fields - obstructing or reducing productivity and/or ease of operation; increased weed danger; fencing; erosion, etc.)?

General overall opinion of the right-of-way taking, and its effect on agricultural operations:

Miscellaneous remarks:

APPENDIX 2

Soil Descriptions

| Soil Series | Soil Capability | Soil Type (Topsoil Texture) | Effective Depth (inches) | Subsoil Permeability | Slope % | Soil Color | -pH- Soil Reaction | Inherent Fertility | Available Moisture Capacity (inches) | Infiltration Rate Inches per hour | Parent Material |
|-------------|-----------------|-----------------------------|--------------------------|----------------------|---------|----------------------|--------------------|--------------------|--------------------------------------|-----------------------------------|-----------------|
| Willamette | I | Silt loam | 60 | Moderate | 0-2 | Grayish brown | 6.1 | High | 12.5 | .80-.80 | Alluvium |
| Amity | IIw | Silt loam | 60 | Moderately slow | 0-2 | Dark gray- ish brown | 5.8 | Moderate | 9.0" | .20-.80 | Old alluvium |
| Concord | IIw | Silt loam | 60 | Moderately slow | 0-2 | Gray | 5.2 | Moderate | 9.0" | .20-.80 | Old alluvium |
| Chehalis | IIe | Gravelly silt loam | 60 | Moderate | 0-2 | Brown | 6.2 | High | 10.0" | .80-2.50 | Alluvium |
| Newberg | IIe | Sandy loam | 60 | Rapid | 0-2 | Brown | 6.0 | Moderate | 6.5" | 2.50-5.00 | Sandy alluvium |
| Woodburn | IIs | Silt loam | 60 | Moderate | 0-4 | Grayish brown | 5.8 | Moderate | 9.0" | .80-2.50 | Old alluvium |
| Clackamas | IIIw | Gravelly loam | 20-60" | Moderate | 0-2 | Dark gray- ish brown | 5.8 | Moderate | 5.0" | .80-2.50 | Old alluvium |
| Holcomb | IIIw | Silt loam | 20-30" | Moderately slow | 0-2 | Grayish brown | 5.5 | Moderate | 5.5" | .05-.20 | Old alluvium |
| Wapato | IIIw | Silty clay | 60 | Moderately slow | 0-2 | Grayish brown | 5.8 | High | 6.0" | .20-.80 | Alluvium |
| Dayton | IVw | Silt loam | 15-20" | Moderately slow | 0-2 | Gray | 5.6 | Low | 2.5" | .05-.20 | Old alluvium |
| Whiteson | IVw | Silty clay | 15-20" | Slow | 0-2 | Gray | 5.8 | Low | 2.5" | .05-.20 | Old alluvium |
| Cove Clay | IVw | Clay | 15-20" | Very slow | 0-2 | Black | 6.4 | Moderate | 6.0" | .05-.20 | Old alluvium |
| Winkle | IVw | Silty clay | 15-20" | Slow | 0-8 | Dark gray | 5.8 | Low | 2.5 | .05-.20 | Old alluvium |
| Courtney | IVw | Silty clay | 15-20" | Slow | 0-2 | Gray | 6.2 | Low | 5.0" | .05-.20 | Old alluvium |

Soil Descriptions Continued.

| Soil Series | Soil Capability | Soil Type (Topsoil Texture) | Effective Depth (inches) | Subsoil Permeability | Slope % | Soil Color | -pH- Soil Reaction | Inherent Fertility | Available Moisture Capacity (inches) | Infiltration Rate Inches per hour | Parent Material |
|-------------|-----------------|--------------------------------|-----------------------------|----------------------|---------|------------|-----------------------|--------------------|---|--------------------------------------|-------------------|
| Reed | IVw | Silty clay | 15-20" | Slow | 0-2 | Gray | 5.4 | High | 6.0" | .05- .20 | Alluvium |
| Tangent | IVw | Clay | 15-20" | Very slow | 0-2 | Black | 6.4 | Moderate | 6.0" | .05- .20 | Old alluvium |
| Camas | IVs | Gravelly sandy loam | 15-20" | Rapid | 0-2 | Brown | 6.3 | Low | 3.0" | 5.00-10.00 | Gravelly alluvium |

APPENDIX 3

APPENDIX 3A

PERSONAL INTERVIEWS

PUBLIC SERVANTS:

1. Bray, William M. Right-of-way technician. Ore. State Highway Department, Salem. 1963.
2. Brown, Al. Linn County Assessor, Albany, 1963.
3. Carnegie, Orris. Linn County Surveyor, Albany, 1963.
4. Cochran, William J. Assistant Administrative Officer, State Soil Conservation Committee, 1963.
5. Couper, J. Drafting Supervisor, Ore. State Highway Department, Salem, 1963.
6. Egan, Adele L. Assistant right-of-way office manager. Ore. State Highway Department, Salem, 1963.
7. Harthhorn, Jess B. Area Conservationist, Soil Conservation Service, Albany, 1963.
8. King, Arthur S. Extension Conservation Specialist (Professor, O.S.U.), Corvallis, 1963.
9. Mullins, Velda D. Sec. U.S.D.A., Agri. Econ., Corvallis, 1964.
10. Olds, C.R. Work Unit Conservationist. Soil Conservation Service, Harrisburg, 1963.
11. Pease, Edwin A. Construction Office Engineer, Ore. State Highway Department, Salem, 1963.
12. Teal, Ray H. Extension Seed & Grain, Marketing Specialist (Associate Professor, O.S.U.), Corvallis, 1964.
13. Wright, Walter T. Right-of-way Engineer, Ore. State Highway Department, Salem, 1963.

APPENDIX 3B

PERSONAL INTERVIEWS

FARM OPERATORS:

| | |
|---------------------------------|------|
| 1. Willoughby, H. F. | 1963 |
| 2. Miller, C. D. | 1963 |
| 3. Malpass, D. C. | 1963 |
| 4. Wassom, A. C. | 1963 |
| 5. Christensen, A. C. | 1963 |
| 6. Lynch, M. J. | 1963 |
| 7. Vannice, J. H. | 1963 |
| 8. Carey, E. E. | 1963 |
| 9. Roberts, V. C. | 1963 |
| 10. Garwood, E. S. | 1963 |
| 11. Cooper, C. C. <u>et al.</u> | 1963 |
| 12. Schmucker, E. | 1963 |
| 13. Ropp, D. M. | 1963 |
| 14. Glasser, F. T. | 1963 |
| 15. Jenks, P. | 1963 |
| 16. Grell, F. | 1963 |
| 17. Conrad, O. M. | 1963 |
| 18. Grell, H. | 1963 |
| 19. Olson, O. | 1964 |
| 20. Roth, E. | 1963 |
| 21. Holloway, E. H. | 1963 |

APPENDIX 3B (Continued)

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|-----|-----------------|------|
| 22. | Randolph, J. O. | 1963 |
| 23. | Kennel, E. W. | 1963 |
| 24. | Hess, S. | 1963 |
| 25. | Shelby, N. V. | 1963 |
| 26. | Higbee, E. J. | 1963 |

APPENDIX 4

APPENDIX 4
National
Interstate
Highway Route 5,
The Linn County
Segment (attached as
a seperate file)