

KINLEY



AVERY

D=1030'

WALKER

WILLIAMS

STEEL

ALIGNMENT F - 1
SHEET 1 of 3
SCALE 1" = 800'
FIGURE S - 5

SILVERS

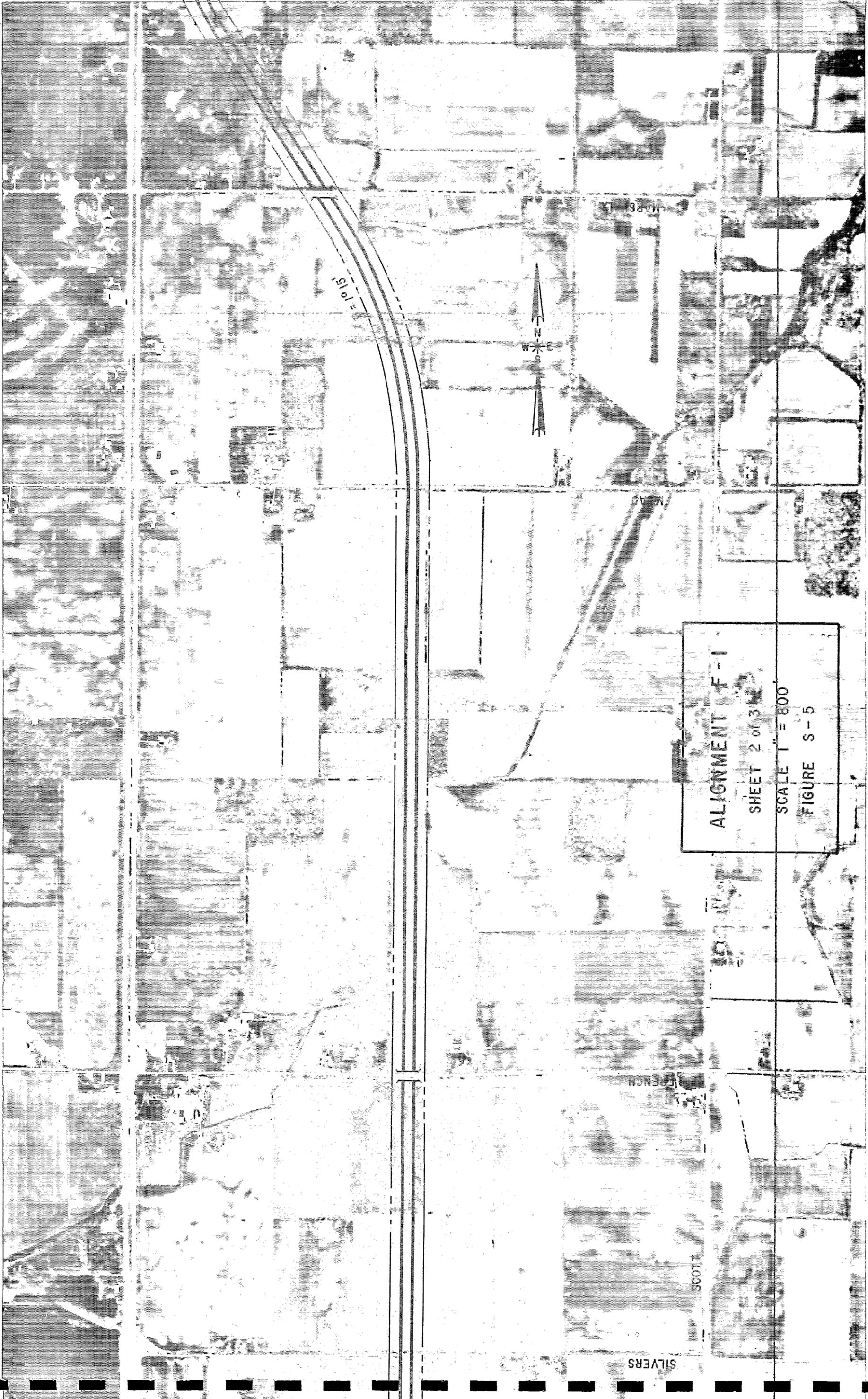
COLONY

KINLEY

AVERY

D-10301





ALIGNMENT F-1
SHEET 2 of 3
SCALE 1" = 800'
FIGURE S-5

SILVERS

SCOTT

LORREN

MAY

10/51



D = 1930

D = 1

U.S. 27

MAPLE RAPIDS

HYDE

SCOTT





ALIGNMENT F-1
SHEET 3 of 3
SCALE 1" = 800'
FIGURE S-5



GRATIOT

B-1030

24,400 trips are expected over the facility on the average day while north of Maple Rapids Road, a traffic volume of 27,500 is anticipated.

Usage levels along US-27 from St Johns to Maple Rapids Road are expected to average only 3,000 trips per day if Alternative F-1 is implemented. Most of these travelers would be local users with either trip origins or destinations in St. Johns or just immediately north of the City along US-27. At this level of usage, US-27 traffic in 1995 would be reduced to less than one-third of present levels. Diversion to the F-1 Alternative would be the reason behind the reduction.

Traveler Costs - It is useful to examine the effect of the length of each new freeway alternative on the vehicle operating costs borne by each frequent traveler on the freeway. Many such travelers would be using the facility to reach work destinations in St. Johns or to the south of St. Johns. Others might make daily usage of the facility for agri-business trips to similar destinations. If it is assumed that this typical frequent traveler also makes one round-trip over the facility during each weekend, then it is possible to estimate these travel costs for each freeway alternative and then to examine the potential savings that short alternatives can offer.

In Table S-1 a comparison has been made between Alternative F-1 and Alternative G (Partial), which was recommended in the previous study. Alternative F-1 is 10.0 miles long between Route M-21 and the Maple River while Alternative G (Partial) is 10.4 miles long between the same points. This difference in length (0.4 miles) accounts for the difference in annual vehicle-miles of travel displayed in the Table. By multiplying the length of the alternative by the number of trips per year (624 trips in each case), the annual vehicle-miles of travel over Alternative F-1 can be determined as 6,240 and 6,490, for Alternative G (Partial). Applying 18 cents per vehicle-mile would produce \$1,123 annual vehicle operating costs for Alternative F-1, and \$1,158 costs for Alternative G (Partial). Savings to the traveler would then amount to \$45 per year if Alternative F-1 were implemented rather than Alternative G (Partial). These are due entirely to the difference in length between the two alternatives which would be the additional distance traveled on each trip at a cost of 18 cents a mile.

Safety

Accident data files from historic records of the Michigan Department of State Highways and Transportation were used to estimate accident rates that were applied to projections for travel on

Table S-1
 FREQUENT TRAVELER COSTS
 EACH YEAR
 (1976 Dollars)

| | <u>LENGTH</u> (Miles) | <u>TRIPS</u> (1) <u>PER</u> <u>WEEK</u> | <u>TRIPS</u> (1) <u>PER</u> <u>YEAR</u> | <u>ANNUAL</u> <u>VEHICLE</u> <u>MILES OF TRAVEL</u> | <u>VEHICLE</u> (2) <u>OPERATING COSTS</u> <u>PER MILE</u> | <u>ANNUAL</u> <u>COSTS</u> | <u>COST</u> (3) <u>DIFFERENTIAL</u> |
|----------------------------|--------------------------|---|---|---|---|-------------------------------|--|
| Alternative F-1 | 10.0 | 12 | 624 | 6240 | \$ 0.18 | \$ 1,123 | \$ 45 |
| Alternative G (Partial) | 10.4 | 12 | 624 | 6490 | \$ 0.18 | \$ 1,168 | \$ 0 |

(1) A frequent traveler is expected to make an average of one round-trip per week day and one round-trip over each weekend during the entire year. This might be the travel pattern of many residents of the area presently using US-27 for work trips to St. Johns or south of St. Johns. In all cases, the trip occurs over the entire length of the Alternative.

(2) Energy Statistics, U.S. Department of Transportation, August, 1976, Table 3-8, P. 71.

(3) Annual savings as compared with Alternate G (Partial).

SOURCE: Wilbur Smith and Associates

both Alternative F-1 freeway and US-27 to produce forecasts of the likely number of accidents that may occur from operations in 1995. Upon this basis, a valid comparison of alternatives is possible since the degree of inherent safety in operations is revealed.

The data files revealed average accident rates for rural freeway --applicable to each of the alternatives--and different rates on various segments of existing US-27. On rural freeways in Michigan, accidents have occurred at a rate of 114.3 accidents for every 100 million vehicle-miles of travel. Fatal accidents on rural freeways in Michigan have occurred at a rate of 1.9 fatal accidents per 100 million vehicle-miles. These rates were used in the analysis of accidents that may occur from operations in 1995 along Alternative F-1 freeway.

Accident experience on existing US-27 revealed a much higher rate due in part to the lack of access control and conflicting paths of vehicles from turns and crossings. Driveways are frequent along the route and as a consequence, slow-turning vehicles are a common occurrence that also contributes to the higher accident rate. An accident rate of 767 accidents per 100 million vehicle-miles was found to be average of US-27 traffic operations between St. Johns and the Maple River.

Applying traffic assignment data and the rates to the segment lengths of Alternative F-1 produced an estimate of 1995 accidents (Table S-2). During 1995, 103 accidents are expected to occur on the freeway facility. Of these, 1.7 fatalities are anticipated.

Meanwhile, other traffic operations will be taking place on US-27 where other accidents will occur. These are expected to number 73 accidents with 0.4 fatalities during 1995.

A composite statement is then possible by combining the forecasts for Alternative F-1 operations with the forecasts for traffic remaining on US-27. Together, a total of 179 accidents are expected with 2.1 fatalities during 1995 if the operations follow the present accident experience trends used in this analysis.

Natural Systems Impact

The woodlots adjacent to Alignment F-1 are classified by the Department of Natural Resources as being important for providing habitat for many species of animals. Details of wildlife and timber values are presented in Appendix G of the Draft Alignment EIS. Alignment F-1 could have an impact on two woodlots.

Alignment F-1 crosses the Hayworth Creek floodplain for approxi-

Table S-2
 PREDICTED 1995 ACCIDENT DATA
 Alternative F-1

| FACILITY | HIGHWAY SECTION | | LENGTH (Miles) | ADT (1) | ACCIDENT RATE (2) | ACCIDENTS PER YEAR | FATALITY RATE (3) | FATALITIES PER YEAR |
|----------------------------|------------------|------------------|-------------------|---------|----------------------|-----------------------|----------------------|------------------------|
| | From | To | | | | | | |
| <u>Freeway Alternative</u> | | | | | | | | |
| <u>F-1</u> | | | | | | | | |
| | M-21 | Maple Rapids Rd. | 8.3 | 24,400 | 114.3 | 84 | 1.9 | 1.4 |
| | Maple Rapids Rd. | Maple River | 1.7 | 27,500 | 114.3 | 19 | 1.9 | 0.3 |
| | <u>Subtotal</u> | | 10.0 | | | 103 | | 1.7 |
| <u>Existing US-27</u> | | | | | | | | |
| | M-21 | Maple Rapids Rd. | 7.3 | 3,000 | 767.0 | 61 | 4.3 | 0.3 |
| | Maple Rapids Rd. | Maple River | 1.7 | 2,500 | 767.0 | 12 | 4.3 | 0.1 |
| | <u>Subtotal</u> | | 9.0 | | | 73 | | 0.4 |
| | <u>TOTAL</u> | | | | | <u>176</u> | | <u>2.1</u> |

- (1) Average Daily Traffic
 (2) Total Accidents per 100 million vehicle miles for 1975
 (3) Total Fatalities per 100 million vehicle miles for 1975

SOURCE: Wilbur Smith and Associates

mately one mile. Basically this area is referred to as the muck area. The muck ranges from one to approximately six feet in depth.

Due to the depth and type of glacial till in the area, bedrock water sources will not be affected. This alignment will not have a significant affect on the adjacent buried deposits of outwash for water supply.

Alignment F-1 traverses two possible recharge zones of the ground water systems (Figure 21). These are north of M-21 and south of the Maple River. Bedrock aquifers, principal sources of water supply in the Study Area, will not be directly affected by this alignment.

Most of the drains crossed by Alignment F-1 are traversed perpendicularly. This will minimize erosion and interference with drainage patterns. Alignment F-1 runs parallel to the St. Johns Big Ditch north of the city for a distance of approximately a mile, and parallel to another drain, east of St. Johns between the Grand Trunk Western Railroad line and Stony Creek, for about two miles. The alignment is situated in the Maple River Drainage Basin and the tributaries that feed the basin.

De-icing operations will result in approximately 50 tons of sodium chloride being spread on the road surfaces each year in the Study Area. Most of this salt will eventually be deposited in the Grand River system via the Maple River.

Social Impact

The displacement of agricultural land is common to each of the alignment alternatives. For evaluation purposes, this impact criteria has been divided into two categories, Agricultural and Prime Agricultural (Class I and II soils) lands. An average of 300 feet has been used for computing the right-of-way (ROW) requirements for construction.

Total land requirements for Alignment F-1 is approximately 469 acres. It is estimated that 86 percent (300 acres) of the acres is agricultural land. Within the agricultural acreage approximately 80 percent is classified as prime agricultural land or 315 acres. Included in the total acreage requirements is the land necessary for the Maple Rapids Road interchange.

Several sites of interest are located in the vicinity of Alignment F-1. These include two Centennial Farms and two potential archeological sites. Right-of-way acreage required from the Centennial Farms will be acquired from the side or rear of the

farms. The structures located on the farm will not be affected. The exact location of the potential archeological sites is not known. After an alignment is selected and prior to final design an archeological survey will be conducted prior to construction, if requested by the State Archeologist (Appendix S-A).

Alignment F-1 has approximately 3 miles of roadway that crosses the section line grid at skew angles. This could result in irregularly shaped parcels of land that constrain agricultural production.

Twelve parcels of land will be divided by Alignment F-1. Six of these parcels are farms that range between 100 and 200 acres each and one that has approximately 300 acres. The degree of impact from severance depends upon the amount of land required, access, size and type of farming operations (i.e. cash crop, dairy, feedlot, etc.). Economic Impact on the small operations will be significant, but at the same time an adverse impact will be inflicted upon the larger operations because of the volume of land and equipment required to continue a viable operation.

The F-1 Alignment passes through the St. Johns School District. This alignment if implemented proposes to close Steel Road, Walker Road, Kinley Road, Silvers Road, Mead Road and Gratiot Road. These road closings should require minimal changes in the bus circulation systems. This alignment will displace approximately 40 children (1%) attending classes in the St. Johns School District. It is probable that the displaced families will relocate in close proximity to their present habitat with a net result of no change in school enrollment.

Alignment F-1 will not adversely affect emergency and fire protection services for the surrounding area. It is anticipated that services will be more efficient and expedient because of less conflict with traffic on US-27.

Relocation

The F-1 Alignment will displace approximately 21 single family structures and 4 mobile homes. In addition Alignment F-1 will require acquisition of one commercial structure and 21 farm buildings. Alignment F-1 will remove approximately 2 acres of commercial land, 68 acres of residential land and 399 acres of agricultural land from the tax books of Clinton and Gratiot Counties.

Economic Impact

A direct and immediate impact of a highway is the amount of

taxable land displaced. Alignment F-1 will reduce the amount of taxable land in Clinton County by 438 acres and Gratiot County by 31 acres. Since agricultural land accounts for 43.7 (Greenbush Township) and 70.3 percent (Washington Township) of the total tax base, this alignment reduces the tax base of Greenbush Township by 0.6 percent and Washington Township by 0.04 percent.

School districts usually incorporate a much larger area than individual townships. Alignment F-1 will have an impact on the St. Johns School District Tax base by displacing 25 residential structures, one commercial structure, 21 farm buildings and 496 acres of land.

Impact upon the county tax base is even less significant. Potential development particularly in the vicinity of interchange locations could have a positive impact on the areas tax base.

The provision of grade separations will alleviate the hazard of farm machinery competing with high-speed through traffic. Where grade separations are not provided alignment could have a detrimental impact on the farms who cultivate now contiguous parcels of land because of the adverse distance required to obtain access to the parcels.

The transportation facility will offer the user improved access to the visual aesthetics of the area's landscape. At the same time, the intrusion of a highway facility on the landscape will alter the visual quality available to the area's residents.

Air and Noise Impact

Air - There is no significant impact on air quality from the F-1 Alignment. Carbon monoxide comprises the majority of automobile pollutants in a rural area. This alignment will generate a total one-hour peak concentration of carbon monoxide of 1.0 PPM (1995) or 2 percent of the National Ambient Air Quality Standard (NAAQS) of 35 PPM. The eight hour prediction is 0.2 or 2 percent of the NAAQS.

For this analysis, the California Line Source Model (CALINE -2) was used. Inputs into the model include: Critical wind speed of 3 MPH; Atmospheric Stability Class (PASQUILL) of F; An average speed of 55 MPH for vehicles; Wind direction of 15 degree with the highway; and a vehicle mix of 90% gasoline cars, 2% light duty gasoline, 4% each of heavy duty gasoline trucks and heavy duty diesel trucks.

In summary, based on the above analysis the F-1 Alignment will not significantly affect the air quality within the area. It is

our findings that the project is consistent with the State Implementation Plan for Air Quality.

Noise - The pattern of noise contours will change significantly because of the redistribution of traffic on the highway system. The 70 dBA and above contour extends 243 feet from the center of the median in either direction. The residents that are located within this contour will be acquired for the right-of-way. The 60 to 70 dBA contour will extend 612 feet from center of median in either direction. There are 27 residential units that would experience a noise level of between 60 dBA and 70 dBA. Reduced traffic volumes on existing US-27 south of Maple Rapids Road will decrease the number of residences on or near the highway which presently experience high noise levels.

ALIGNMENT F-3

The alignment of Alternative F-3 at Route M-21 is located one-quarter mile east of Williams Road (Figure S-6). The alignment extends northward to a bridge over the Grand Trunk Railroad. It curves northwesterly to a crossing of Steel Road, which would be closed. In a northwestward direction, it proceeds across Walker Road, which would be closed with connections to Williams Road, which would be bridged. It extends northwestward to a point just south of Avery Road, where the alignment curves northward while crossing Avery Road, which would be bridged. The alignment then follows the quarter-section line west of Williams Road.

The F-3 Alignment proceeds northward to a bridge over Colony Road and a crossing of Silvers Road, which would be closed. It continues northerly following the quarter-section line to a bridge over French Road and Mead Road.

Just to the north of Mead Road, the alignment departs from the quarter-section line and proceeds along a curve to the west. The curve terminates on an alignment along the half-section line between Marshall Road and Hyde Road.

It then proceeds westerly across Scott Road along the half-section alignment. West of Scott Road, which would be bridged, the alignment curves northward to Hyde Road, which would be bridged. It then curves into the present alignment of US-27, just south of Maple Rapids Road.

The alignment extends northward along existing US-27 alignment with an interchange at Maple Rapids Road. Maple Rapids Road and the interchange will be relocated approximately 100 feet to the south of present alignment. I would continue north to a crossing

ST. JOHNS

WILDCAT

M-21

GRAND TRUNK R. R.

WILDCAT





ALIGNMENT F-3

SHEET 1 of 3

SCALE 1" = 800'

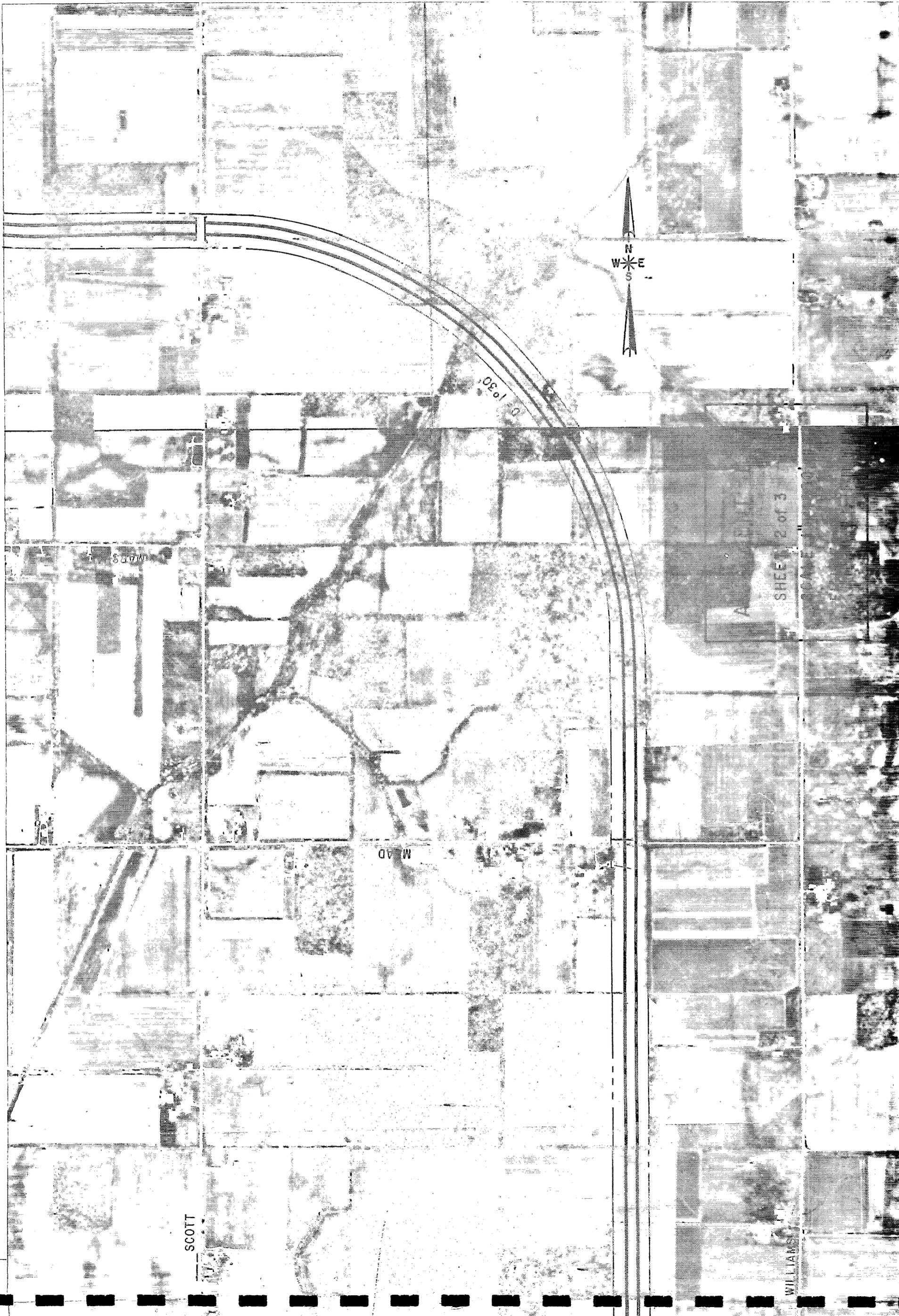
FIGURE S-6

SCOTT

FRENCH

SILVERS

WILLIAM



SHEET 2 of 3

M AD

0301

SCOTT

WILLIAMS



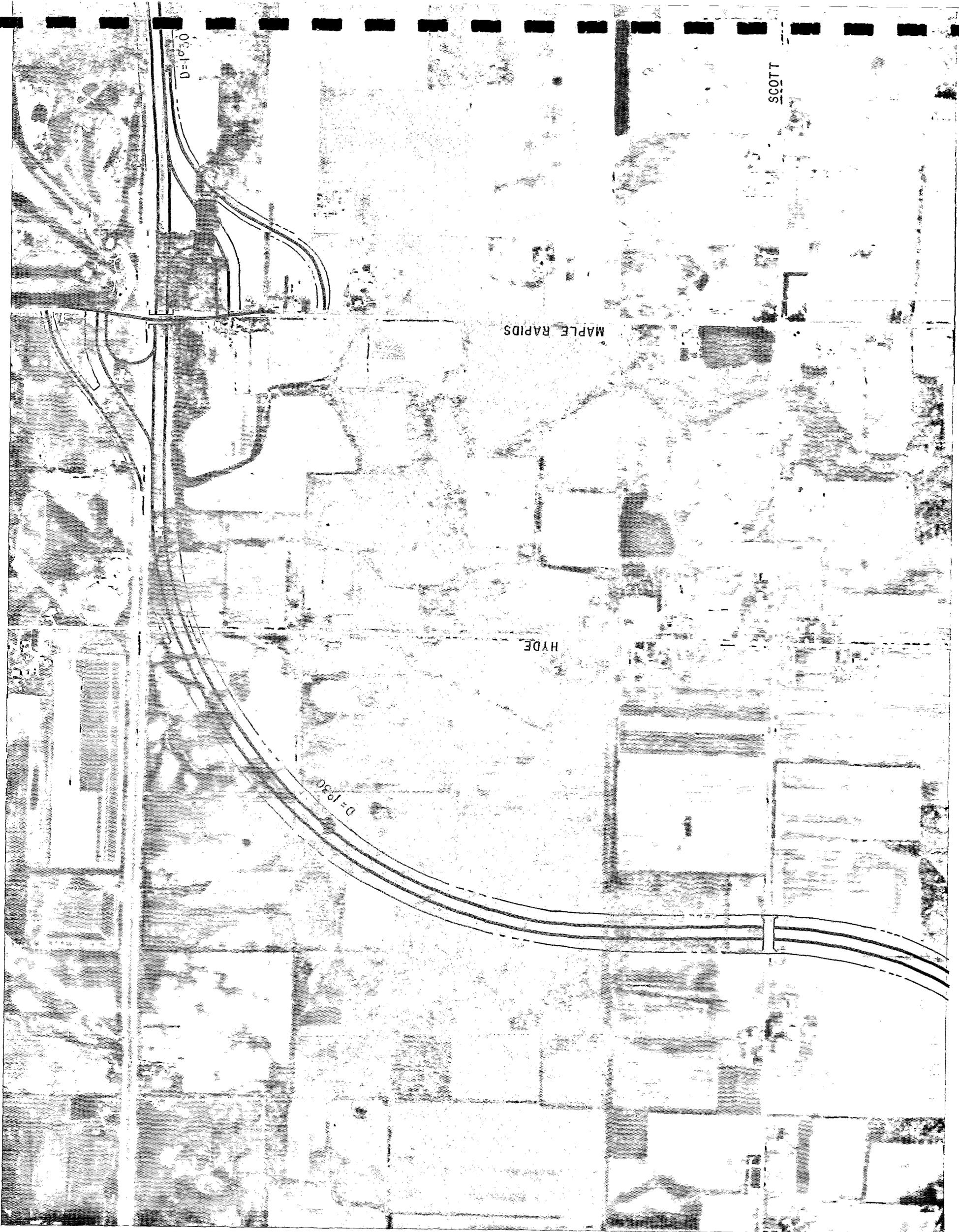
SCOTT

MAPLE RAPIDS

HYDE

D-1930

D-1930



WILSON



ALIGNMENT F-3

SHEET 3 of 3

SCALE 1" = 800'

FIGURE S-6

GRATIOT

U.S. 27

D=1°30'

SCOTT