TRAFFIC SEPARATION STUDY

FOR

KANNAPOLIS, NORTH CAROLINA

AND

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RAIL DIVISION

ENGINEERING AND SAFETY BRANCH

RAIL DIVISION

NS NORFOLK SOUTHERN

PREPARED BY

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AUGUST 1997

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VOLUME III

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CONCLUSIONS:

Accommodating the **Transit 2001 Plan** goal of two-hour passenger train service between Raleigh, Greensboro, and Charlotte will require a substantial reduction in the number of streets that cross the railroad at grade, as well as major modifications to many of those that remain.

Rail freight traffic along the Norfolk Southern (NS) will increase due to the division of CONRAIL routes between Norfolk Southern (NS) and CSX.

Vehicular traffic in Kannapolis will continue to increase as growth and expansion in Cabarrus and Rowan Counties continues.

Grade crossing safety is an issue at many of the crossings, as demonstrated by the eight (8) recorded fatalities.

Vehicles queuing across the tracks is an issue at three of the crossings and the humped condition at Winecoff School Rd., Ebenezer Rd., Plymouth St., and 29th St. creates a visibility problem for crossing motorists.

RECOMMENDATIONS:

Near-Term

- Install 4-quad gates at Winecoff School Rd. $125,000.00
- Install long-gate arms at Universal Street. $15,000.00
- Install modular crossings at Universal Street $40,000.00
- Close the Plymouth Street crossing $18,500.00
- Close the East C Street crossing $14,000.00
- Install 4-quad gates at the 1st St. crossing $125,000.00
- Close the Ebenezer Road crossing $28,000.00
- Install median barriers at 18th & 22nd Sts. $20,000.00
- Install long-gate arms at 29th St. $15,000.00

$400,500.00

Long-term

- Build the 22nd St. Crossing Consolidation Project $5,056,000.00
- Close the Winecoff School Rd. crossing
- Build an overpass of the NS at Universal Street $4,300,000.00
- Reconsider closing East 1st Street

TRAFFIC SEPARATION STUDY
FOR KANNAPOLIS, NORTH CAROLINA
AND THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PURPOSE OF THE STUDY

The **City of Kannapolis** and the **North Carolina Department of Transportation (NCDOT)** have entered into a cooperative agreement to evaluate certain local street at-grade crossings of the **Norfolk Southern Railway** in **Kannapolis**. The purpose of the evaluation is to determine if any of the crossings are candidates for closure or grade separation, or if not, are there improvements that can be made to the local street and crossing network that will enhance public safety. The study includes nine (9) public street crossings of the railroad from Winecoff School Road north to 29th Street.

Preamble

Highway/railway at-grade crossing collisions are the number one cause of death in the railroad industry. In 1996, there were 4,159 train-vehicle collisions with 471 deaths nationwide. North Carolina had 140 collisions, 9 deaths and 53 injuries. There are 4,756 public street grade crossings of railroads in North Carolina.

Deaths and injuries at grade crossings have steadily declined in this country since 1978 due to an aggressive safety program by the **United States Department of Transportation**, the various state Departments of Transportation and the railroad companies. These efforts have included improved automatic warning devices, roadway improvements, elimination of sight obstructions, construction of crossing separation structures, and closure of some crossings.

The **NCDOT**, through its **Rail Division** has a substantial program in place to improve rail crossing safety. The program is endorsed and supported by the **USDOT**, **Federal Railroad Administration** and **Federal Highway Administration**, and the various railroad operating companies. To be successful, however, requires the support of local government and the citizens of North Carolina. Highway/railway safety cannot be mandated from Raleigh, but must be endorsed, supported and enforced at the local level. These series of studies, undertaken through a cooperative agreement between state and local government, are part of a continuing effort to enhance the safety of all who travel North Carolina's streets, highways and railways.

The Kannapolis Study

The City of Kannapolis is served by the Norfolk Southern (NS) Railway* which extends

*For purposes of this study, the railroad will be referred to as the Norfolk Southern (NS); however, Norfolk Southern (NS) is the operating company with the railroad right-of-way being owned by the North Carolina Railroad (NCRR), which is owned by the State of North Carolina (75%) and private shareholders (25%).

from Charlotte to Raleigh and points north and south. Train movements over seven of the crossings included in this study are 34 per day according to information supplied by the NS Division Superintendent. Movements over the crossings at 1st St. and C St. are 38 per day. **See Figures 1 and 4.**

Vehicular crossing volumes range from a low of approximately 1,550/day at Plymouth St. to 6,900 at Universal St.

Over the ten years for which records are available, all of the crossings in Kannapolis have had train/vehicle collisions except East C St. Fatalities have occurred at five of the crossings, with two each having occurred at Winecoff School Rd., Universal St. and East 22nd St.

The evaluation of the Kannapolis crossings included the following:

- Twenty-four hour automatic traffic counts were obtained for the crossings as well as other streets within the network.

- A system Level of Service analysis was conducted for the paralleling roadways of US 29-A (Main St.) and Ridge Ave./Linda Ave. involving all the crossings for both 1997 traffic volumes and 2010 traffic volumes. Several different scenarios of the analysis were conducted and will be discussed later in the report.

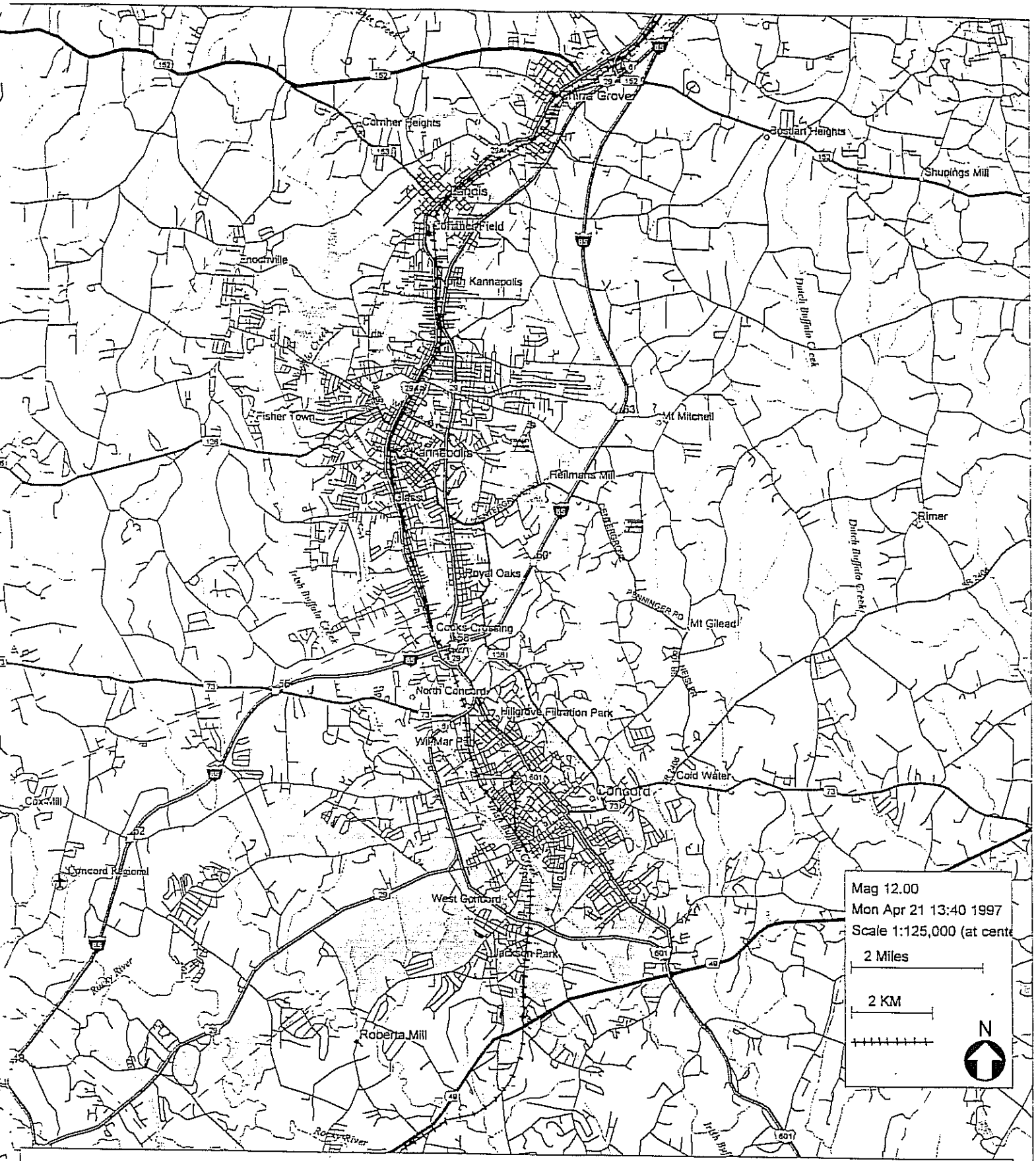
- Interviews with state and local officials were conducted to gain insight into problems and potential improvements to each crossing.

- Data was collected from the Rowan Co. School System, Kannapolis City School System, Cabarrus Co. School System, Kannapolis City Administrative staff, Cabarrus Co. EMS, and the Rowan County Emergency Medical Service as to frequency of use of each crossing, as well as service impacts that might occur should a crossing be closed or modified.

- Available historic information and mapping was utilized in the development of report conclusions and recommendations.

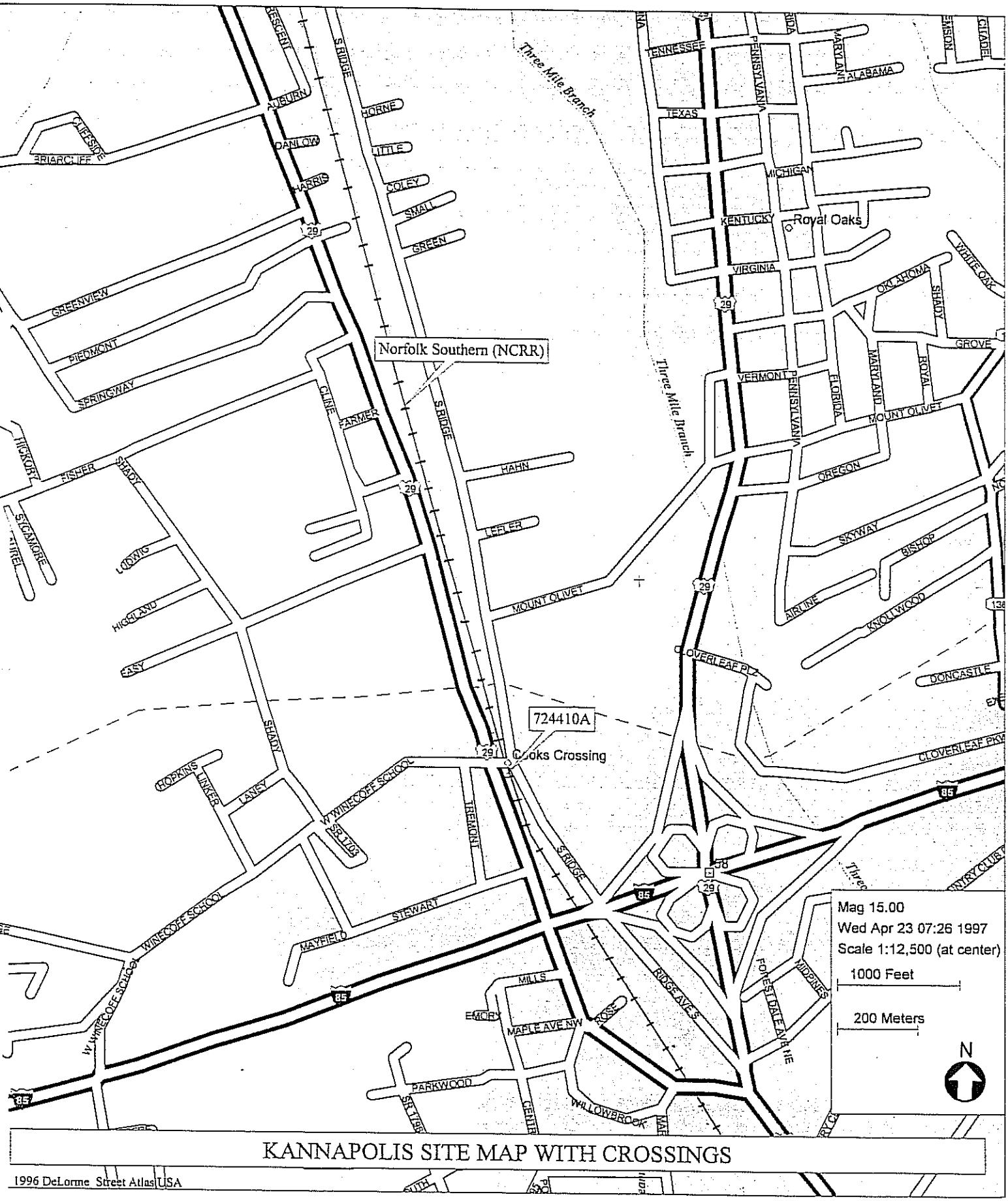
Based upon the above described evaluation, this report will:

- Identify impacts of any proposed crossing closure on adjacent property and the roadway network.



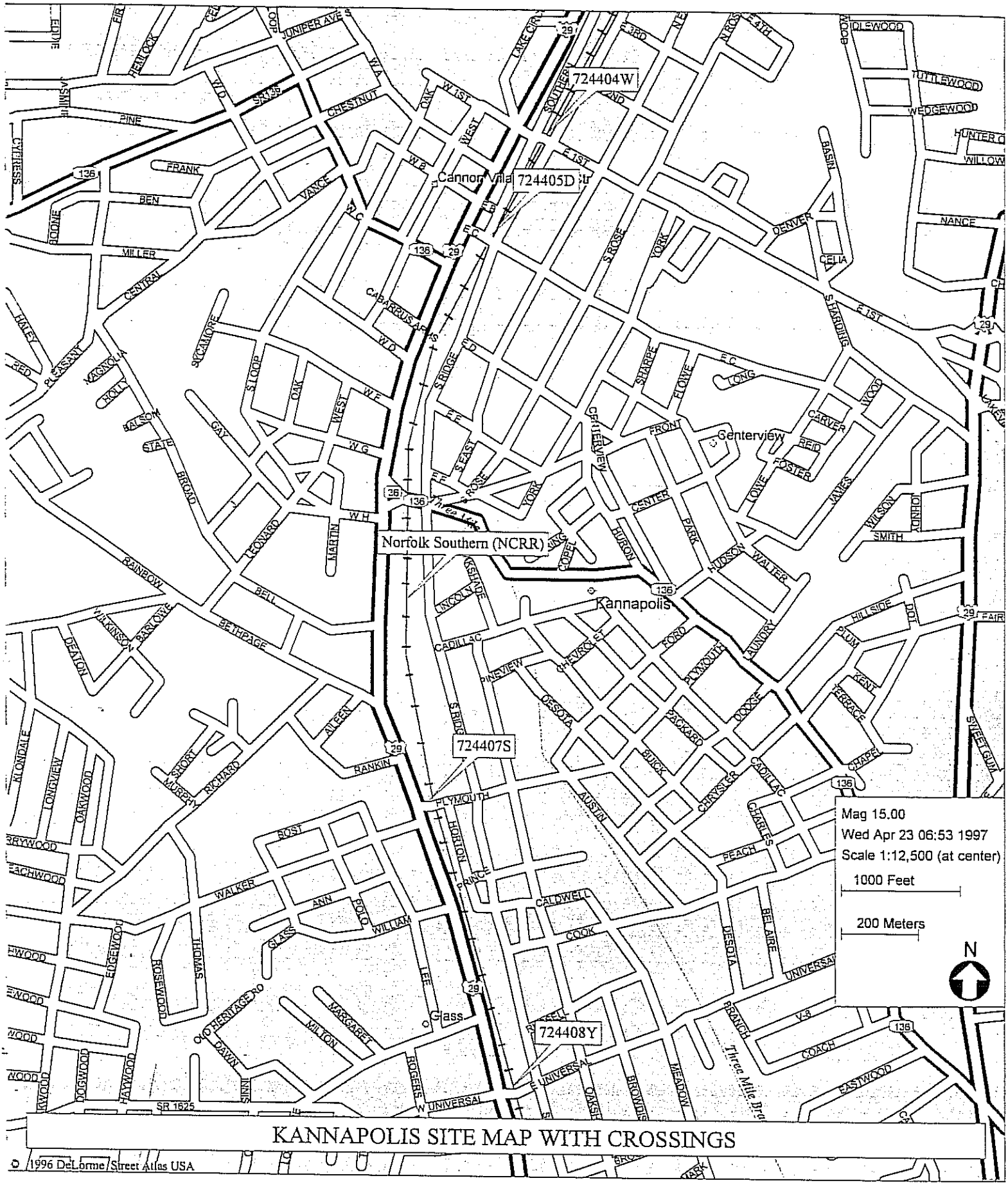
CONCORD & KANNAPOLIS VICINITY MAP

FIGURE 1



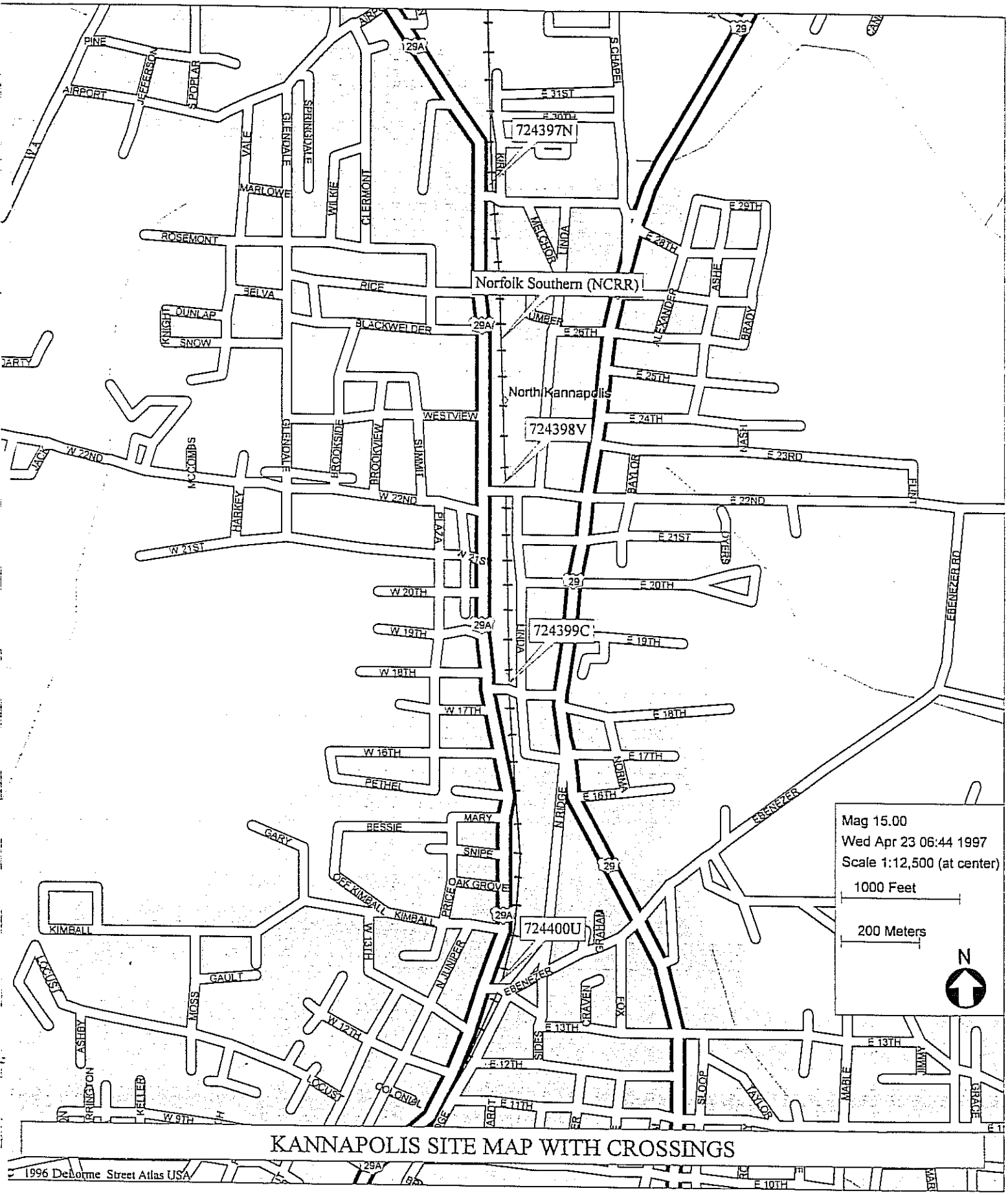
KANNAPOLIS SITE MAP WITH CROSSINGS

FIGURE 2



KANNAPOLIS SITE MAP WITH CROSSINGS

FIGURE 3



KANNAPOLIS SITE MAP WITH CROSSINGS

FIGURE 4

- Include conclusions and recommendations necessary to accommodate any proposed crossing closure.

- Identify candidate crossings for grade separation.

- Recommend corrective action for any identified safety issues relating to the nine (9) crossings.

- Include preliminary cost estimates for recommended improvements.

EXISTING TRANSPORTATION SETTING

The City of Kannapolis sets astride the Rowan/Cabarrus county line with the majority of the City located inside Cabarrus County. The population is approximately 34,500. Population growth in the area for the two counties, has averaged just over two percent per year as has job growth. For purposes of this report, traffic volumes were projected to grow at two percent per year.

Traffic along the Norfolk Southern (NS) continues to grow with significant freight operations based in Charlotte to the south and Linwood to the north, as well as the expansion of NCDOT sponsored rail passenger service in the corridor.

Of the 9 crossings included in the Kannapolis study, two, Wincoff School Rd. and Universal St., are minor thoroughfares. East 1st St. and Ebenezer St. are minor thoroughfares east of Ridge Ave. but not including the crossing. US 29-A, a major thoroughfare, and Ridge Ave., a minor thoroughfare, parallel the NS on the west and east sides respectively. Of all the municipalities included in this series of studies, Kannapolis is unique in that paralleling roadways (US 29-A and Ridge Ave./Linda Ave.), are in place for the entire length of the project and connect with all 9 of the crossings. Universal St. carries the most traffic of all the crossings at 6900 vehicles per day.

The NS operates two mainline tracks from Winecoff School Rd. to north of 18th St. where it drops to a single track for the crossings at 22nd and 29th Streets. Operating speeds range from 30 to 50 MPH for merchandise trains and 60 MPH for intermodal trains while passenger trains can operate up to 79 MPH.

EVALUATION CRITERIA

All crossings were initially evaluated using the criteria developed for the NCDOT rail crossing closure program.

Criteria used in evaluating the Kannapolis crossings include:

- Accident history

This report utilizes the accident classification system developed by the Federal Highway Administration and others, and in general use around the country. Under this system, accidents are classified as follows:

- K - Killed
- Class A - Injured and transported to hospital
- Class B - Injured and treated on-scene
- Class C - Complains of injury but not treated
- PDO - Property damage only

- Vehicle traffic - Present and future
- Train traffic
- Truck traffic/Truck route
- Hazardous materials
- Type roadway (thoroughfare, collector, local access, etc.)
- Type of property being served (residential, industrial, commercial)
- School bus route
- Emergency route
- Type warning devices present
- Redundant crossing (yes/no)
- Potential for grade separation (hi, med, lo)
- Feasibility of implementing roadway improvements (hi, med, lo)
- Economic impact if crossing closed (hi, med, lo)

The evaluations are shown on **Table 1.**

Level of Service Analysis

Level of Service (LOS) is a measure of congestion for signalized and unsignalized intersections as well as roadway segments. To the motorist, an intersection or road operating at an LOS of A, would be virtually free of congestion with almost no delay or interruption to travel. On the other hand, an LOS of F would mean considerable delay, stop and go driving

and could require the motorist to sit through 2 or 3 red signal indications before clearing a signalized intersection.

The street network, including all crossings, was subjected to a detailed volume/ capacity analysis in accordance with the procedures contained in the Highway Capacity Manual Special Report 209 (1994) as published by the Transportation Research Board, Washington, D.C. The procedures contained in the Manual for Level of Service Analysis (LOS) have been validated by considerable research and field testing and have been further enhanced by modern computer analysis techniques.

Analysis techniques are prescribed in the Highway Capacity Manual for both unsignalized and signalized intersections. The analysis determines the amount of delay the motorist experiences in clearing the intersection which determines its Level of Service.

Unsignalized Intersections

Operating characteristics of roadway intersections and driver behavior are mandated by the traffic laws of the State of North Carolina. These laws require traffic from minor or side streets to yield right-of-way to traffic on the major or through street. This basic "rule of the road" has yielded the following assumptions being used in the analysis of unsignalized intersections.

- Major street flows are not affected by minor (stop sign controlled) street movements.
- Left turns from the major street to the minor street are influenced only by opposing major street through-flow.
- Minor street right turns are impeded only by the major street traffic coming from the left.
- Minor street left turns are impeded by all major street traffic plus opposing minor street traffic.
- Minor street through traffic is impeded by all major street traffic.

The LOS for both unsignalized and signalized intersections is based upon the amount of delay (calculated in seconds/vehicle) to a motorist waiting to execute a maneuver. Delay is calculated for all vehicles through the intersection during the peak hour or peak 15-minute analysis period. Criteria used to determine LOS of unsignalized intersections are as follows:

Level of Service	Average Total Delay (Sec/Veh)
A	≤5
B	>5 ≤10
C	>10 ≤20
D	>20 ≤30
E	>30 ≤45
F	>45

Signalized Intersections

The LOS criteria for signalized intersections is based upon stopped delay per vehicle in seconds. The criteria from the Highway Capacity Manual are:

Level of Service	Description	Stopped Delay Per Vehicle (Seconds)
A	Very low delay, good progression; most vehicles do not stop at intersection	5.0
B	Generally good signal progression and/or short cycle length; more vehicles stop at intersection than level of service A.	>5≤15
C	Fair progression and/or longer cycle length: significant number of vehicles stop at intersection than level of service A.	>15≤25
D	Congestion becomes noticeable; individual cycle failures; longer delays from unfavorable progression, long cycle length, or high volume/ capacity ratios; most vehicles stop at intersection.	>25≤40
E	Considered limit of acceptable delay, indicative of poor progression, long cycle length, high volume/ capacity ratio; frequent individual cycle failures.	>40≤60
F	Unacceptable delay, frequently an indication of oversaturation (i.e. arrival flow exceeds capacity.)	>60

LEVEL OF SERVICE

Six separate **Level of Service (LOS) Analyses** were run on the street network involving the

9 crossings included in the Kannapolis study. The results of the analyses are shown on Table 2. In addition to analyzing the crossings, the street network paralleling the railroad (US 29-A and Ridge Ave./Linda Ave.) was also included. The analyses are further described as follows:

- **1997 Existing Conditions:** The network was analyzed using current traffic volumes to determine current levels of congestion. The results show that the system is operating at an **LOS** of **B** with the exception of the unsignalized intersections of US 29-A/Ebenezer Rd. and US 29-A/22nd St., which are operating at an **LOS** of **C.**

- **2010 Future Conditions:** The network was analyzed using projected 2010 traffic volumes. The results show that the system will continue to operate at an **LOS** of **B/C** except for the intersection of US 29-A/22nd St. which falls to an **LOS** of **D.**

- **2010 Build 1 Conditions:** The network was analyzed using future traffic volumes with the crossings at Plymouth St., East C St., East 1st St., Ebenezer Rd., 18th St. and 29th St. closed. A grade-separation (overpass) structure was installed at Universal St. and 22nd St. was left at-grade. Under this scenario, the network will continue to operate at **B/C** except for the intersection of US 29-A/22nd St. which falls to an **LOS** of **F.**

- **2010 Build 1 Conditions with Improvements:** This scenario is the same as the one described immediately above, except US 29-A/22nd St. is signalized and left-turn lanes are added on all approaches. Overall network performance remains at **B/C** and US 29-A/22nd St. improves to an **LOS** of **B.**

- **2010 Build 2 Conditions:** This scenario is the same as **2010 Build 1 Conditions** except Winecoff School Rd. is also closed at the railroad and a grade-separation (overpass) structure is added at 22nd St. This scenario has the most impact on the network in that the Universal St. intersections with US 29-A and Ridge Ave. fall **below LOS** of **F** as does the US 29-A/22nd St. intersection.

- **2010 Build 2 Conditions with Improvements:** In addition to the improvements included in **2010 Build 1 Conditions with Improvements,** this scenario adds westbound turn-lanes and a northbound right-turn-only lane at US 29-A/Universal St. as well as an eastbound left-turn lane, a northbound left-turn lane and a southbound right-turn lane at Ridge Ave./Universal St. The network **Level of Service** returns to **B/C** at all locations with these improvements. However, it should be noted, that the intersections of Universal St. with US 29-A and Ridge Ave. may require significant modification should an overpass at the NS be constructed.

TRAFFIC VOLUME

Based on the 24-hr. traffic volumes, the 9 at-grade crossings in Kannapolis rank in terms of

vehicles served:

1.	Universal St. (SR 1766)	6,900 VPD
2.	Winecoff School Rd. (SR 1750)	4,450 VPD
3.	Ebenezer Rd. (SR 1267)	3,450 VPD
4.	E. 18th St.	3,450 VPD
5.	East 1st St. (SR 1706)	3,100 VPD
6.	East 29th St.	2,750 VPD
7.	East C St.	2,600 VPD
8.	East 22nd St. (SR 1254)	2,600 VPD
9.	Plymouth St.	1,550 VPD

ACCIDENT HISTORY

With the exception of East C Street, all of the crossings in Kannapolis have experienced rail/highway collisions over the ten years for which accident records are available. And of greatest significance and concern, is the fact that eight fatalities have occurred at the nine crossings during the ten years. Fatalities have occurred at Winecoff School Rd. (2), Universal Street (2), Ebenezer St. (1), East 18th St. (1) and East 22nd St. (2). In addition, Winecoff School Rd and Ebenezer have had one Class A injury accident each during the same period. These accidents have occurred in spite of the fact that all of the Kannapolis crossings have flashing signals, bells and gates. And, as a matter of record, East C St. was signalized in 1935 and the last one to receive crossing protection devices was Winecoff School Rd. in 1975.

COST OF RAILWAY/HIGHWAY COLLISIONS

According to a report prepared by, and first published by, the Federal Highway Administration in 1991, accident costs by 1995 were as follows:

Fatal accident	$2,780,000.00
Injury accident	$55,000.00
Property damage only accident	$3,000.00

Utilizing these numbers, the accidents occurring in Kannapolis during the 10-year period have cost the community, in addition to the pain and suffering of the survivors, over $22,000,000.00.

TABLE 1
EVALUATION OF STREET/RAILROAD AT-GRADE CROSSINGS

CROSSING #	RAILROAD	MUNICI-PALITY OR COUNTY	STREET NAME	MAINTENANCE RESPONSIBILITY (CITY/NCDOT)	SECONDARY ROAD NUMBER	STREET CLASS.	WARNING DEVICES (TYPE)	24 HR ADT	2020 ADT (PRO-JECTED)	24 HR TRAIN VOL.	12 YR ACCIDENT HISTORY (NUMBER) 1984-95	SCHOOL BUS ROUTE (Y/N)	EMER-GENCY ROUTE (Y/N)
724397N	NS	Kannapolis	E 29th St.	City		Local	5	2750	—	34	1	Y	Y
724398V	NS	Kannapolis	E. 22nd St.	NCDOT	1254	Local	5	2600	—	34	3(2K)(88)	Y	Y
724399C	NS	Kannapolis	E. 18th St.	City		Local	5	3450	—	34	2(1K)(94)	N	Y
724400U	NS	Kannapolis	Ebenezer	NCDOT	1267	Min. Thor.	5	3450	200	34	3(1K)(89)	Y	Y
724404W	NS	Kannapolis	E. 1st St.	NCDOT	1706	Coll	5	3100	—	38	1	N	Y
724405D	NS	Kannapolis	E. C St.	City		Coll	5	2600	—	38	0	N	Y
724407S	NS	Kannapolis	Plymouth	City		Coll	5	1550	—	34	2	N	N
724408Y	NS	Kannapolis	Universal	NCDOT	1766	Min. Thor.	5	6900	3500	34	2(2K)(91)	N	Y
724410A	NS	Kannapolis Concord	Winecoff Sch.	NCDOT	1750	Min. Thor.	5	4450	6600	34	2(2K)(85/88)	N	Y

* Type 1: Unmarked
Type 2: Crossbucks
Type 3: Stop signs/Crossbucks
Type 4: Flashing signals & bells
Type 5: Flashing signals, bells & gates

TABLE 1
EVALUATION OF STREET/RAILROAD AT-GRADE CROSSINGS (KANNAPOLIS)

STREET NAME	DESIG-NATED TRUCK ROUTE (Y/N)	% TRUCKS	HAZARDOUS MATERIALS (Y/N)	CROSSING CONDITION (GOOD, FAIR, POOR)		REDUN-DANT CROSSING (Y/N)	ADEQUATE STORAGE SPACE (Y/N)	PROPERTY SERVED	ECONOMIC IMPACT IF CLOSED (HI,MED, LOW)	NEED FOR ENHANCED WARNING DEVICES	NEED FOR ROADWAY IMPVTS (HI, MED, LOW)	FEASI-BILITY OF IMPLE-MENTING RDWAY IMPVTS (HI,MED, LOW)	POTEN-TIAL FOR GRADE SEPARA-TION (HI,MED LOW)
				GEOMETRY	SIGHT DISTANCE								
E. 29th St.	N	1%	N	Poor	Good	N	N	Res	TBD	S&M	High	Low	Low
E. 22nd St.	N	1%	N	Good	Good	N	Y	Res/Comm	TBD	S&M	Med	High	Med
E. 18th St.	N	1%	N	Fair	Fair	N	Y	Comm	TBD	S, S&M	Low	High	Low
Ebenezer	N	1%	N	Poor	Fair	N	N	Res/Comm	TBD	S, S&M	High	Low	Low
E. 1st St.	N	0	N	Good	Good	N	N	Res/Comm	Med	S, S&M	Low	Med	Low
E. C St.	N	0	N	Good	Fair	Y	Y	Res/Comm	Low	S, S&M	Low	Med	Low
Plymouth	N	0	N	Poor	Fair	N	N	Res/Comm	Low	S&M	High	Low	Low
Universal	N	1%	N	Fair	Fair	N	N	Res/Comm	High	Signs	High	Med	Med
Winecoff Sch.	N	1%	N	Poor	Poor	N	N	Res/Comm	Med	S&M	High	Low	Low

S&M - Signs & Markings
S, S&M - Signals, Signs & Markings (8" lenses)

TABLE 2

EXHIBIT 5 CAPACITY ANALYSES SUMMARY (Kannapolis Study Section)

Intersection	1997 Existing Conditions	2010 No Build Conditions	2010 Build 1 Conditions	2010 Build 1 Conditions w/Improve.	2010 Build 2 Conditions	2010 Build 2 Conditions w/Improve.
Main Street and Winecoff Road (sig)	B	B	B	N/A	C	N/A
Ridge Avenue and Winecoff Road (unsig)	B	C	C	N/A	N/A	N/A
Main Street and Universal Street (sig)	B	B	B	N/A	*	B (3)
Ridge Avenue and Universal Street (sig)	B	B	C	N/A	*	B (4)
Main Street and Plymouth Street (unsig)	B	C	N/A	N/A	N/A	N/A
Ridge Avenue and Plymouth Street (sig)	B	B	B	N/A	B	N/A
Main Street and C Street (unsig)	B	C	N/A	N/A	N/A	N/A
Ridge Avenue and C Street (unsig)	B	B	B	B (1)	B	B (1)
Main Street and 1st Street (sig)	B	B	B	N/A	B	N/A
Ridge Avenue and 1st Street (sig)	B	B	C	N/A	C	N/A
Main Street and Ebeneezer Road (unsig)	C	C	N/A	N/A	N/A	N/A
Ridge Avenue and Ebeneezer Road (unsig)	B	C	B	N/A	B	N/A
Main Street and 18th Street (unsig)	B	B	N/A	N/A	N/A	N/A
Main Street and 22nd Street (unsig)	C	D	F	B (2)	F	B (2)
Main Street and 29th Street (unsig)	B	C	N/A	N/A	N/A	N/A

NOTES:

1. Capacity analysis results shown as Level of Service (LOS) for worst approach/ movement for unsignalized intersections and overall LOS for signalized intersections.
2. " * " means that LOS exceeds capacity.
3. N/A - not applicable

IMPROVEMENTS:

(1) only 1 EB left-turn lane and 1 EB thru/right-turn lane is needed

(2) signalization, create 1 WB left-turn lane and 1 WB right-turn lane, add SB left-turn lane, add NB right-turn lane

(3) add WB left-turn lane, add WB right-turn lane, add NB right-turn lane

(4) add EB left-turn lane, add NB left-turn lane, add SB right-turn lane

MENU OF AVAILABLE TRANSPORTATION SYSTEM ENHANCEMENTS

As growth in the greater Cabarrus/Rowan Counties' area continues, and with train traffic expected to increase along the Norfolk Southern (NS) due to the recent agreement between Norfolk Southern (NS) and CSX to purchase CONRAIL, the potential for traffic delays and accidents at the crossings is certain to increase.

The Norfolk Southern (NS) line from Washington, D.C. to Charlotte, including the segment that comprises this report, has been designated by the USDOT as a **High Speed Rail Corridor**. Governor Jim Hunt has declared the line from Raleigh to Charlotte as a vital link in the **Transit 2001 Program**. A significant objective of the **Program** is to have two-hour passenger train service in place between Raleigh and Charlotte early in the next century. In order to accomplish this goal, significant changes will have to be made to the rail line that will affect many of the crossing streets and the communities they serve. The menu of system enhancements available for consideration follows:

- **Grade Separation Structures**

In recommending highway/railroad grade separation structures, there are many factors that must be considered. Among these factors are:

- Traffic volumes (both vehicle & train)
- Accident history
- Topography
- Construction impacts
- Costs

Traffic Volumes in the 15,000 to 20,000 vehicles per day (VPD) range and above are generally considered to be the threshold for consideration of a grade separation structure for local streets. Volumes of 30,000 VPD and more can be accommodated without significant delay provided train traffic is low.

The **NCDOT** uses an **"exposure index"** to determine whether or not a grade separation structure is warranted at either an existing or proposed railway/highway crossing. The exposure index is determined by multiplying the number of trains per day over the railroad by the number of vehicles per day (in the design year)* on the roadway. In other words, for a railroad with 5 trains per day and a roadway with 2,000 vehicles per day, the exposure index would be 10,000. The threshold for consideration for construction of either an overpass or an underpass is an exposure index of 15,000 in rural areas and 30,000 in urban areas.

*The Design Year is that future year when the improved roadway is expected to reach its theoretical vehicle carrying capacity. In other words, a roadway designed with a 20-year design life, and constructed in 1997, would reach its capacity in 2017. In computing the

exposure index, the projected traffic volumes for 2017 would be used in the formula.

Accident History is another of the factors used when considering grade separation structures. Even though traffic volumes for vehicles and trains may be low, if frequent collisions between railroad and highway traffic is occurring, then a separation structure may be warranted.

Topography, or the lay of the land, is another important consideration. Where the street, railroad and surrounding land are all at about the same elevation, the construction of grade separation structures is made considerably more difficult.

Construction Impacts are of considerable importance in that they may be of such a magnitude as to do greater harm to the community than if the present conditions remain. Construction impacts can include acquisition and the subsequent relocation of families and businesses; destruction of the natural environment such as woodlands and wetlands; and, disruption of historical and archaeological sites. While the effects of some of the impacts may only be temporary, some can forever alter the character of a neighborhood or community.

Costs for grade separation structures can easily exceed $1 million and must, therefore, receive careful consideration before proceeding with funding and construction.

- **Crossing Protection Devices Upgrade**

Generally, the most cost effective way to deal with safety issues at an at-grade railroad crossing is to upgrade the crossing protection devices.

Crossing protection devices include signs, signals, bells and gates used to warn motorists of the pending crossing and, in the case of bells, signals and gates, alert the motorist to the train approaching the crossing. Passive devices, which include advance warning signs, railroad crossbucks and standard stop signs, are generally used on low volume crossings with good site distance. Active devices, which include signals, bells and gates, are used on higher volume crossings with greater accident potential or where existing conditions warrant more positive control. These devices rank from lowest to highest as follow:

Type	Description
1.	Unmarked
2.	Railroad crossbucks
3.	Standard stop signs (limited sight distance) & crossbucks
4.	Flashing signals and bells
5.	Flashing signals, bells & gates

All of the crossings in Kannapolis have flashing signals, bells and gates.

- **Advanced Crossing Protection Devices**

The NCDOT Rail Division has recently completed testing of more advanced crossing protection devices in the form of four-quadrant gates and barrier medians. These devices are appropriate for use on multi-lane, high-volume crossings of high-speed mainline railroads where significant numbers of motorists are ignoring the existing devices. The installation consists of dual gates across the entire approach width, and a barrier median on each approach to prevent motorists from crossing the roadway centerline in an attempt to get around the gates.

In tests recently completed at Sugar Creek Rd. in Charlotte (1996) in cooperation with Norfolk Southern (NS), violations dropped from almost 45 per week with standard gates and signals, to less than 2 per week with the advanced protection devices.

Video imaging is another technique that is being used to improve crossing safety. Under this program, video cameras are set up at certain crossings to record events as well as the vehicle and license plate of violators. This information is then provided to law enforcement officials for enforcement purposes.

- **Crossing Closure/Crossing Consolidation**

The most effective way to deal with railroad/highway crossing safety issues is to close low-volume redundant crossings. Crossings that connect to the same street network and are within a quarter mile (+/- 1300 feet) of each other, are considered to be redundant. (East 1st st. and E. C St. meet this criteria.) Crossing consolidation is another way to treat crossings that may be relatively close to each other. Consolidation of two or more crossings into one can be accomplished by utilizing or building roads that parallel the tracks or by replacing several crossings with a grade separation structure.

- **Street Improvements**

Street improvements are an effective way to treat capacity and safety problems associated with a particular section of roadway, an intersection or a railroad crossing. These improvements can range from simply remarking the existing pavement to obtain a turn lane to total reconstruction of the roadway. In many cases, the more minor the improvement, the greater the benefits.

- **Traffic Signals**

As traffic volumes increase within a roadway network or at a particular intersection, the addition of a traffic signal(s) to the system may be warranted. Traffic signals are not a "cure-all" for traffic problems. Signals have distinct advantages and disadvantages. They are:

Advantages[1]

1. They can provide for the orderly movement of traffic.

2. Where proper physical layouts and control measures are used, they can increase the traffic-handling capacity of the intersection.

3. They can reduce the frequency of certain types of accidents, especially the right-angle type.

4. Under favorable conditions, they can be coordinated to provide for continuous or nearly continuous movement of traffic at a definite speed along a given route.

5. They can be used to interrupt heavy traffic at intervals to permit other traffic, vehicular or pedestrian, to cross.

Disadvantages[1]

1. Excessive delay may be caused.

2. Disobedience of the signal indications is encouraged.

3. The use of less adequate routes may be induced in an attempt to avoid such signals.

4. Accident frequency (especially the rear-end type) can be significantly increased.

Because of these advantages/disadvantages, it became necessary to develop a series of "warrants" for signal installation. The warrants are prescribed in the Manual on Uniform Traffic Control Devices (MUTCD) and are:

Warrant 1 - Minimum vehicular volume
Warrant 2 - Interruption of continuous traffic
Warrant 3 - Minimum pedestrian volume
Warrant 4 - School crossings
Warrant 5 - Progressive movement
Warrant 6 - Accident experience
Warrant 7 - Systems
Warrant 8 - Combination of warrants
Warrant 9 - Four hour volumes
Warrant 10 - Peak hour delay
Warrant 11 - Peak hour volume

(1) Manual on Uniform Traffic Control Devices, USDOT, Federal Highway Adm., Washington, D.C. 1988

Minimum criteria are established for each of the warrants and one or more must be met before installation of a new traffic signal can be considered.

SAFETY AND MOBILITY ISSUES

- Vehicles Queuing Across Railroad Tracks

Queuing of vehicles across the tracks usually occurs due to the nearby presence of traffic signals, intersections or paralleling roadways.

All of the crossings in Kannapolis are impacted by paralleling roadways on either side of the tracks, and, in the case of Winecoff School Rd., Universal St. and East 1st St., a nearby traffic signal is also involved. In that the separation between US 29-A and Ridge Ave. is less than 300 feet at several of the crossings, the potential for vehicles to que across the tracks exists. During field work for this report, vehicles were observed to que across the tracks at Winecoff School Rd., Universal St. and 22nd St.

- Traffic Signal Preemption

The Manual on Uniform Traffic Control Devices requires that preemption of traffic signals occur when the signal is within 200 feet or less of the crossing. The signals at Winecoff School Rd., Universal St. and East 1st St. meet this criteria. Signal preemption is in place and was operating properly during field observations.

- Humped Crossings

A "humped" crossing is one at which the elevation of the railroad is generally higher than that of the approaching roadway. This humped affect causes cars and trucks to ascend on one approach to cross the track and descend on the other side. When the humping is severe enough, vehicles, especially low-hanging trucks, tend to drag over the crossing and can become hung such that the vehicle can go neither forward nor backward. Maintenance of the railroad tends to exacerbate the hump over time in that work on the track ballast generally raises the roadbed about three inches per occurrence. Over a ten-year period, the railroad will rise about one foot (1').

All of the crossings in Kannapolis are humped with the exception of 22nd Street. Winecoff School Rd., East C St., 1st St., Ebenezer St. and 18th St. are humped on both approaches. Universal St. and 29th St. are humped on the eastbound approach while Plymouth St. is badly humped on the westbound approach. Signs of vehicles dragging across the tracks are evident at Winecoff School Rd., Plymouth St., 1st St. and Ebenezer Rd.

- Grade Crossing Condition

The condition of the grade crossing surface can affect both safety and mobility. A poorly

maintained crossing surface can contribute to accidents that may or may not involve a train. Also, a crossing in poor condition may also cause operating speeds over the crossing to be lowered, thereby, impacting roadway capacity.

All crossing surfaces in the Kannapolis Study have recently been reworked and are in fair to good condition. Crossing speeds are in the 5 to 15 MPH range due to nearby paralleling roadways which generally have the right-of-way.

- Vehicles Driving Around Automatic Gates

This occurs when motorists perceive that the automatic gates have lowered but a train is not approaching the crossing; when the gates fail in the lowered position (Fail Safe); or when impatience causes a driver or pedestrian to maneuver around the gates even when an approaching train is in sight. Field observations did not indicate a problem of this nature at any of the crossings.

- Improved Signs and Markings

Installation and maintenance of required traffic control signs and markings is consistently an issue with state and municipal street and highway departments. And, to some extent, maintenance of the railroad signs, signals, and gates at crossings can be an issue with the railroad company.

Signs and pavement markings need attention at all the crossings with the exception of 1st Street and Universal Street which have adequate pavement markings. At East C St., East 1st St., Ebenezer Rd. and East 18th St., the railroad signals have 8-inch lenses which should be replaced with 12-inch lenses.

- Roadway Improvements

Roadway improvements are proposed that will impact all of the crossings and are detailed in the **RECOMMENDATIONS SECTION** of this report.

- Roadway Grade Separation

Providing a roadway grade separation can eliminate safety, queuing and delay problems at a railroad grade crossing. Highway grade separations can either be on a bridge over the railway or the roadway can cross beneath the rail line.

Overpasses require greater length for the same design speed. The total elevation difference is greater because the standard rail vertical clearance of 23 feet exceeds the typical highway clearance of 16 or 16-1/2 feet (even though the structure depth is usually greater for the rail bridge typically provided at an underpass). More importantly, the vertical curve in the middle of the facility, the "crest" curve on an overpass is longer for a given design speed

than the "sag" curve at an underpass, due to stopping sight distance requirements.

The visual and noise impacts associated with overpasses can make them undesirable for use in residential areas, downtowns, or near historic structures. For the Kannapolis Study, the consolidation of some of the crossings, both north and south of the CBD appears feasible. This will be discussed in more detail in the **Recommendations Section** of this report.

The design, and ultimately the feasibility, of a highway grade separation is heavily influenced by property access considerations and the location and connectivity of roadways which parallel the tracks and connect to the cross street. Where an existing frontage road is immediately adjacent to the railroad, the street crossing can clear this facility as well. If necessary, a connection to the frontage road can be provided by directional ramps similar to freeway on-and-off ramps that provide access to the frontage road for traffic to-and-from points on the same side of the railway line as the frontage roadway.

Design standards for mainline railroads are very restrictive as far as the ability to modify the railroad grade or profile. For purposes of the study, changes in the profile of the Norfolk Southern (NS) line were not considered.

- Other Mobility Factors

Since the City of Kannapolis is in two counties, three school systems and several emergency responders were consulted in preparation of this report. Of the five crossings in Cabarrus Co. beginning with Winecoff School Rd., none are used by Kannapolis City/Cabarrus Co. School System. All crossings of the tracks by their system buses are made at the grade separations at Centergrove Rd. and Loop Rd. Of the four crossings in Rowan Co. from Ebenezer Rd. north to 29th St., all are used by the Rowan Co. School System except 18th St.

Emergency medical responders report utilization of all crossings with the exception of Plymouth St. However, the Kannapolis Fire Dept. does not use any of the crossings for emergency response, instead, they respond to an emergency from stations on either side of the tracks.

THE KANNAPOLIS-CONCORD THOROUGHFARE PLAN proposes an extension of Dakota St. westward from its current terminus at Ridge Ave. to tie into Oakwood Ave. and, ultimately, SR 1624 (Scout Camp Rd.). Should this extension occur, a grade separation structure is proposed at the NS.

A grade separation was also investigated for Universal St. at the NS, but was not included in the final plan.

- The **NCDOT Transportation Improvement Program** includes projects **Y-3363 A** and **Z-2763 D,** which are improvements to the automatic warning devices at 18th St.

and Ebenezer Rd. respectively. Also, the **Sealed Corridor Program** recommends a median barrier at Ebenezer Rd., 4-quad gates at East C St. and Winecoff School Rd. and long-gate arms at Universal and Plymouth Streets.

CONCLUSIONS

Accommodating the **2001 Transit Plan** goal of two-hour passenger train service between Raleigh and Charlotte will require a substantial reduction in the number of streets that cross the railroad at grade, as well as major modifications to many of those that remain.

Freight train traffic along the Norfolk Southern (NS) will increase due to the division of CONRAIL routes between Norfolk Southern (NS) and CSX.

Vehicular traffic in Kannapolis will continue to increase as growth and expansion in Cabarrus and Rowan Counties continues.

Grade crossing safety is an issue at many of the crossings, as demonstrated by the eight (8) recorded fatalities.

Vehicles queuing across the tracks is an issue at three of the crossings and the humped condition at Winecoff School Rd., Ebenezer Rd., Plymouth St., and 29th St. creates a visibility problem for crossing motorists.

RECOMMENDATIONS

For purposes of this report, recommendations are classified as follows:

Near-term (0-2 years)
Mid-term (2-5 years)
Long-term (5+ years)

I. WINECOFF SCHOOL RD.: is a humped crossing with inadequate separation between the two paralleling roadways of US 29-A and Ridge Ave. (approximately 100 feet). The potential for vehicles to que across the two tracks is very real and the crossing has experienced two fatalities even though flashing signals, bells and gates have been in-place since 1975. The nearness of Ridge Ave. to the tracks and the placement of the signals and gates, makes it relatively easy for northbound vehicles on Ridge Ave. to drive around the lowered gates and onto the tracks. **See Figures 5 and 6.**

Near-term Recommendation: install 4 quad gates at the crossing.

Estimated Cost: **$125,000.00**

Mid-term Recommendation: Mt. Olivet Rd. intersects Ridge Ave. approximately 1200 feet

north of the Winecoff School Rd. crossing. The separation between Ridge Ave. and US 29-A at the intersection is just over 300 feet as opposed to the just over 100 feet at Winecoff School Rd. It is recommended that a study be conducted to determine the feasibility of constructing a new grade crossing of the **NS** and extending Mt. Olivet Rd. to intersect with US 29-A. Should the new crossing prove to be feasible, then it should be constructed and the existing crossing at Winecoff School Rd. should be removed.

Long-term Option for Consideration: if a new grade crossing is ultimately constructed at Mt. Olivet Rd., then the **MPO** and the **NCDOT Statewide Planning Branch** should investigate the possibility of relocating Winecoff School Rd. west of US 29-A and reconnecting it to US 29-A opposite the new crossing. While **Level of Service** analyses indicate that US 29-A could continue to provide an acceptable level of service should the new crossing be constructed and Mt. Olivet Rd. and Winecoff School Rd. remain offset, the possibility exits that both intersections would require signalization. Introduction of a new traffic signal and growth in overall traffic volumes would eventually lead to an inefficiency in the system that the relocation of Winecoff School Rd. would prevent.

Long-term Recommendation: close the crossing at such time as an overpass of the railroad is constructed at either Universal Street or Dakota Street.

II. UNIVERSAL STREET: of all the crossings in Kannapolis, carries the most crossing traffic. While the separation between US 29-A and Ridge Ave. is approximately 400 feet, the potential for vehicles to que across the tracks is high due to signalized intersections on both ends of the crossing. Two fatalities were recorded at the crossing in a single accident in 1991. Crossing protection devices were installed in 1966. Although the crossing itself has recently been reworked by the railroad, the crossing material is timber and asphalt which traditionally has not held up well under heavy traffic loads. The existence of the two mainline tracks and the approach grade on Universal St. tend to produce a very low-speed crossing. **See photographs on page __ and Figure 8.**

Near-term Recommendation: install long-gate arms on both approaches to the crossing and replace the asphalt and timber crossing material with either modular rubberized or concrete crossings.

Estimated Cost:

Long-gate arms	**$15,000.00**
Modular Crossing (2)	**$40,000.00**

As indicated previously in this report under **Level of Service (LOS),** the intersection of Universal St./Ridge Ave. falls below an **LOS of F** under **2010 Build 2 Conditions.** In other words, more traffic would be trying to go through the intersection than the traffic signal could handle with the existing lanes. In order to return the intersection to an acceptable **LOS (B/C),** additional lanes will be required:

1. A left-turn lane on the northbound approach of Ridge Ave.;
2. A right-turn lane on the southbound approach of Ridge Ave.; and,
3. A left-turn lane on the eastbound approach of Universal St..

It should be noted, however, that the intersection of Universal/Ridge will continue to provide an acceptable **LOS (B/C)** well into the future under current conditions and projected traffic volumes.

Long-term Recommendation: build a grade-separation (overpass) at the Universal Street crossing and modify the intersection at US 29-A (S. Main St.) and Ridge Ave.

Estimated Cost: $4,300,000.00

Impacts of Recommendation: the construction of an overpass at Universal Street will require the taking of privately held property and placing it in public right of way. The project will require approximately 2.5 acres of land and 3 businesses. As shown on **Figure 8,** the overpass will not only span the railroad, but US 29-A as well. This will require that modifications occur in the local street network so that motorists wishing to connect to US 29-A will be able to do so. This connectivity can be accomplished by constructing ramps that connect the overpass with US 29-A, or by modifying the existing street network west of US 29-A to accommodate the new system.

The overall impacts of the recommendation are positive, however, in that all of the grade crossings of the **NS** south of the Kannapolis CBD can ultimately be closed which also eliminates the potential for grade crossing collisions. While some modification in local driving habits and patterns must occur to accommodate the new roadway system, given the development patterns and the paralleling roadway system, these impacts are not deemed to be significant.

While this report deals with safety and mobility issues of public at-grade railroad crossings, and in this case, Universal Street, as previously noted under **Other Mobility Factors,** the local **Thoroughfare Plan** calls for an extension of and an overpass at **Dakota Street.** While Dakota does have the advantage over Universal Street of being more centrally located between the railroad overpass at **Centergrove Road** and the southern coorporate limit represented by Winecoff School Rd., it has the disadvantages of level terrain at the potential overpass as well as no connectivity to a roadway network west of US 29-A. Given the magnitude of a grade-separation project and the alternative analyses that will accompany same, both locations should be thoroughly examined before a final decision is made as to the ultimate location.

III. PLYMOUTH STREET: carries the least amount of crossing volume (1550 VPD), is significantly humped on the westbound approach and, while not meeting the definition of a redundant crossing, the same movements are served by crossings both north and south of Plymouth. While there have been no fatalities recorded at the crossing, it has had two

train/vehicle collisions. Crossing protection devices were installed in 1966. **See Figures 9 and 10.**

Near-term Recommendation: close the crossing.

Estimated Cost:

Closure $8,000.00
Pavement Removal/Barricade installation/Landscaping $10,500.00

Impacts of Recommendation: closing the crossing will require some modification in local driving habits and patterns. However, these impacts are not expected to be of significance in light of the paralleling roadways and the Universal St. crossing approximately 2400 feet to the south, and the overpass at Centergrove St. approximately 2300 feet to the north. Closing the crossing will eliminate the potential for train/vehicle collisions, the noise impact associated with the blowing of train horns and will facilitate the implementation of the **Piedmont High Speed Rail Corridor.**

IV. EAST C STREET: is a low-volume (2600VPD) crossing and meets the classification for a redundant crossing in that it is approximately 1000 feet south of the East 1st St. crossing. While there have been no recorded accidents at the crossing, the sight distance for approaching eastbound motorists is inadequate. **See Figures 11 and 12.**

As discussed in the **Appendix,** a proposal to move the location of the **Amtrak** passenger station to an existing building just north of the East C Steet crossing is being discussed between local, state, Amtrak and NS personnel. One of the requirements for relocation of station is the construction of a 450 foot boarding platform. Although designs for the platform have not been completed, the closing of C St. would greatly facilitate its construction.

The NCDOT, as part of the **Sealed Corridor Program,** proposes to install 4-quad gates and signals at the C St. crossing. The estimated cost for the new safety equipment is $125,000.

Near-term Recommendation: Close the crossing. Reprogram the 4-quad gates and signals for the 1st St. crossing.

Estimated Cost:

Closure $8,000.00
Modify pavement/Install barricade/Landscape $6,000.00

Impacts of Recommendation: closing the crossing will require some modification in local driving habits and patterns, but this will be mitigated by the presence of East 1st St. to the north, the Centergrove Rd. overpass to the south and the paralleling roadways. Closing the crossing will eliminate the potential for train/vehicle collisions, the noise impacts associated with the blowing of train horns and will facilitate the implementation of the **Piedmont High Speed Rail Corridor** and the relocation of the Amtrak Station.

Another issue of significance in the **East C St./ East 1st St./New AMTRAK Station** vicinity, is pedestrian traffic crossing the tracks to access US 29-A (Main St.) and Ridge Ave. Local officials report that measurable pedestrian movements are occurring over the tracks, especially at the C St. crossing. Pedestrians trespassing on railroad right of way as well as legitimate crossings at public streets, is a safety concern for all agencies involved. While train/vehicle collisions get the most sensational media coverage, hardly a week goes by that a pedestrian is not killed or injured on railroad right of way somewhere in this country.

Given the attractiveness of **Cannon Village,** the potential for a new **AMTRAK STATION** near the East C Street crossing, the observed pedestrian traffic in the area and the existence of significant numbers of on-street parking spaces along Ridge Avenue, it is **recommended** that the study group looking at the relocation of the **AMTRAK STATION** consider the fencing of a portion of the railroad right of way from south of the **C Street** crossing to **1st Street.** Fencing the right of way will prevent trespassing and direct pedestrians to the **1st Street** crossing, where, due to the openness of the crossing, pedestrian movements should be more safely accomplished.

Another option that the study group may wish to examine is a pedestrian overpass. While overpasses certainly have the potential to keep pedestrians off the railroad tracks, they have some significant disadvantages:

1. Cost-pedestrian bridges are very expensive when spanning railroads due to the fact that the must be constructed of concrete and steel to prevent burning as a result of a train derailment. Also, in order to meet the requirements of the **Americans with Disabilities Act,** steps cannot be included in the bridge resulting in long and costly approach ramps.

2. In order to assure that pedestrians actually do use the bridge, fencing of the approaches for several hundred feet can often be required.

V. EAST 1st STREET: while the traffic volumes are not great at 3100 VPD, East 1st St. does serve a significant commercial area in downtown Kannapolis, Cannon Village and shops along both US 29-A and Southern Ave. The area just south of the crossing, along Southern Ave. and the railroad, is also considered to be a prime location for a relocated **AMTRAK STATION.**

The crossing is unique of those included in the Kannapolis Study, in that Southern Ave. adds a third paralleling roadway and all within 300 feet. However, there has been only one "property damage only" accident at the crossing. Railroad signals, bells and gates were installed in 1941. **See Figures 13 and 14.**

Near-term Recommendation: install 4-quad gates and signals originally programmed for the East C Street crossing.

Estimated Cost: **$125,000.00**

Long-term Recommendation: at such time as the overpasses at Universal St. and 22nd St. are in place and the AMTRAK STATION has been relocated, reassess the crossing for closing consideration.

VI. EBENEZER ROAD: is a badly humped crossing, is constrained by the fact that the paralleling roadways of US 29-A and Ridge Ave. are less than 200 feet apart and is further complicated by a 5-point intersection at Ridge Ave. The crossing suffered a fatality in a train/vehicle collision in 1989. Crossing protection devices were installed in 1946. **See Figures 15 and 16.**

Near-term Recommendation: close the crossing.

Estimated Cost:

Closure **$8,000.00**
Pavement Removal/Restoration/Landscaping **$20,000.00**

Impacts of Recommendation: closing the crossing will require some modification in local driving habits and patterns. However, given the development in the area and the existing street network, it appears that most motorists using the crossing have had to drive some distance before reaching the crossing. This being the case, closing the crossing should have a negligible impact. The positive impacts of the recommendation are the elimination of the potential for train/vehicle collisions, the noise impacts associated with the blowing of train horns and the implementation of the **Piedmont High Speed Rail Corridor.**

VII. 22nd STREET CROSSING CONSOLIDATION PROJECT:

(a). 18th STREET- while carrying approximately 3450VPD, 18th St. is a short street (600 feet) connecting US 29-A and US 29. The crossing is somewhat humped on both approaches and incurred a fatality in a 1994 train/vehicle collision. Crossing protection devices have been in-place since 1968. **See Figures 17 and 18.**

(b). 22nd STREET-carries approximately 2600VPD, has below standard grades on both approaches, has the potential for vehicles to que across the track due to the nearby presence of US 29-A and has had three train/vehicle collisions resulting in two fatalities. Crossing protection devices were installed in 1976. Of all the crossings evaluated as part of the Kannapolis Study, 22nd St. has the greatest potential, because of its geography, for construction of an overpass of the NS.

(c). 29th STREET- carries approximately 2750VPD, is badly humped on the eastbound approach and has the potential for vehicles to que across the track due to the nearby presence of US 29-A. The crossing has suffered one "property damage only" accident. Crossing protection devices were installed in 1976.

Near-term Recommendation: Install median barrier at 18th and 22nd Streets and long-gate arms at 29th St. to prevent motorists from driving around lowered gates.

Estimated Cost: $35,000.00

Long-term Recommendation: close all three of the above crossings and build a grade-separation structure at 22nd Street. **See Figure 20.**

Estimated Cost: $5,056,000.00

Close 18th St.

Closure $8,000.00
Pavement Removal & Modification/Landscaping $20,000.00

Build Overpass @ 22nd St. $5,000,000.00

Close 29th St.

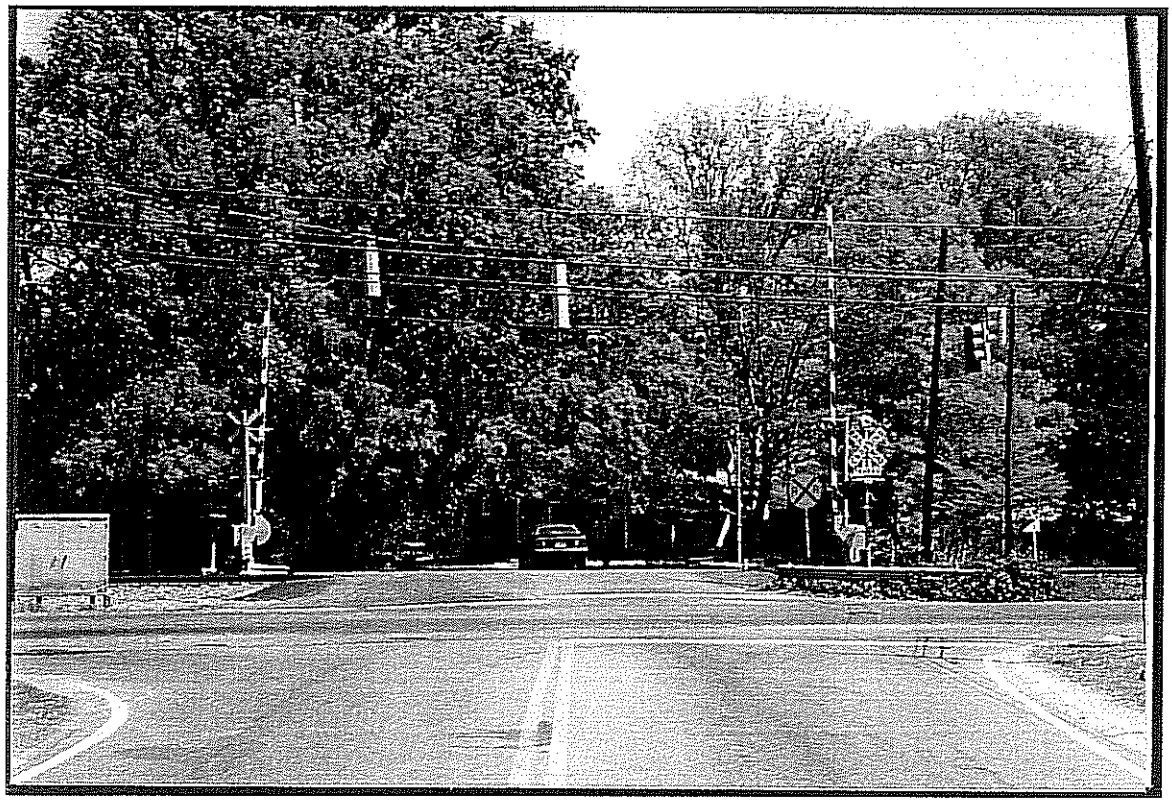
Closure $8,000.00
Pavement Removal/Restoration/Landscaping $20,000.00

Impacts of Recommendation: consolidating all three crossings into one will require significant changes in driving habits and patterns for a large segment of northern Kannapolis. However, due to the development patterns in the area and the presence of the paralleling roadways of US 29, US 29-A and Ridge Ave./Linda Ave., these impacts should be considerably mitigated. Constructing the overpass will require the taking of approximately 5 acres of privately held property for public right of way, 18 homes and 3 businesses.

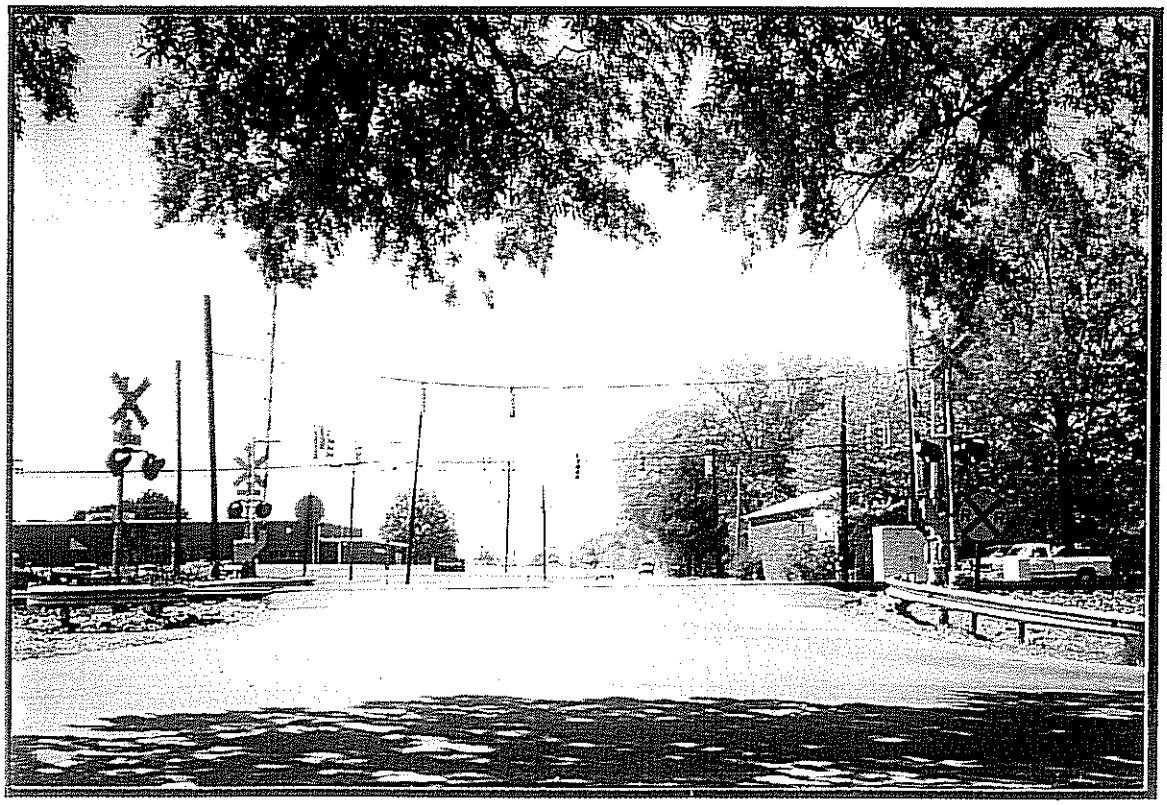
The long-term impacts of the recommendation are all positive, however. Closing the crossings will eliminate the potential for train/vehicle collisions, the noise impacts associated with blowing of train horns and will facilitate the implementation of the **Piedmont High Speed Rail Corridor.**

Municipality: Kannapolis

Crossing Number: 724410A *Street Name:* Winecoff Sch. Rd.

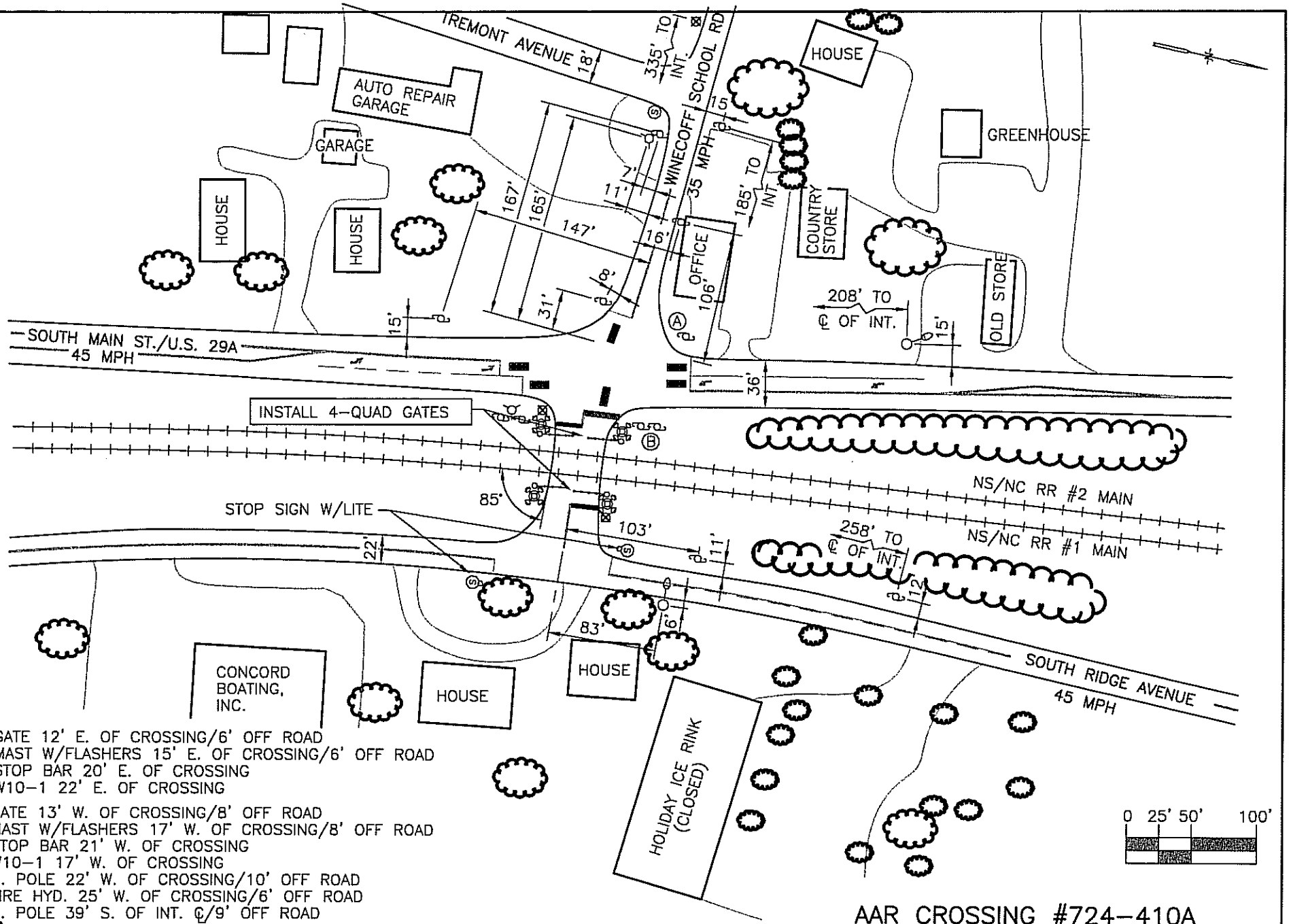


Eastbound Approach



Westbound Approach

FIGURE 5



GATE 12' E. OF CROSSING/6' OFF ROAD
MAST W/FLASHERS 15' E. OF CROSSING/6' OFF ROAD
STOP BAR 20' E. OF CROSSING
W10-1 22' E. OF CROSSING

GATE 13' W. OF CROSSING/8' OFF ROAD
MAST W/FLASHERS 17' W. OF CROSSING/8' OFF ROAD
STOP BAR 21' W. OF CROSSING
W10-1 17' W. OF CROSSING
U. POLE 22' W. OF CROSSING/10' OFF ROAD
FIRE HYD. 25' W. OF CROSSING/6' OFF ROAD
U. POLE 39' S. OF INT. ℄/9' OFF ROAD

Ⓐ U. POLE 27' W. OF CROSSING/14' OFF ROAD
U. POLE 27' W. OF CROSSING/18' OFF ROAD

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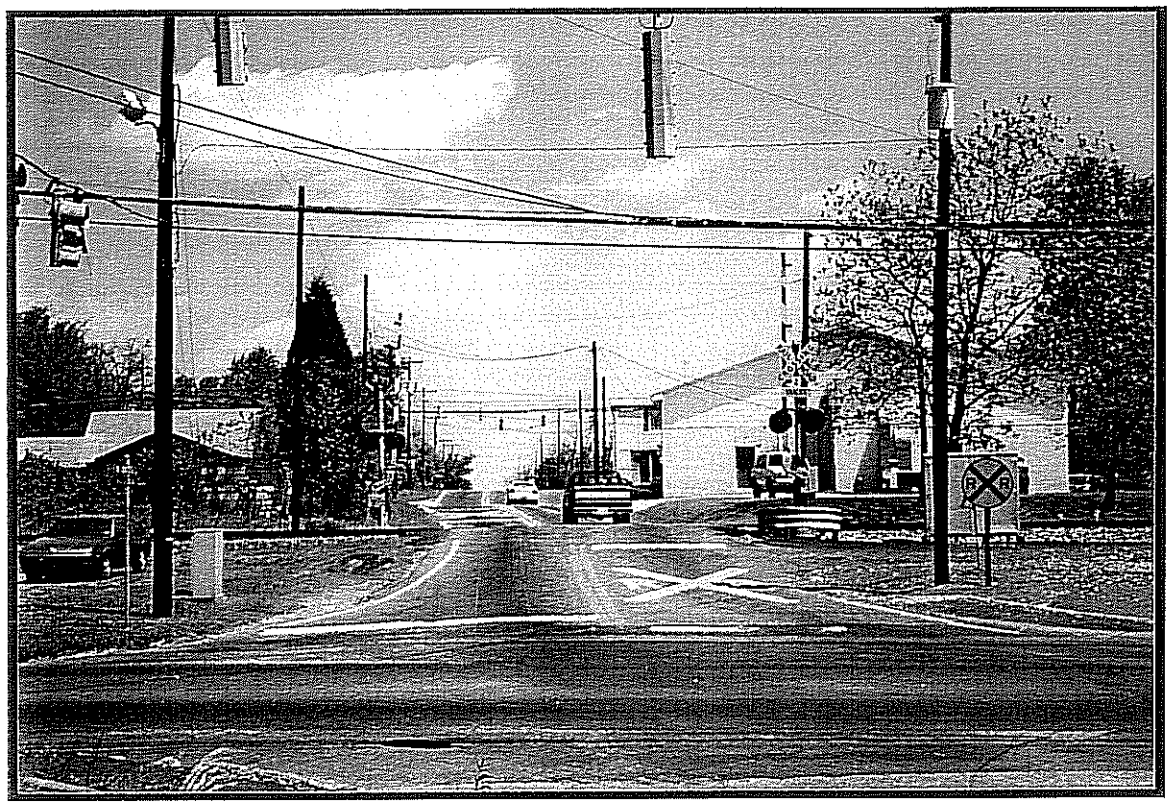
AAR CROSSING #724-410A
LOCAL STREET- WINECOFF SCHOOL RD.
RECOMMENDED IMPROVEMENTS

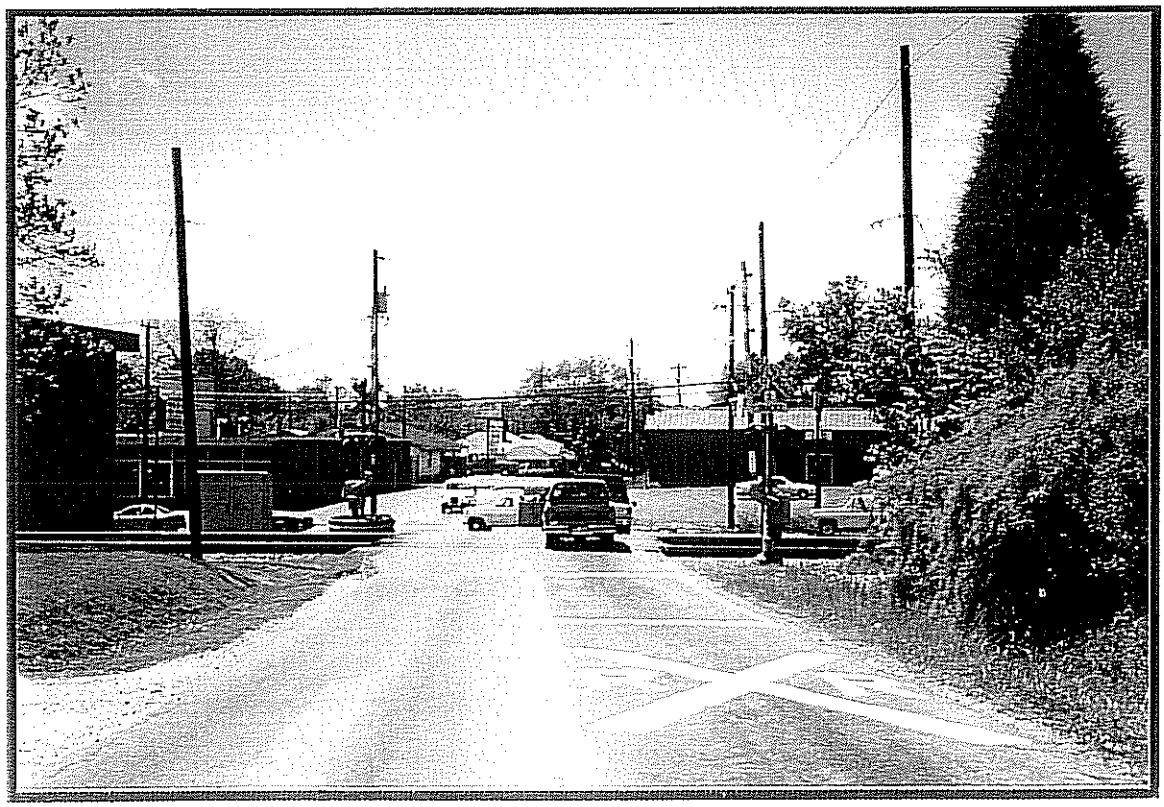
FIGURE 6

Municipality: Kannapolis

Crossing Number: 724408Y *Street Name:* Universal St.

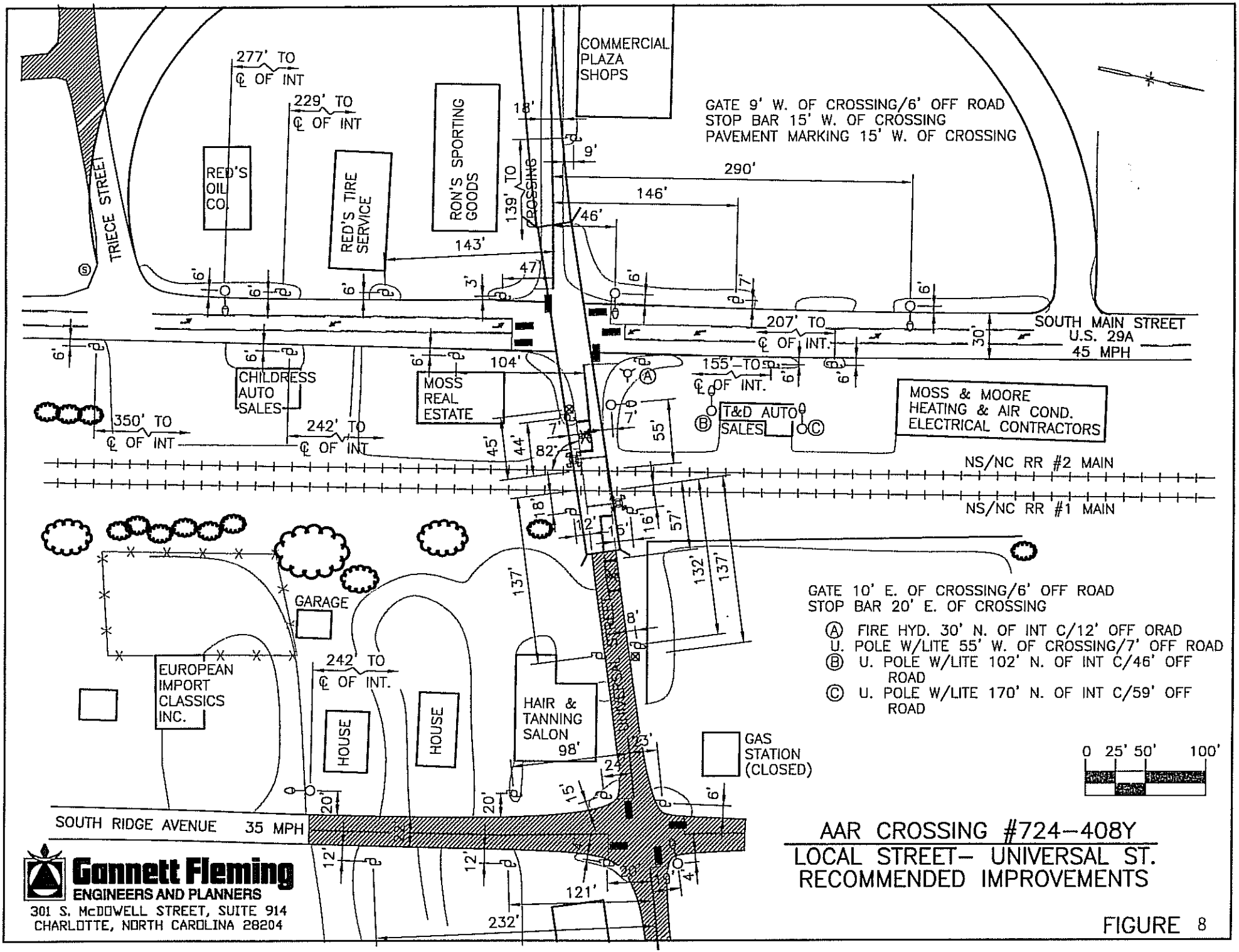


Eastbound Approach



Westbound Approach

FIGURE 7



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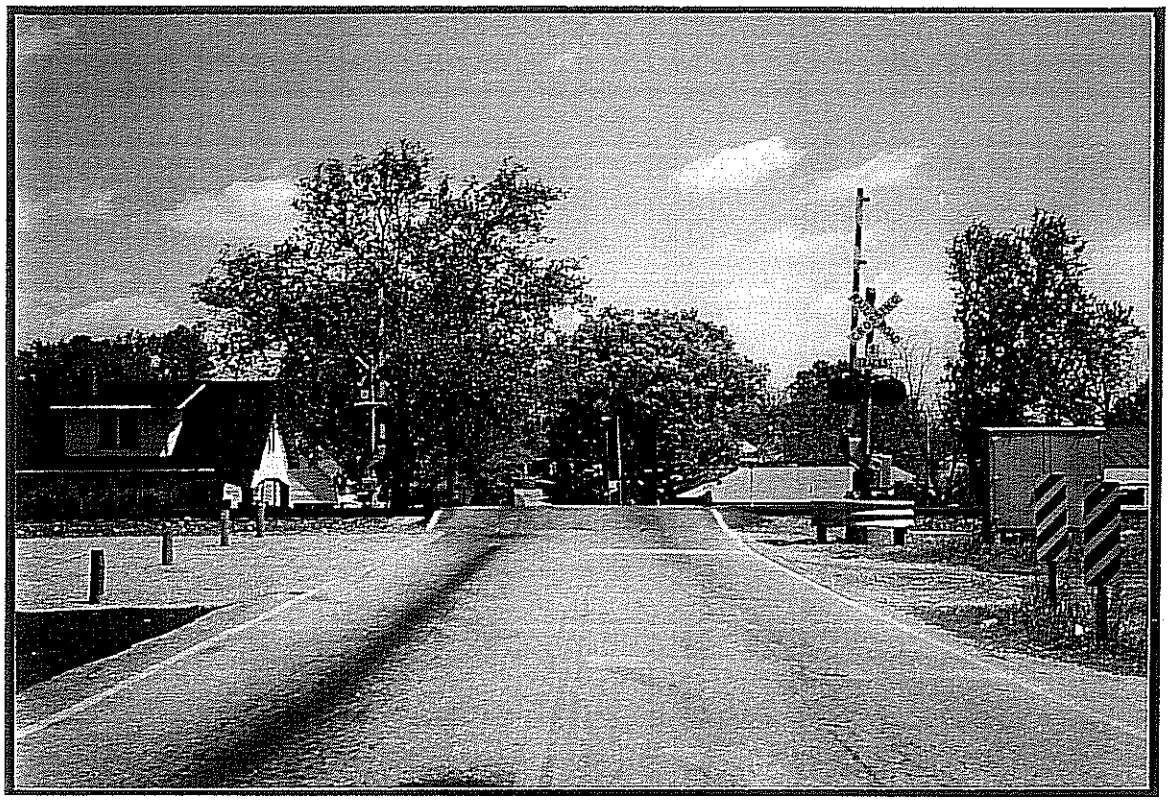
AAR CROSSING #724-408Y
LOCAL STREET- UNIVERSAL ST.
RECOMMENDED IMPROVEMENTS

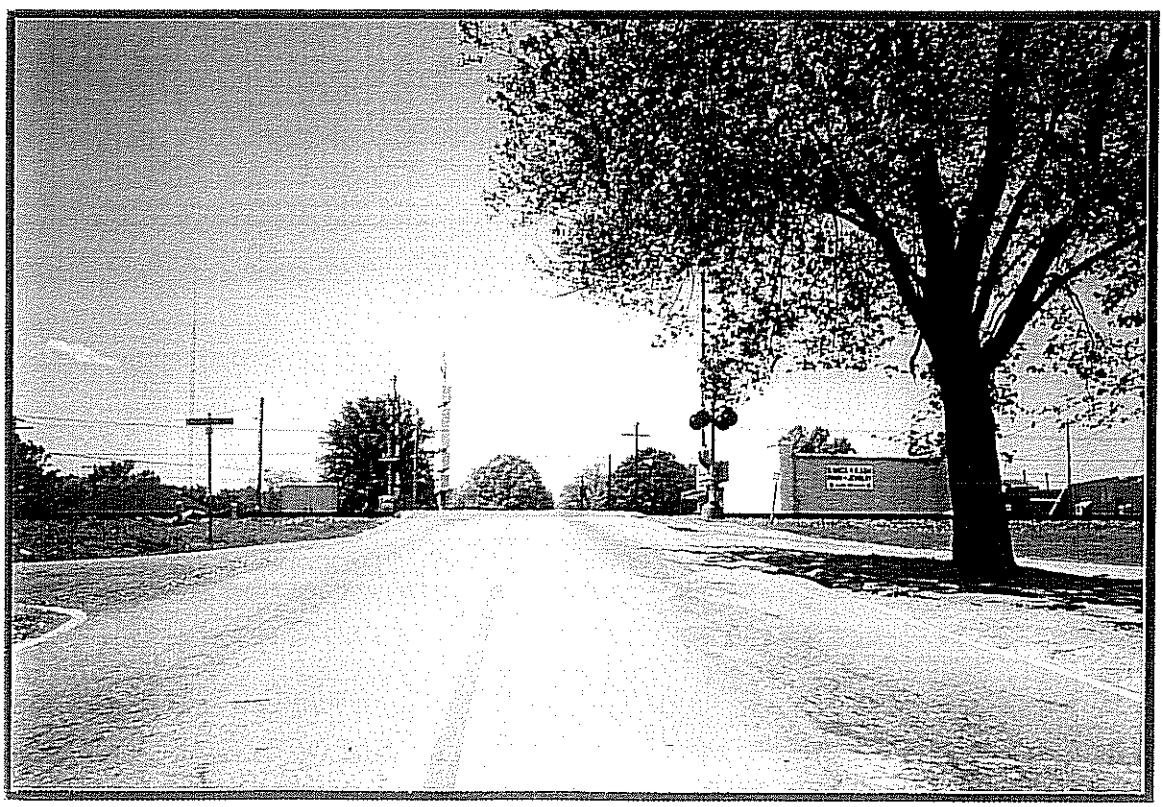
FIGURE 8

Municipality: Kannapolis

Crossing Number: 724407S *Street Name:* Plymouth St.

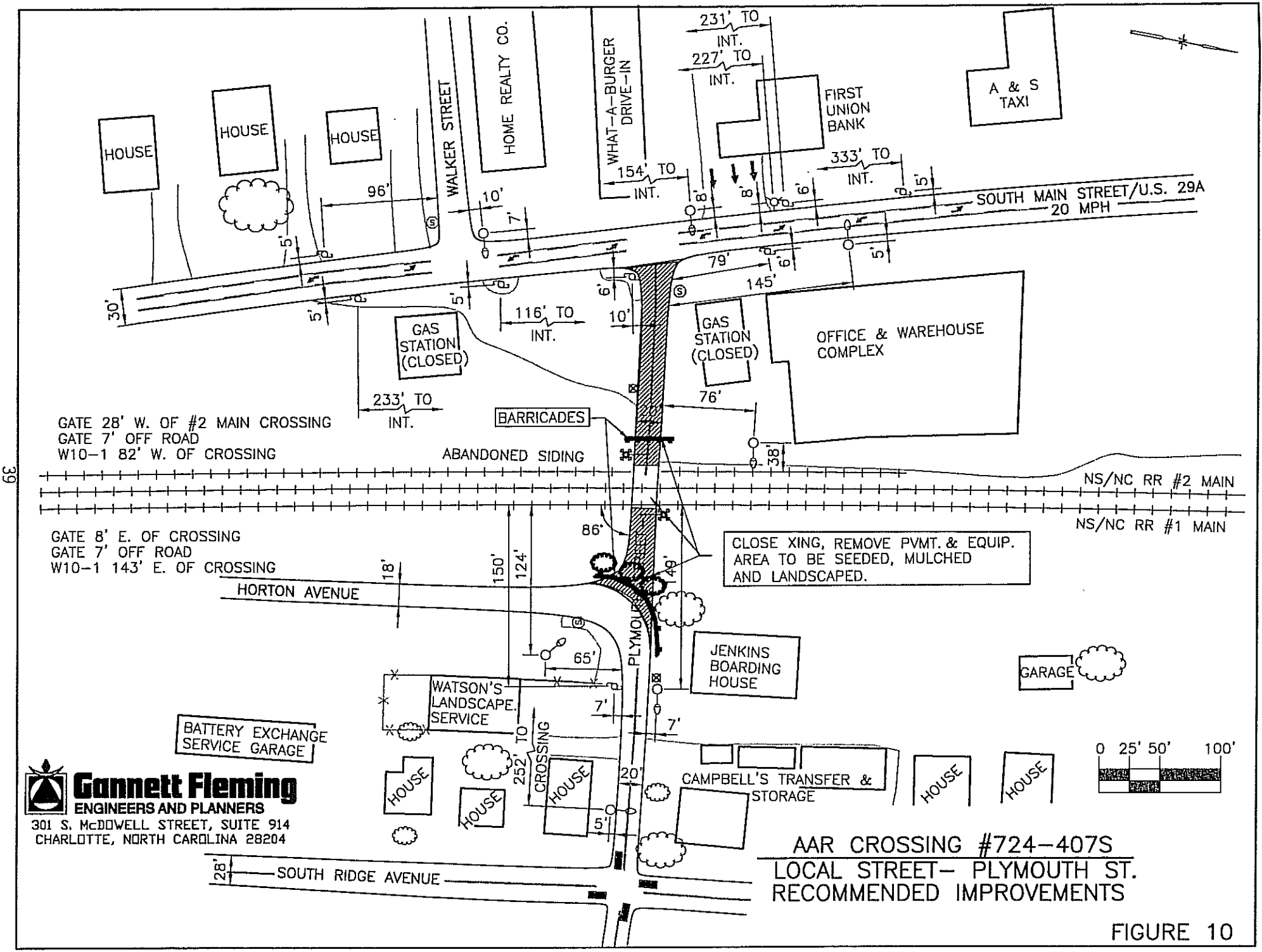


Eastbound Approach



Westbound Approach

FIGURE 9


HOUSE
HOUSE
HOUSE
WALKER STREET
HOME REALTY CO.
WHAT-A-BURGER DRIVE-IN
231' TO INT.
227' TO INT.
FIRST UNION BANK
A & S TAXI
154' TO INT.
333' TO INT.
SOUTH MAIN STREET/U.S. 29A
20 MPH
96'
10'
7'
5'
30'
79'
145'
6'
116' TO INT.
GAS STATION (CLOSED)
GAS STATION (CLOSED)
OFFICE & WAREHOUSE COMPLEX
233' TO INT.
76'
BARRICADES
GATE 28' W. OF #2 MAIN CROSSING
GATE 7' OFF ROAD
W10-1 82' W. OF CROSSING
ABANDONED SIDING
NS/NC RR #2 MAIN
NS/NC RR #1 MAIN
GATE 8' E. OF CROSSING
GATE 7' OFF ROAD
W10-1 143' E. OF CROSSING
86'
CLOSE XING, REMOVE PVMT. & EQUIP. AREA TO BE SEEDED, MULCHED AND LANDSCAPED.
HORTON AVENUE
18'
150'
124'
PLYMOUTH STREET
JENKINS BOARDING HOUSE
GARAGE
65'
WATSON'S LANDSCAPE SERVICE
7'
BATTERY EXCHANGE SERVICE GARAGE
252' TO CROSSING
20'
CAMPBELL'S TRANSFER & STORAGE
HOUSE
HOUSE
HOUSE
HOUSE
HOUSE
0 25' 50' 100'
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ENGINEERS AND PLANNERS
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CHARLOTTE, NORTH CAROLINA 28204
28'
SOUTH RIDGE AVENUE
AAR CROSSING #724-407S
LOCAL STREET- PLYMOUTH ST.
RECOMMENDED IMPROVEMENTS
FIGURE 10

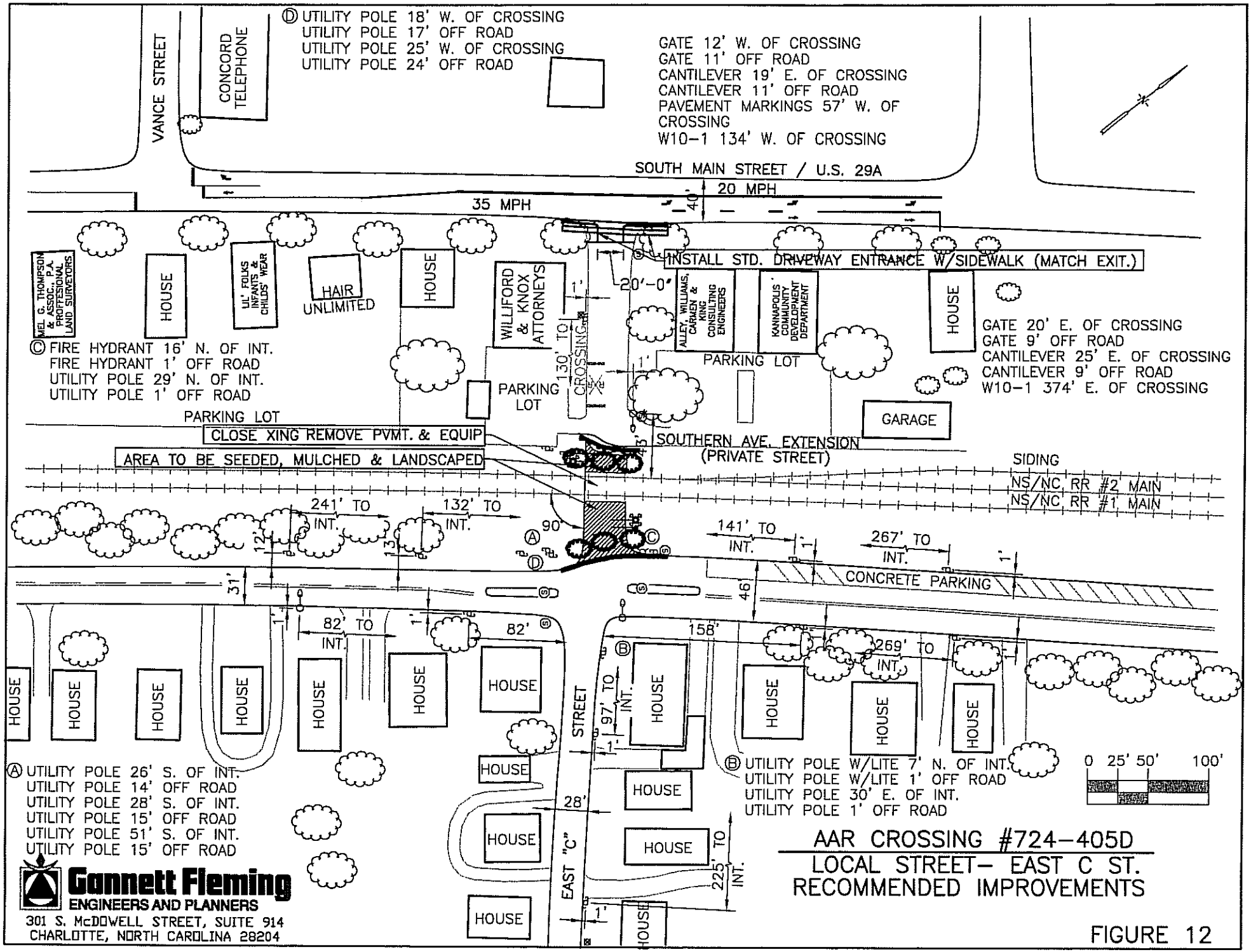
Municipality: Kannapolis

Crossing Number: 724405D *Street Name:* East C St.

Eastbound Approach

Westbound Approach

FIGURE 11


VANCE STREET
CONCORD TELEPHONE
Ⓓ UTILITY POLE 18' W. OF CROSSING
UTILITY POLE 17' OFF ROAD
UTILITY POLE 25' W. OF CROSSING
UTILITY POLE 24' OFF ROAD
GATE 12' W. OF CROSSING
GATE 11' OFF ROAD
CANTILEVER 19' E. OF CROSSING
CANTILEVER 11' OFF ROAD
PAVEMENT MARKINGS 57' W. OF CROSSING
W10-1 134' W. OF CROSSING
SOUTH MAIN STREET / U.S. 29A
35 MPH
20 MPH
40'
MEL G. THOMPSON & ASSOC., P.A. PROFESSIONAL LAND SURVEYORS
HOUSE
LIL' FOLKS INFANTS & CHILDS' WEAR
HAIR UNLIMITED
HOUSE
WILLIFORD & KNOX ATTORNEYS
INSTALL STD. DRIVEWAY ENTRANCE W/SIDEWALK (MATCH EXIT.)
20'-0"
ALLEY, WILLIAMS, CARMEN & KING CONSULTING ENGINEERS
KANNAPOLIS COMMUNITY DEVELOPMENT DEPARTMENT
HOUSE
GATE 20' E. OF CROSSING
GATE 9' OFF ROAD
CANTILEVER 25' E. OF CROSSING
CANTILEVER 9' OFF ROAD
W10-1 374' E. OF CROSSING
Ⓒ FIRE HYDRANT 16' N. OF INT.
FIRE HYDRANT 1' OFF ROAD
UTILITY POLE 29' N. OF INT.
UTILITY POLE 1' OFF ROAD
PARKING LOT
PARKING LOT
130' TO CROSSING
PARKING LOT
GARAGE
CLOSE XING REMOVE PVMT. & EQUIP
AREA TO BE SEEDED, MULCHED & LANDSCAPED
SOUTHERN AVE. EXTENSION (PRIVATE STREET)
SIDING
NS/NC RR #2 MAIN
NS/NC RR #1 MAIN
241' TO INT.
132' TO INT.
90
141' TO INT.
267' TO INT.
CONCRETE PARKING
31'
46'
82' TO INT.
82'
158'
269' TO INT.
97' TO INT.
STREET
28'
225' TO INT.
EAST "C"
HOUSE
Ⓐ UTILITY POLE 26' S. OF INT.
UTILITY POLE 14' OFF ROAD
UTILITY POLE 28' S. OF INT.
UTILITY POLE 15' OFF ROAD
UTILITY POLE 51' S. OF INT.
UTILITY POLE 15' OFF ROAD
Ⓑ UTILITY POLE W/LITE 7' N. OF INT.
UTILITY POLE W/LITE 1' OFF ROAD
UTILITY POLE 30' E. OF INT.
UTILITY POLE 1' OFF ROAD
0 25' 50' 100'
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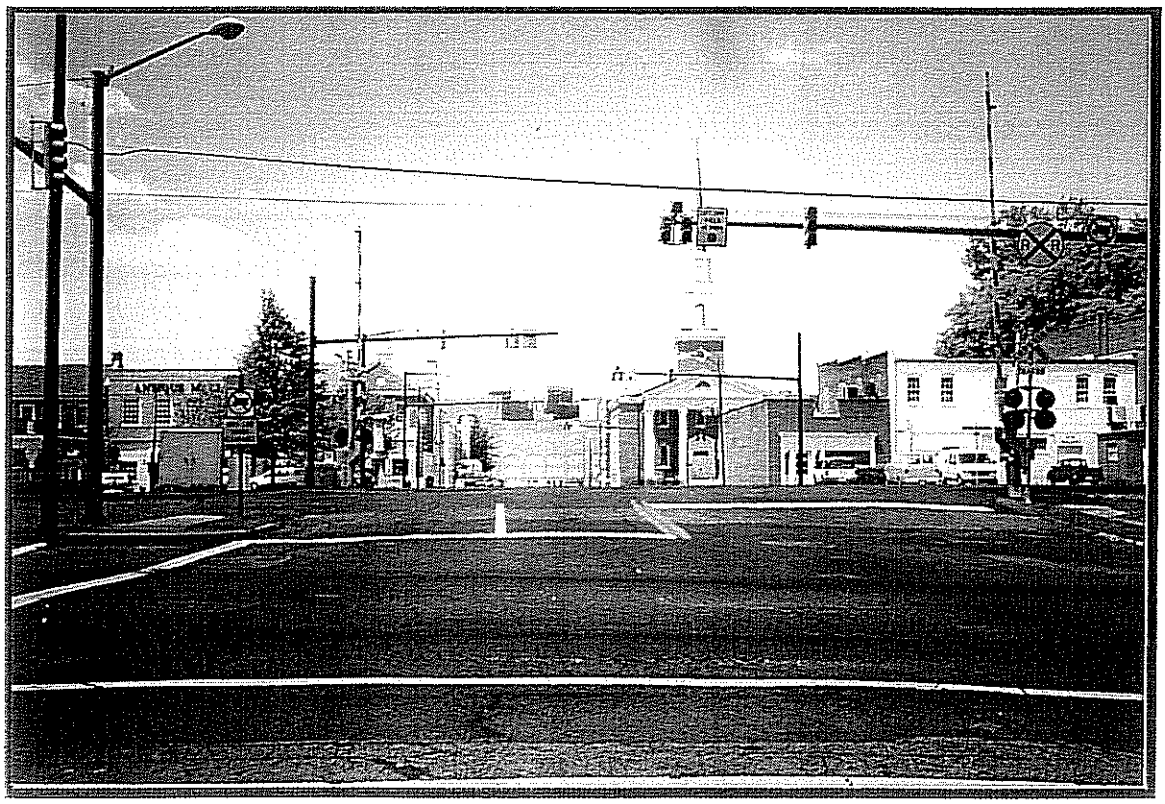
CHARLOTTE, NORTH CAROLINA 28204
AAR CROSSING #724-405D
LOCAL STREET- EAST C ST.
RECOMMENDED IMPROVEMENTS
FIGURE 12

Municipality: Kannapolis

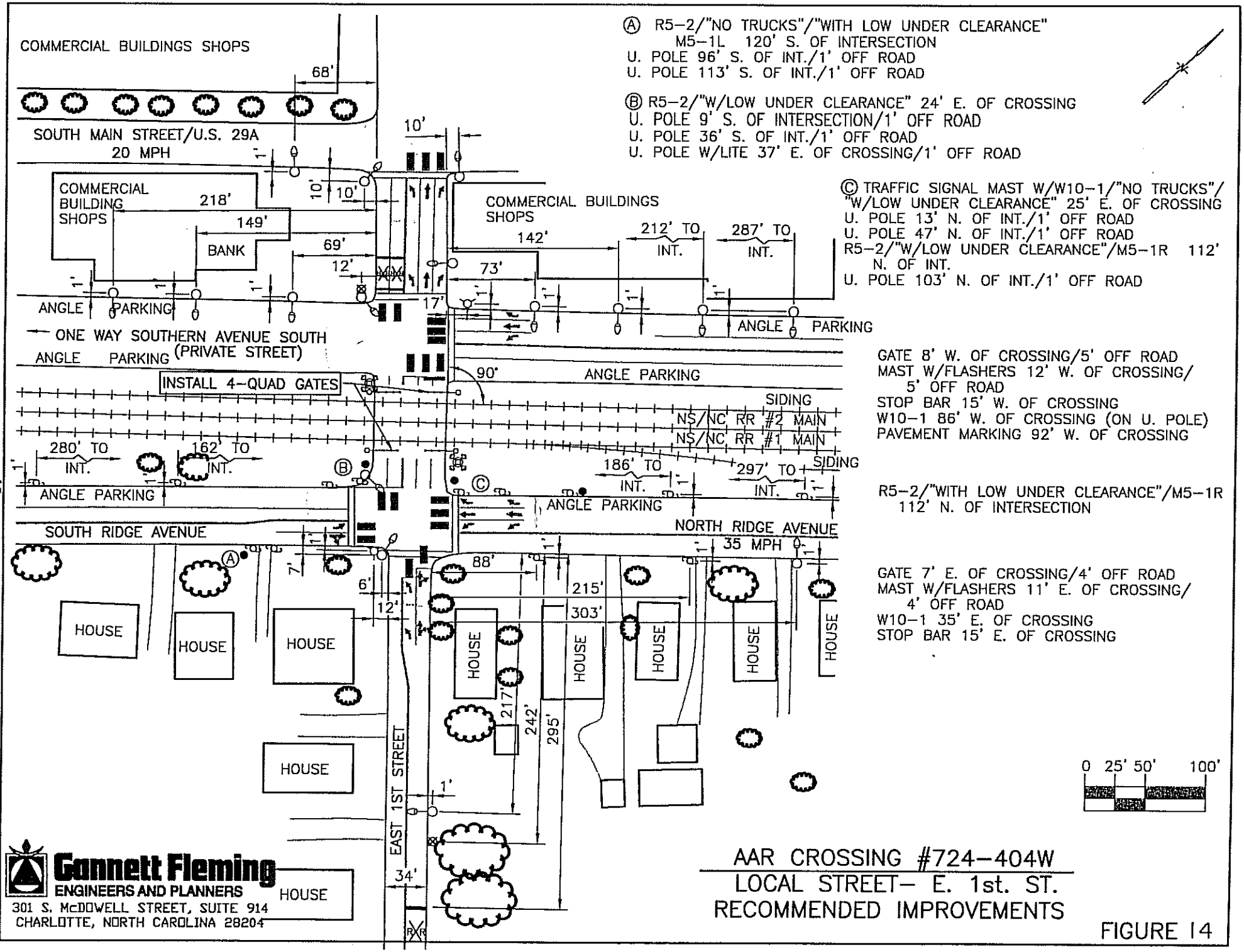
Crossing Number: 724404W *Street Name:* East 1st St.

Eastbound Approach



Westbound Approach

FIGURE 13



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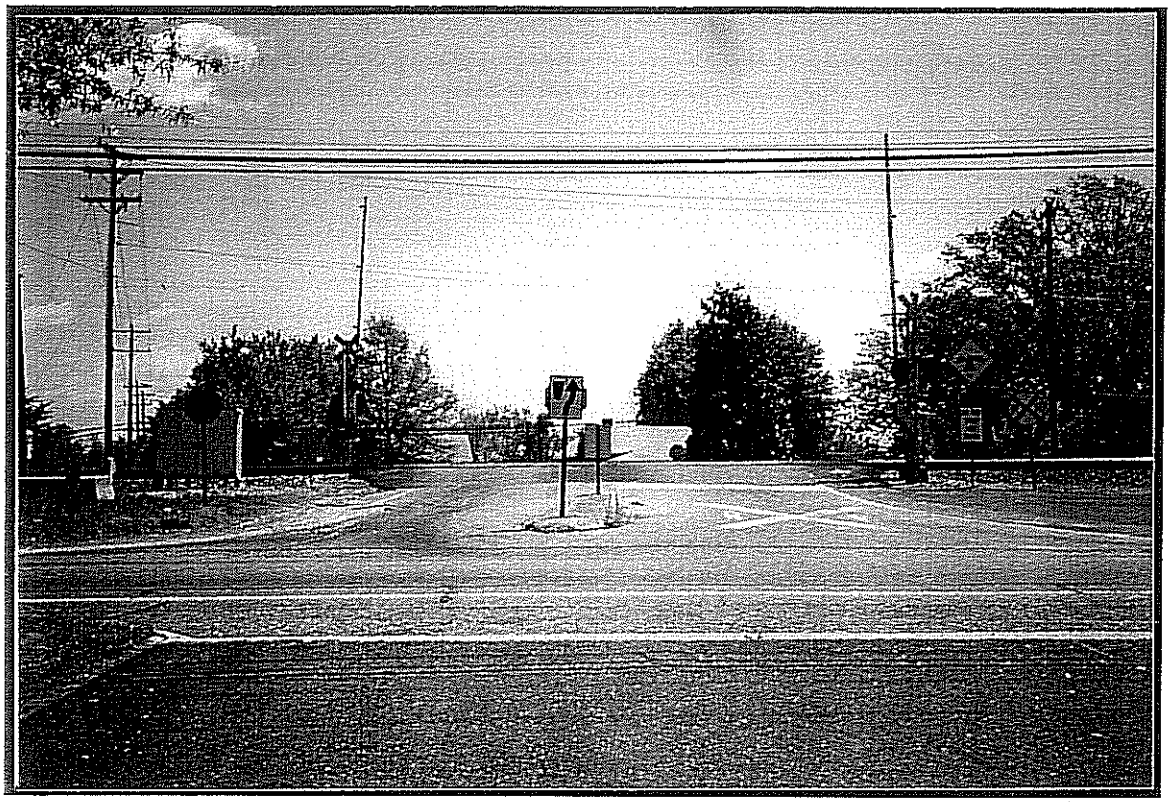
AAR CROSSING #724-404W
LOCAL STREET- E. 1st. ST.
RECOMMENDED IMPROVEMENTS

FIGURE 14

Municipality: Kannapolis

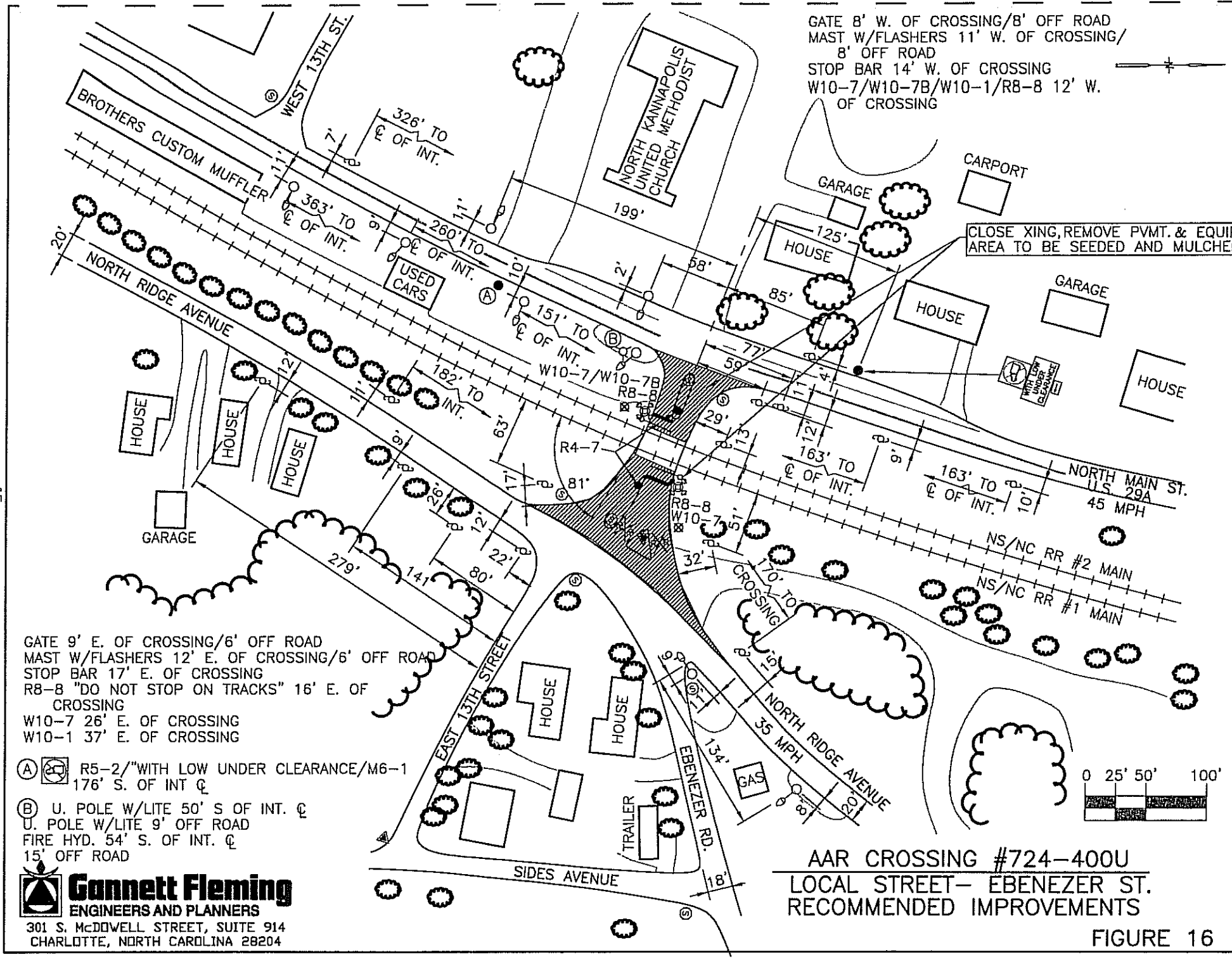
Crossing Number: 724400U *Street Name:* Ebenezer Rd.



Eastbound Approach

Westbound Approach

FIGURE 15



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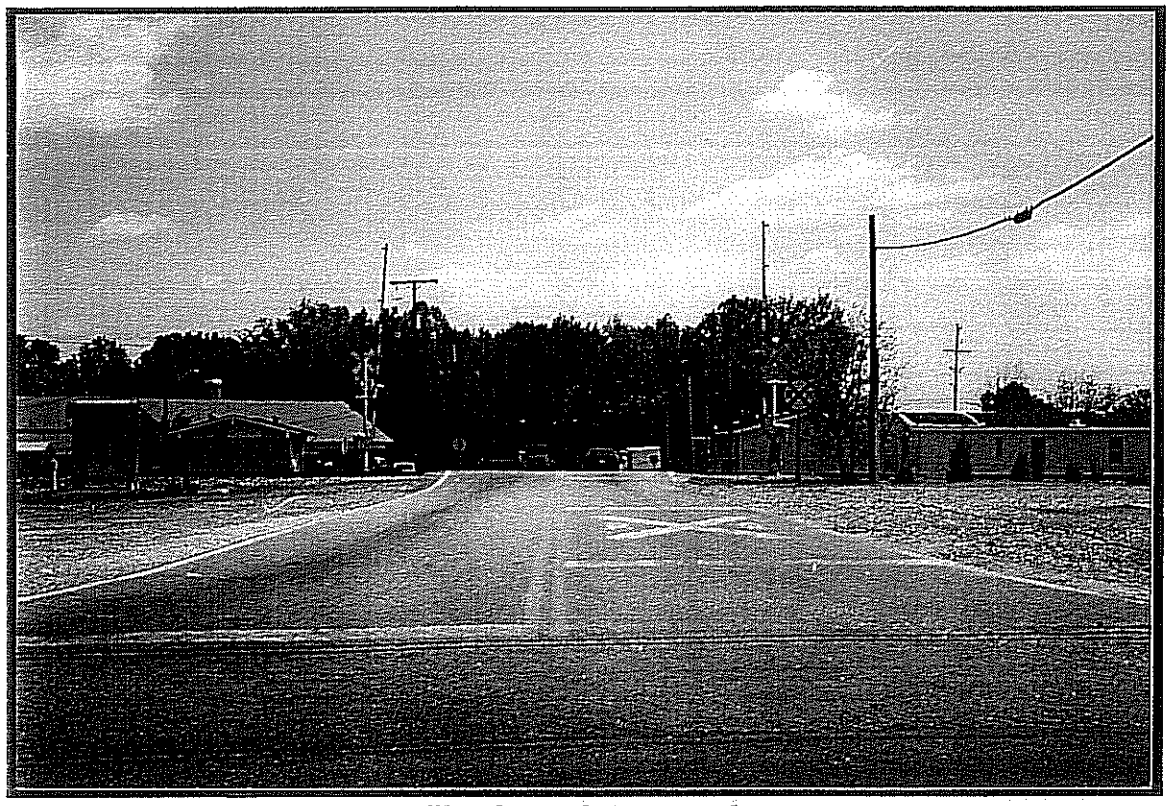
AAR CROSSING #724-400U
LOCAL STREET- EBENEZER ST.
RECOMMENDED IMPROVEMENTS

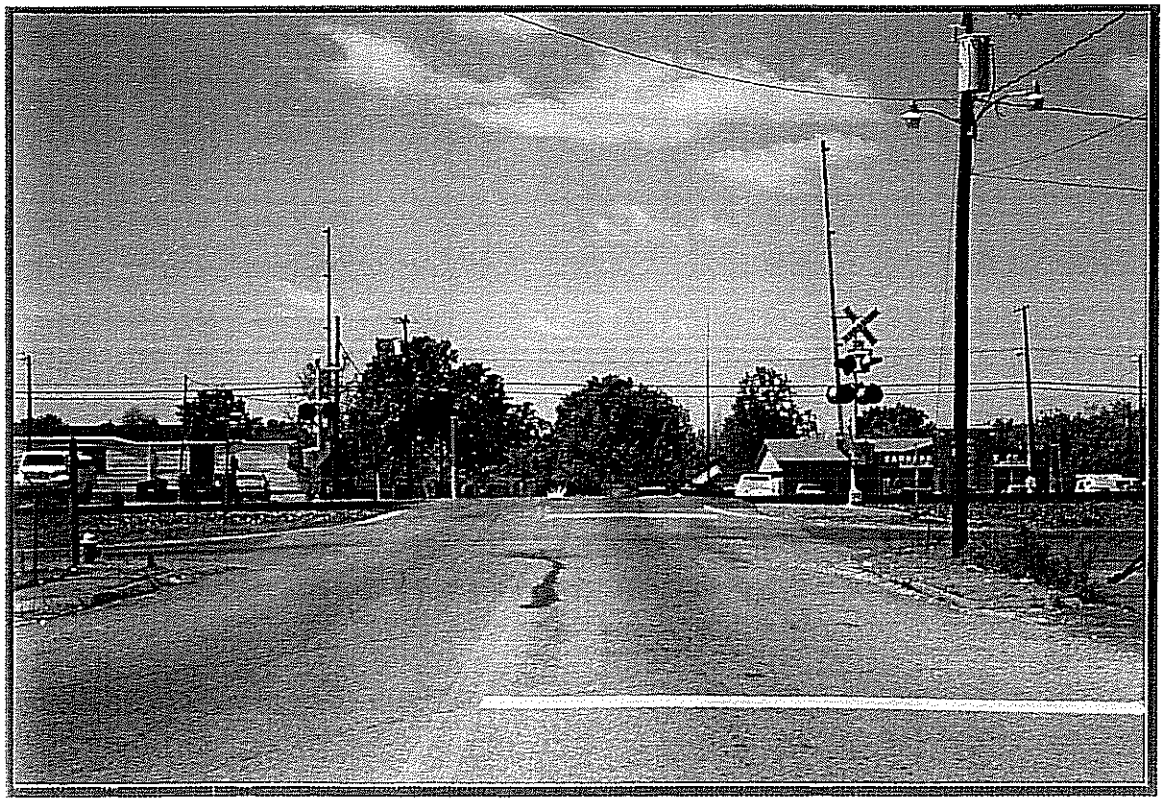
FIGURE 16

Municipality: Kannapolis

Crossing Number: 724399C *Street Name:* East 18th St.

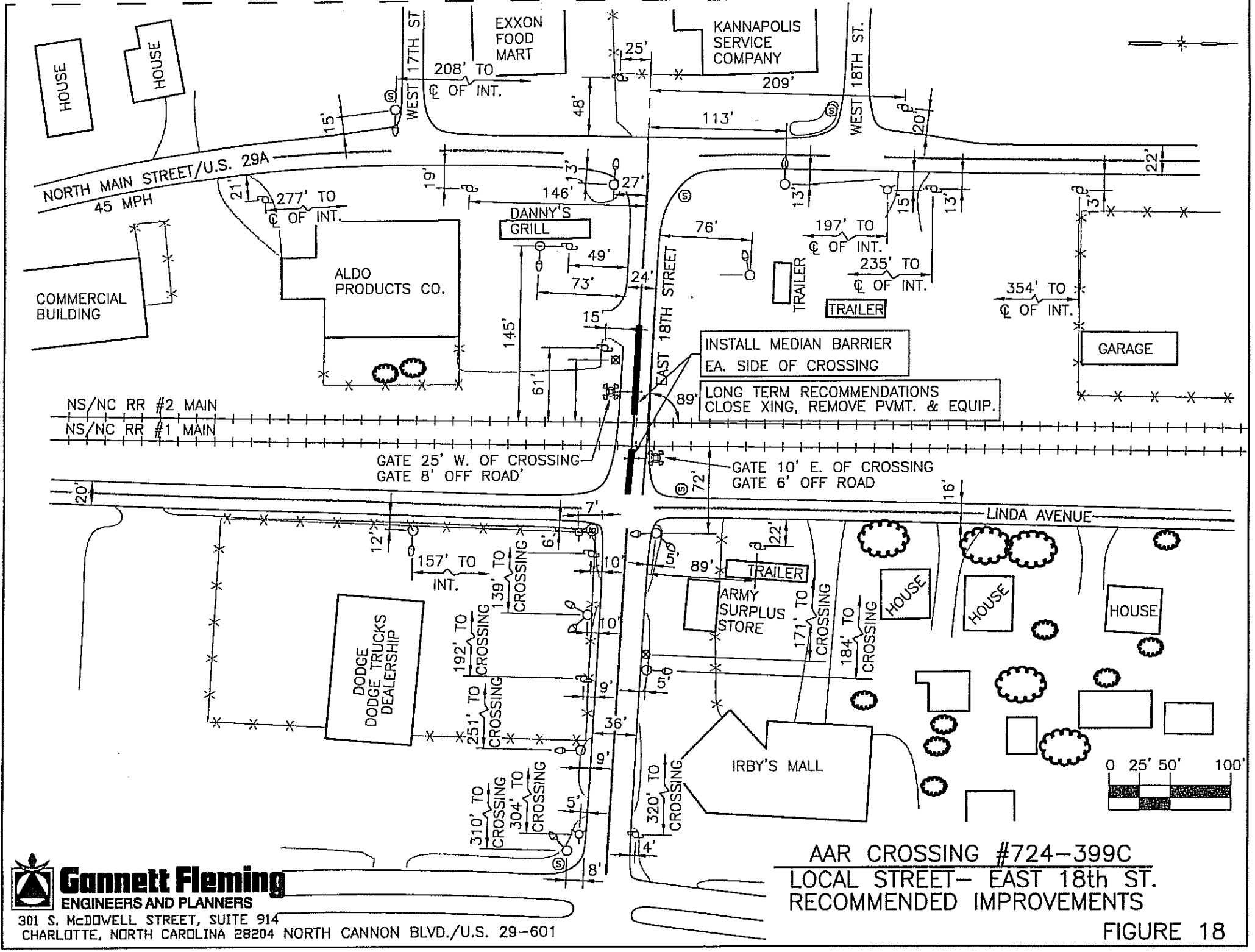


Eastbound Approach



Westbound Approach

FIGURE 17



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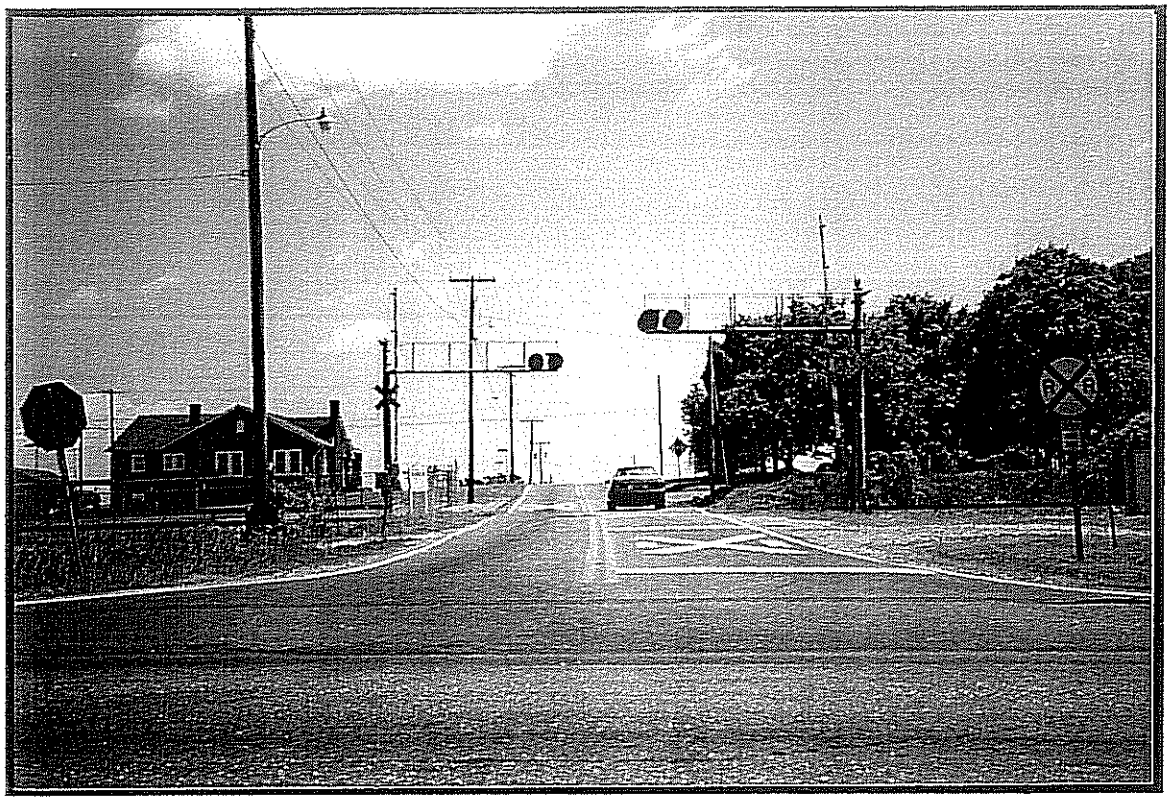
CHARLOTTE, NORTH CAROLINA 28204 NORTH CANNON BLVD./U.S. 29-601

AAR CROSSING #724-399C
LOCAL STREET- EAST 18th ST.
RECOMMENDED IMPROVEMENTS

FIGURE 18

Municipality: Kannapolis

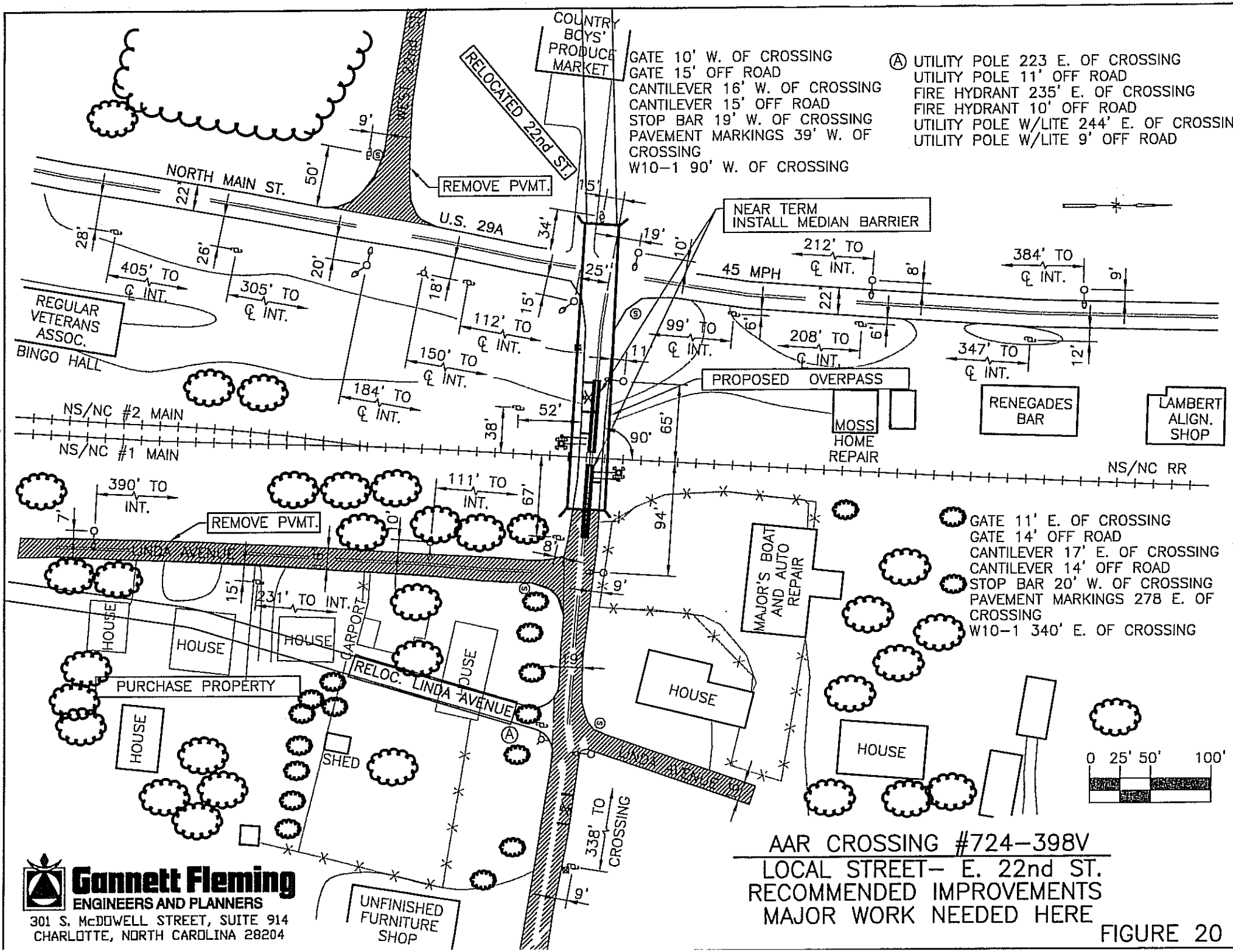
Crossing Number: 724398V *Street Name:* East 22nd St.



Eastbound Approach

Westbound Approach

FIGURE 19



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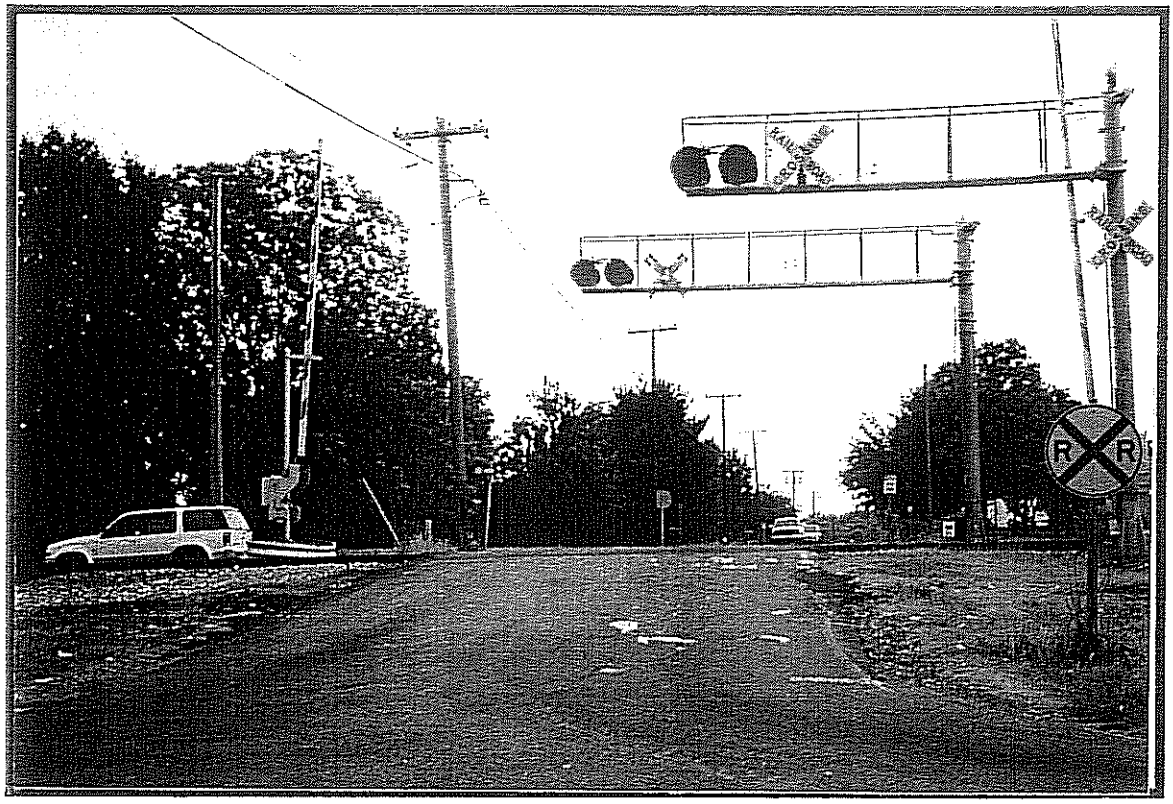
AAR CROSSING #724-398V
LOCAL STREET- E. 22nd ST.
RECOMMENDED IMPROVEMENTS
MAJOR WORK NEEDED HERE

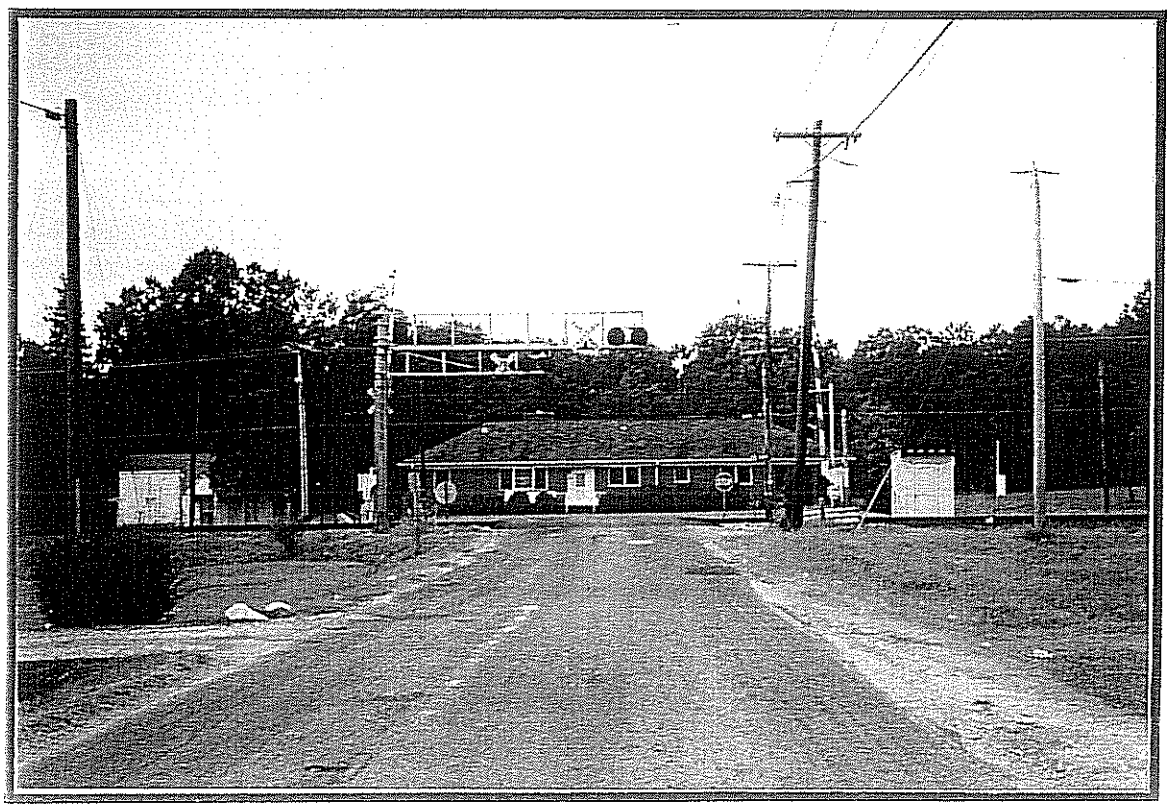
FIGURE 20

Municipality: Kannapolis

Crossing Number: 724397N *Street Name:* East 29th St.



Eastbound Approach

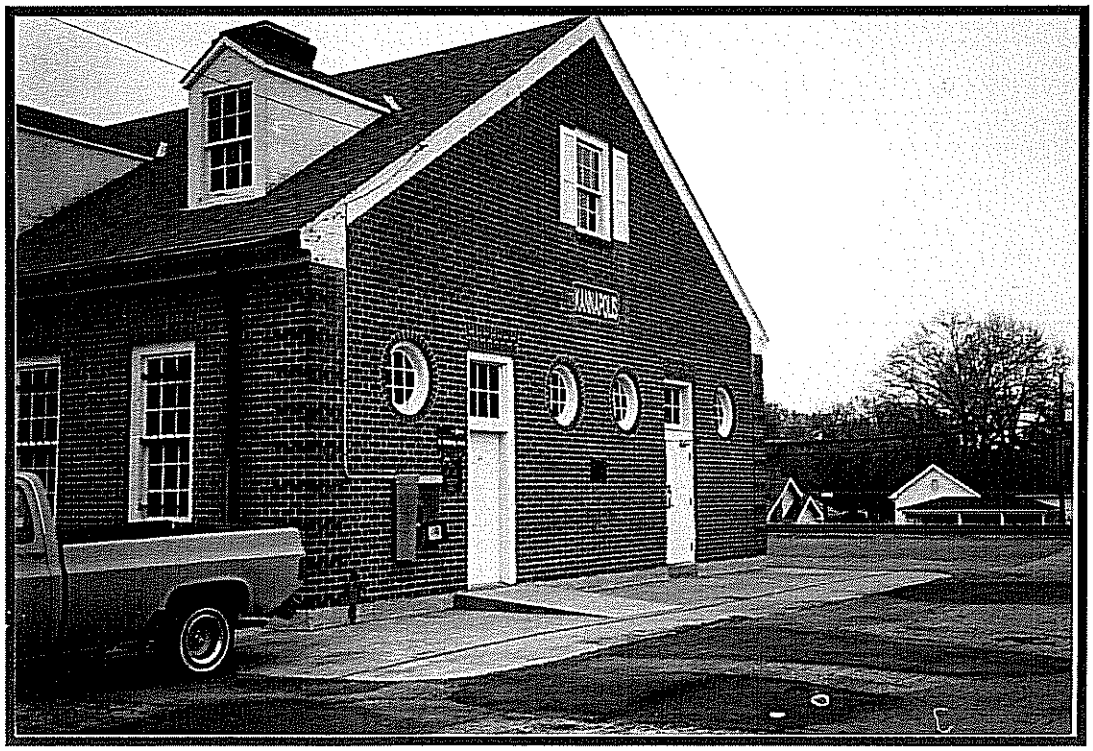


Westbound Approach

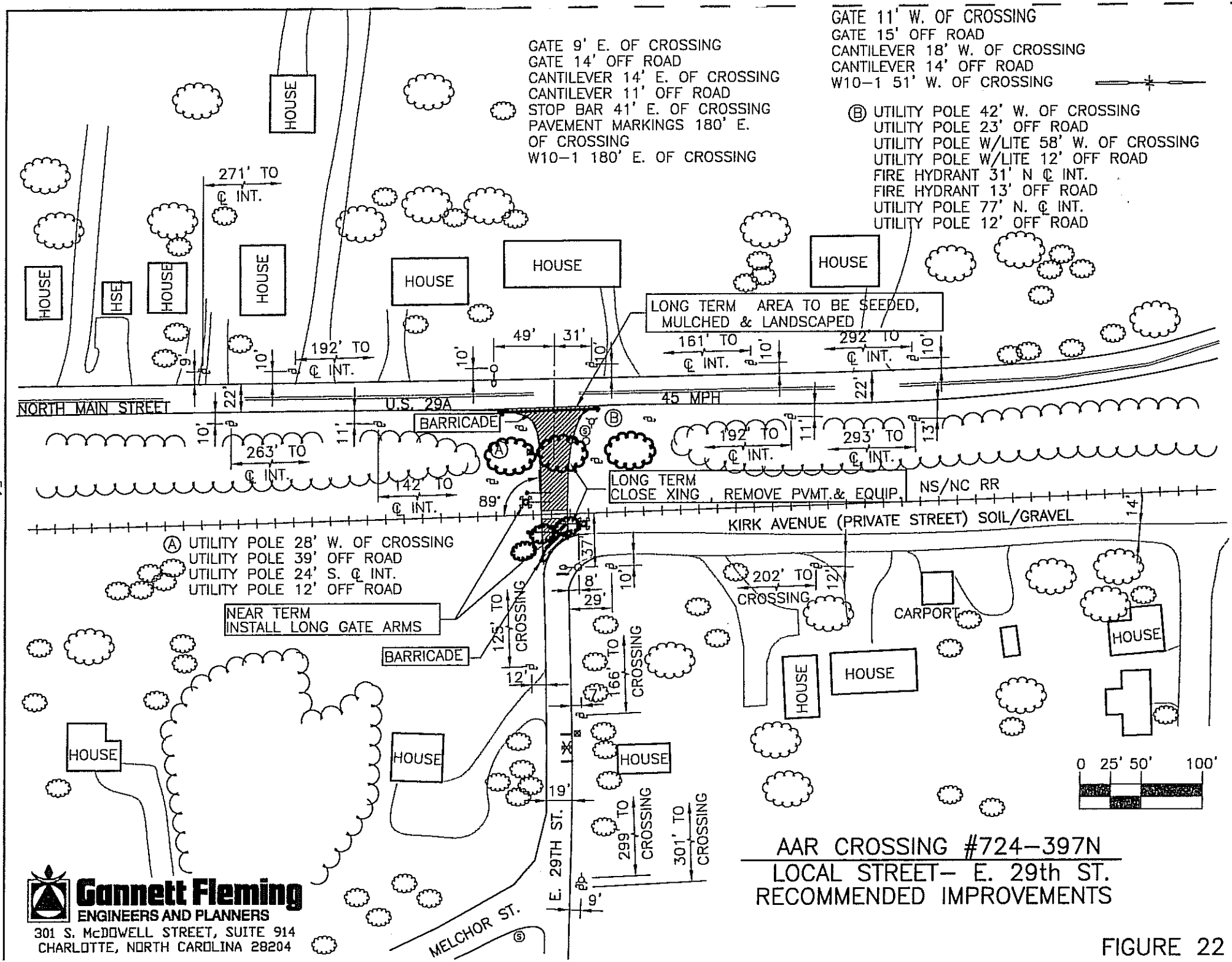
FIGURE 21

Kannapolis AMTRAK Station

Existing Station



Existing Station



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AAR CROSSING #724-397N
LOCAL STREET- E. 29th ST.
RECOMMENDED IMPROVEMENTS

FIGURE 22

APPENDIX

AMTRAK STATION

The existing AMTRAK Station is located north of the Kannapolis Central Business District along N. Main St (US 29-A). The Station is across the street from the Fieldcrest Cannon Mill #1 and the parking area around the Station is used by mill employees. The Norfolk Southern Railway also occupies a large portion of the building with a maintenance shop. While the building itself appears to be of sound condition, its location and appearance do not qualify as "user friendly". Other than the standard Amtrak logo sign on the street and a small plaque on the side of the building identifying the waiting area and train schedules, there is nothing inviting about the building. As a matter of fact, the building appears to repel rather than attract rail passengers.

Both the **"Carolinian"** and the **"Piedmont"** trains make daily scheduled stops at the Kannapolis Station. The Piedmont (train73/74) makes a southbound stop at 10:09 AM and a northbound stop at 6:02PM. The Carolinian (train 79/80) makes a southbound stop at 7:47PM and a northbound stop at 8:27AM. Information supplied by the **NCDOT Rail Division,** indicates that daily activity for 1996 (boardings/deboardings) for the Piedmont averages 2.2 passengers per day, while activity on the Carolinian averages 6.5 passengers per day.

Cannon Village is a large shopping area abutting S. Main St. on the West side and extending from West 1st Street southerly to Vance Street. While demographic information is not available, the Visitor's Center at the Village reports that over 50,000 people annually sign the guest registry. If one assumes that those signing the registry represent only 5% of those that shop in the Village on an annual basis, then total attendance approaches 1 million. Information from the guest registry indicates that a significant number of guests are from out-of-state. These out-of-state guests as well as those from other cities in North Carolina along the rail corridor are potential rail passenger riders.

STATION CRITERIA

There are many factors that influence one's decision to use another mode of transportation other than the automobile. In the case of someone choosing to use rail service, as with any mass transit mode, convenience is always a critical factor. The North Carolina Department of Transportation, through its Rail Division, has attempted to address the convenience factor by scheduling the Carolinian and the Piedmont to operate during hours that provide the most convenience to the most people.

Another significant factor in the travel decision is that people do not like to change modes. In the case of the Kannapolis station, a location close to Cannon Village would allow those who elect to arrive/depart by rail to walk to their destination and not have to use another form of ground transportation such as a taxi or bus.

Passenger amenities are an important factor in travel decisions. Included in this category are:

- Location of station (convenience).

- Accessibility to station for automobile and pedestrian traffic.

- Security- both personal and for parked automobiles.

- Boarding arrangements-a platform of sufficient length, height and width to effectively provide access to and from the trains.

- Station Amenities
  -Restrooms meeting Americans With Disability Act requirements are mandatory.
  -A comfortable, secure and pleasing waiting area.
  -Inviting information panels.
  -Storage lockers that rent for a nominal fee.
  -Access to nearby food services.
  -Easy access to boarding platform.
  -Acoustics and graphics in and around the station.

- Overnight accommodations.

SITE PROPOSAL

A committee consisting of Kannapolis City officials, Chamber of Commerce, NCDOT Rail Division staff, AMTRAK staff, MPO staff, developers and interested citizens have been working on a proposal to upgrade or relocate the current station for some time. The committee now seems prepared to propose a relocated station to be housed in a small building adjacent the tracks at 201 South Main Street near the East C Street crossing. Access to the building and the structure itself, appear to be acceptable for a temporary location. However, the building is hidden behind a house that fronts on S. Main St. and does not appear to meet the above listed criteria for a permanent station.The overall area housing the proposed temporary station can be improved to meet the criteria and its nearness to Cannon Village is paramount.

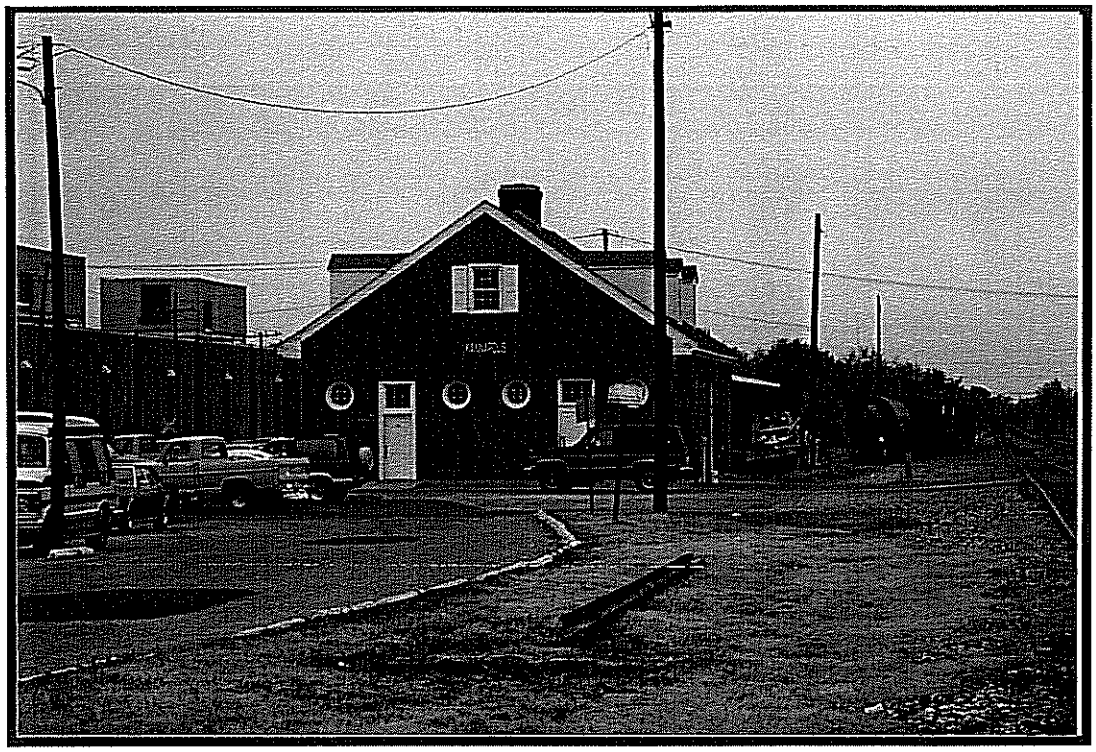
RECOMMENDATION

It is recommended that a permanent **AMTRAK** station be planned and ultimately built in the general vicinity of the proposed temporary site. The station should be constructed to the north of the temporary site with good visibility from all directions. The platform that is proposed to serve the temporary station should be designed to accommodate the permanent station such that only minor renovations will be required at the time the new station is constructed.

The area proposed for the new station has ample parking, the topography is generally flat, has good visibility from all quadrants and is within a few hundred feet of the **Village**. The area is well lighted, however, pedestrian-scale lighting should be considered during the planning process. Overall landscaping of the site is also an important factor in station ambiance. Trees, benches and water features can make the station much more inviting as well as providing a pleasing outdoor waiting area.

Two other factors must be addressed as **Kannapolis, AMTRAK and NCDOT** move forward to construct a permanent facility-access to overnight accommodations and ground transportation to and from the station. Nearby hotel/motel accommodations are available and reasonably priced ground transportation can be provided in the form of taxis or possibly van service supported or supplied by the County.These factors will be critical to the long-term success of the **Kannapolis Station** and ridership on both the **Carolinian and the Piedmont**.

Kannapolis AMTRAK Station



Existing Station

Existing Station

Kannapolis AMTRAK Station

Proposed Temporary Station

Proposed Temporary Station

Kannapolis AMTRAK Station

Proposed Temporary Station

Proposed Temporary Station

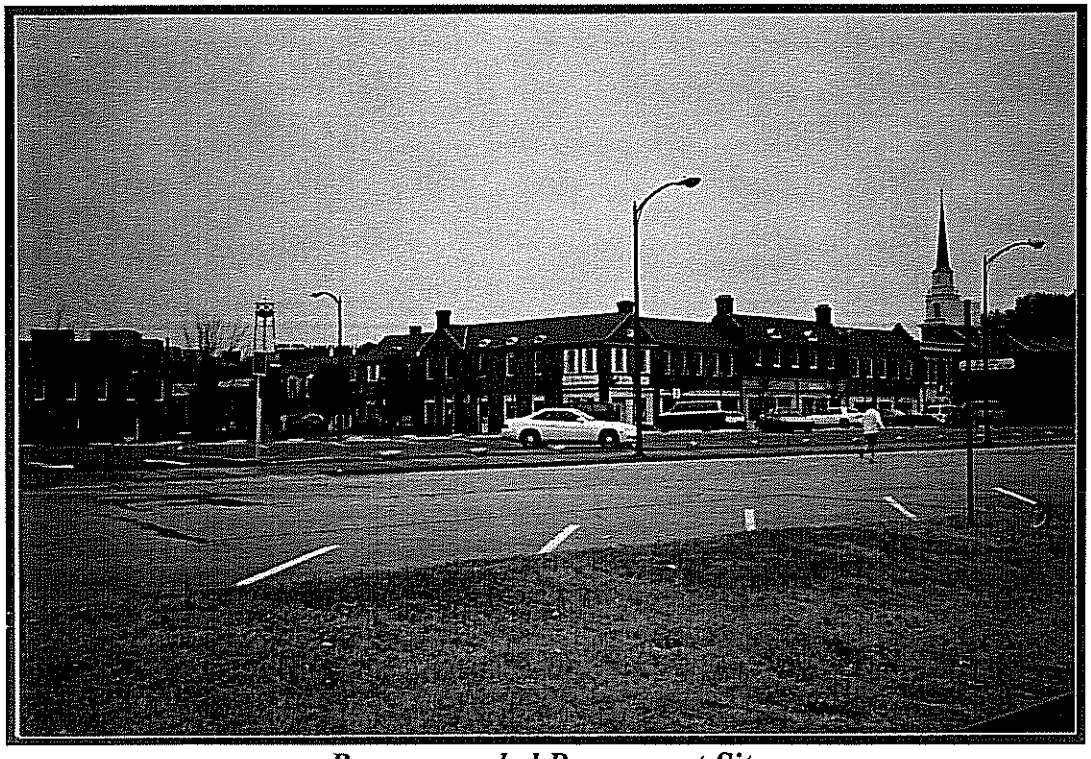
Kannapolis AMTRAK Station

Recommended Permanent Site

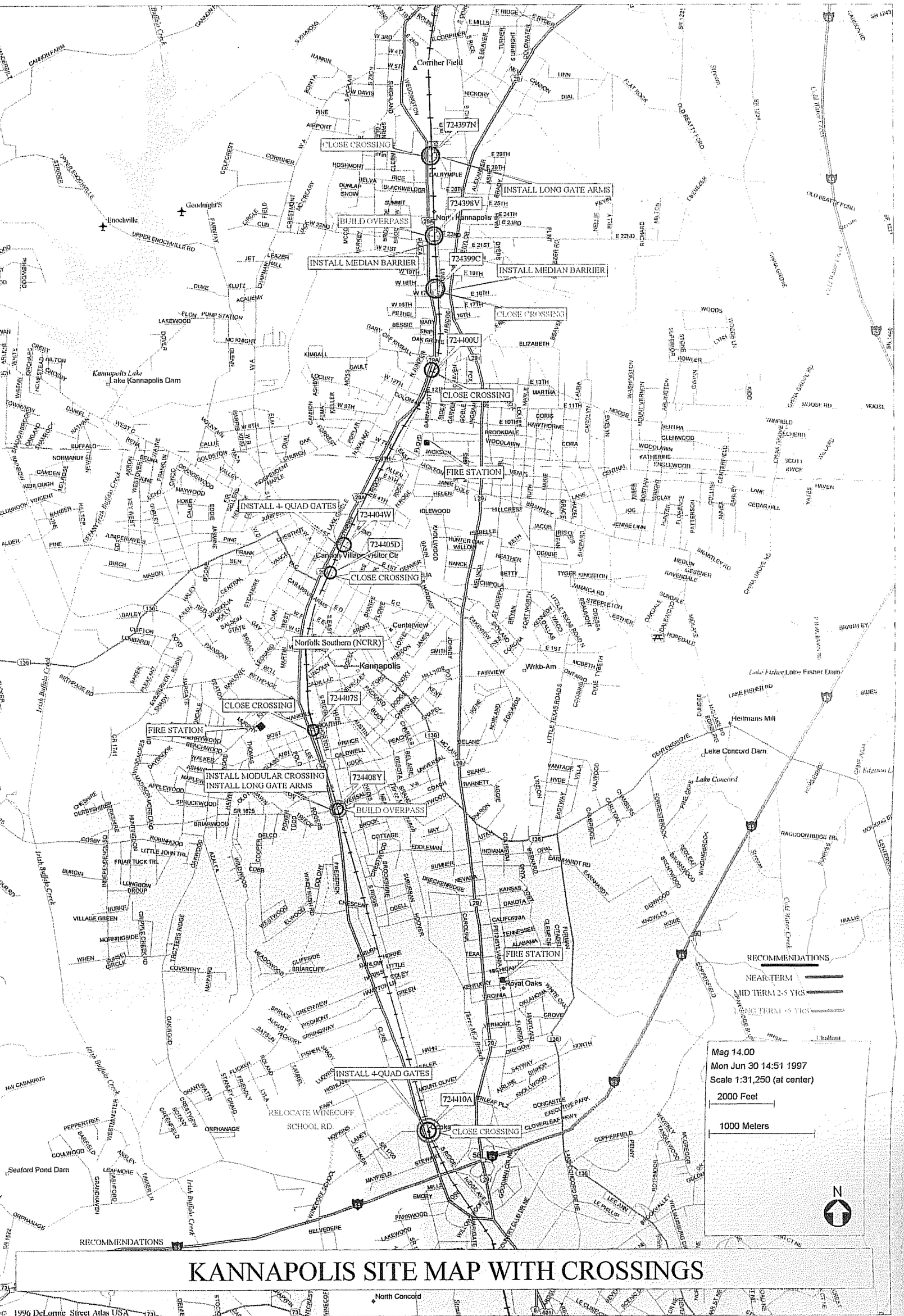
Recommended Permanent Site

Kannapolis AMTRAK Station

Recommended Permanent Site



Recommended Permanent Site



KANNAPOLIS SITE MAP WITH CROSSINGS

FIGURE 23

TABLE 2

CAPACITY ANALYSES SUMMARY (Kannapolis Study Section)

Intersection	1997 Existing Conditions	2010 No Build Conditions	2010 Build 1 Conditions	2010 Build 1 Conditions w/improve.	2010 Build 2 Conditions	2010 Build 2 Conditions w/improve.
Main Street and Winecoff Road (sig)	B	B	B	N/A	C	N/A
Ridge Avenue and Winecoff Road (unsig)	B	C	C	N/A	N/A	N/A
Main Street and Universal Street (sig)	B	B	B	N/A	*	B (3)
Ridge Avenue and Universal Street (sig)	B	B	C	N/A	*	B (4)
Main Street and Plymouth Street (unsig)	B	C	N/A	N/A	N/A	N/A
Ridge Avenue and Plymouth Street (sig)	B	B	B	N/A	B	N/A
Main Street and C Street (unsig)	B	C	N/A	N/A	N/A	N/A
Ridge Avenue and C Street (unsig)	B	B	B	B (1)	B	B (1)
Main Street and 1st Street (sig)	B	B	B	N/A	B	N/A
Ridge Avenue and 1st Street (sig)	B	B	C	N/A	C	N/A
Main Street and Ebeneezer Road (unsig)	C	C	N/A	N/A	N/A	N/A
Ridge Avenue and Ebeneezer Road (unsig)	B	C	B	N/A	B	N/A
Main Street and 18th Street (unsig)	B	B	N/A	N/A	N/A	N/A
Main Street and 22nd Street (unsig)	C	D	F	B (2)	F	B (2)
Main Street and 29th Street (unsig)	B	C	N/A	N/A	N/A	N/A

NOTES:

1. Capacity analysis results shown as Level of Service (LOS) for worst approach/ movement for unsignalized intersections and overall LOS for signalized intersections.
2. " * " means that LOS exceeds capacity.
3. N/A - not applicable

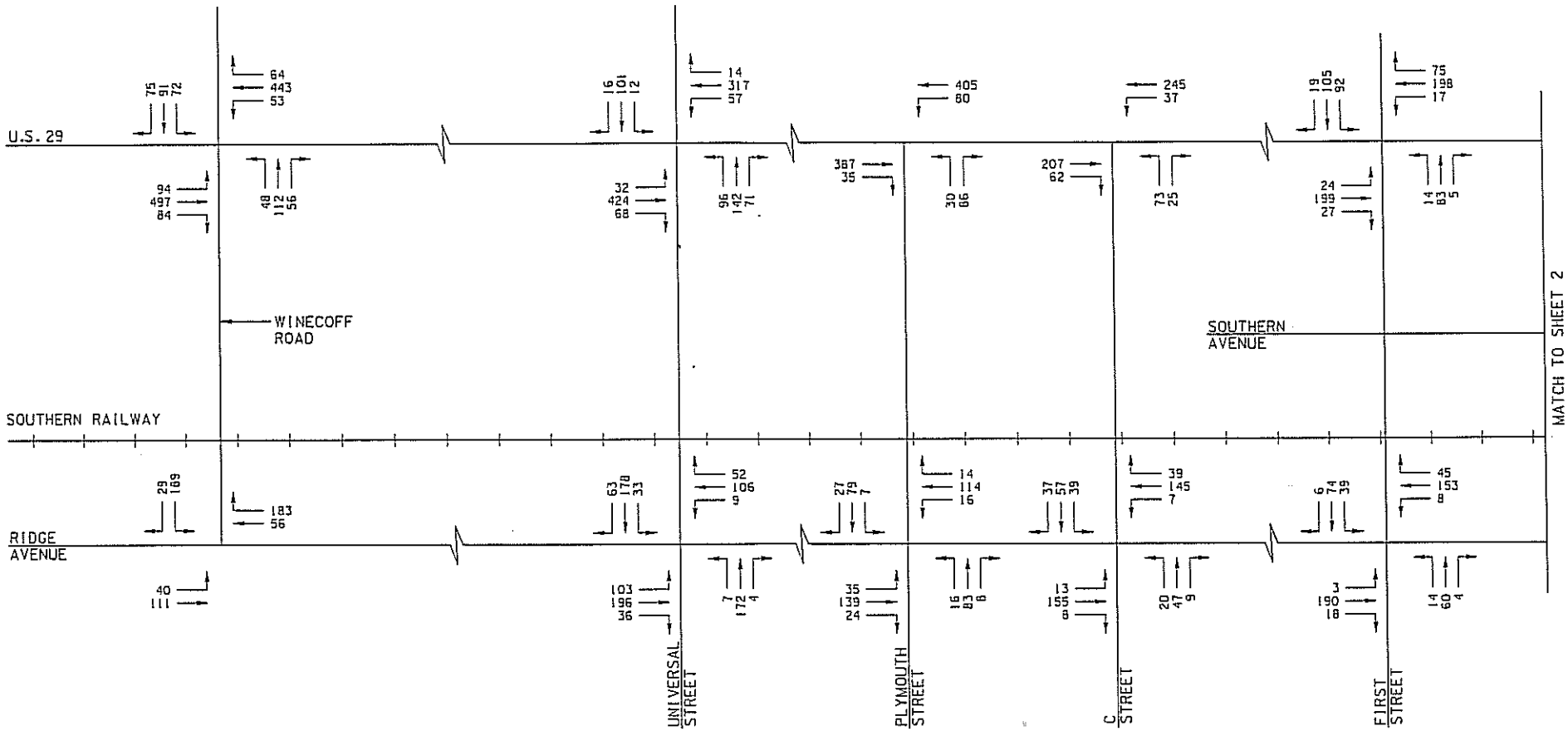
IMPROVEMENTS:

(1) only 1 EB left-turn lane and 1 EB thru/right-turn lane is needed

(2) signalization, create 1 WB left-turn lane and 1 WB right-turn lane, add SB left-turn lane, add NB right-turn lane

(3) add WB left-turn lane, add WB right-turn lane, add NB right-turn lane

(4) add EB left-turn lane, add NB left-turn lane, add SB right-turn lane



NO SCALE 1/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

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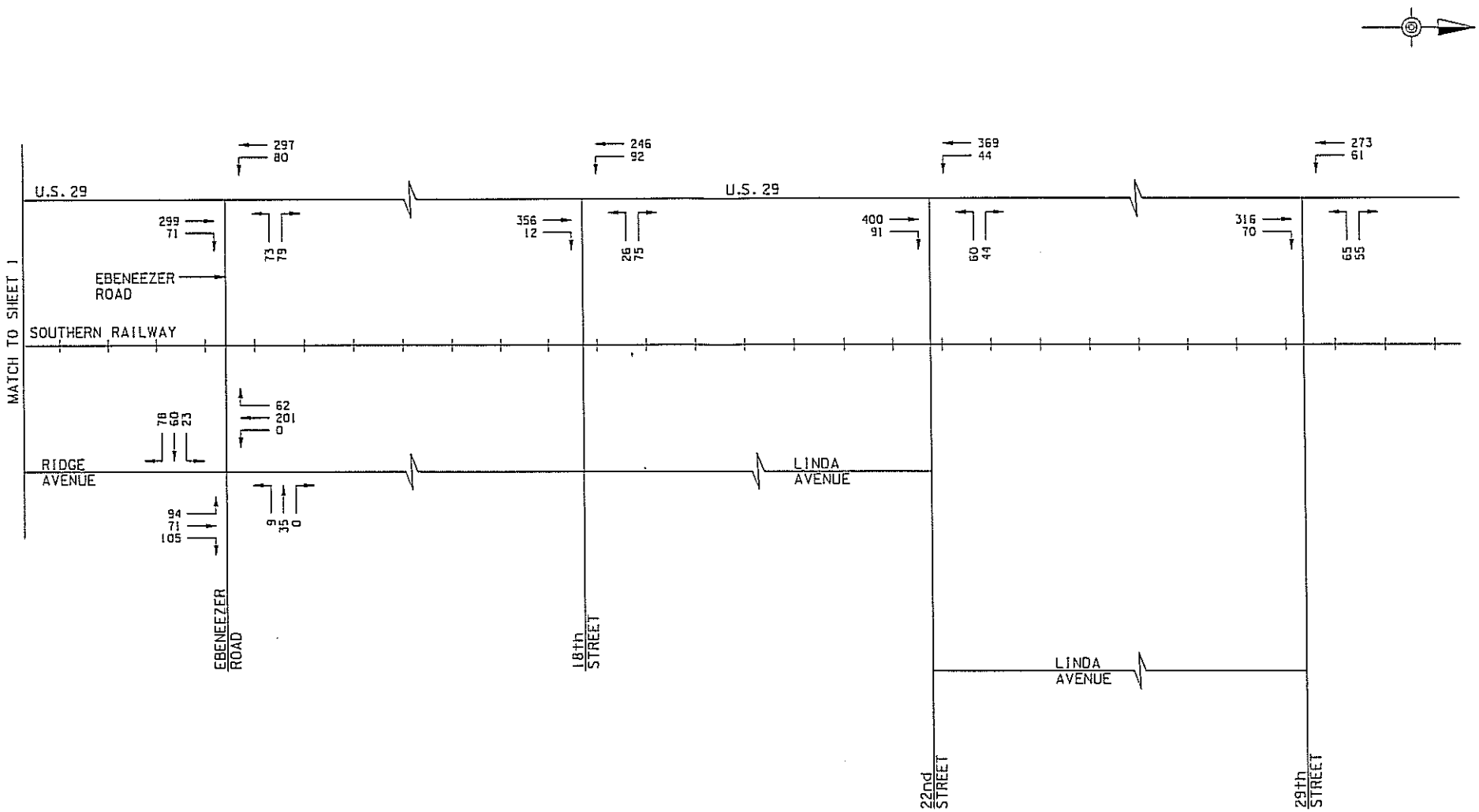
PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 1 1997 EXISTING PEAK HOUR TRAFFIC VOLUMES

FILE: g:\traffic\30709\us29ncl.dgn
DATE: 24-Apr-97 15:07



NO SCALE 2/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

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PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 1 1997 EXISTING PEAK HOUR TRAFFIC VOLUMES

FILE: c:\traffic\30709\us29ncla.dgn
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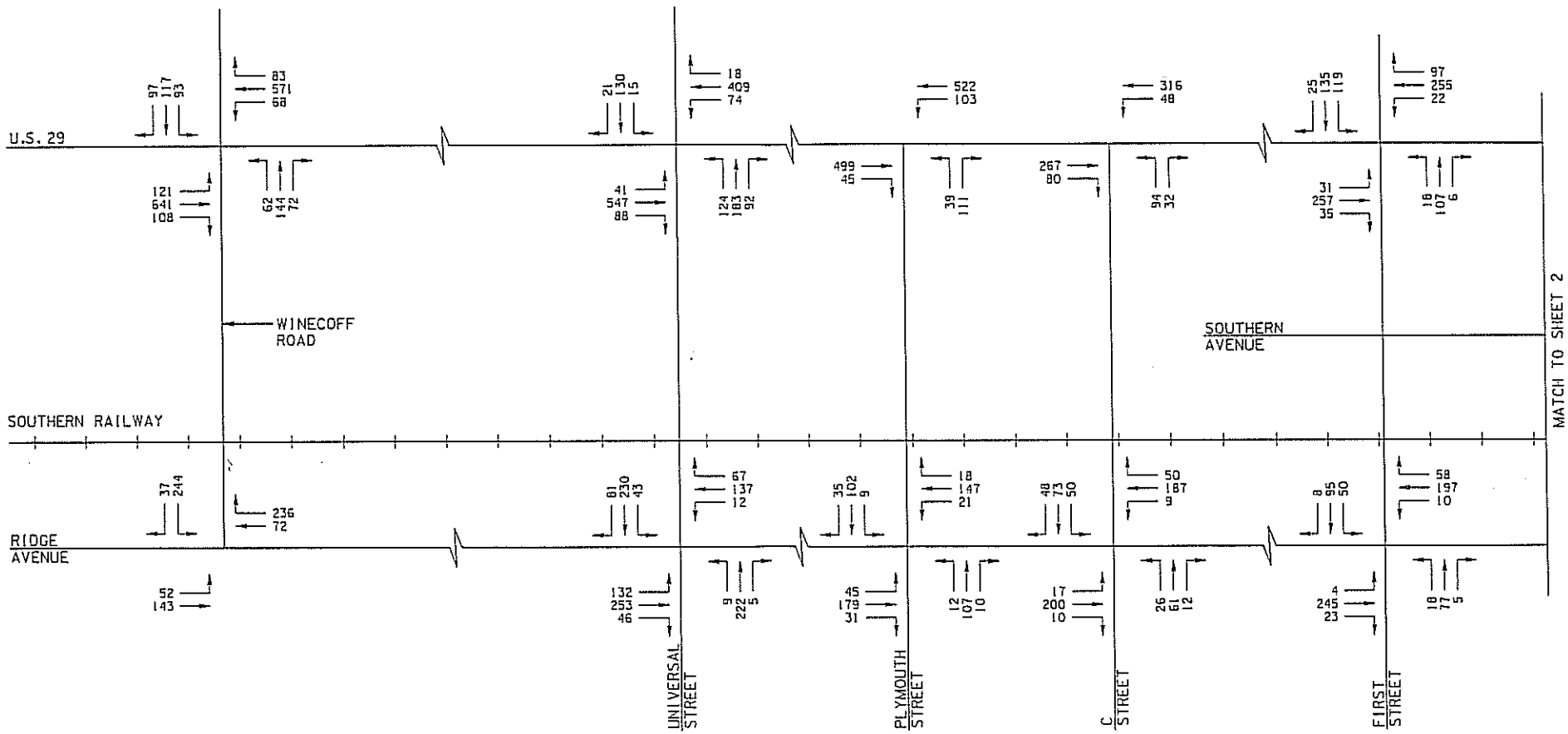


NO SCALE 1/2

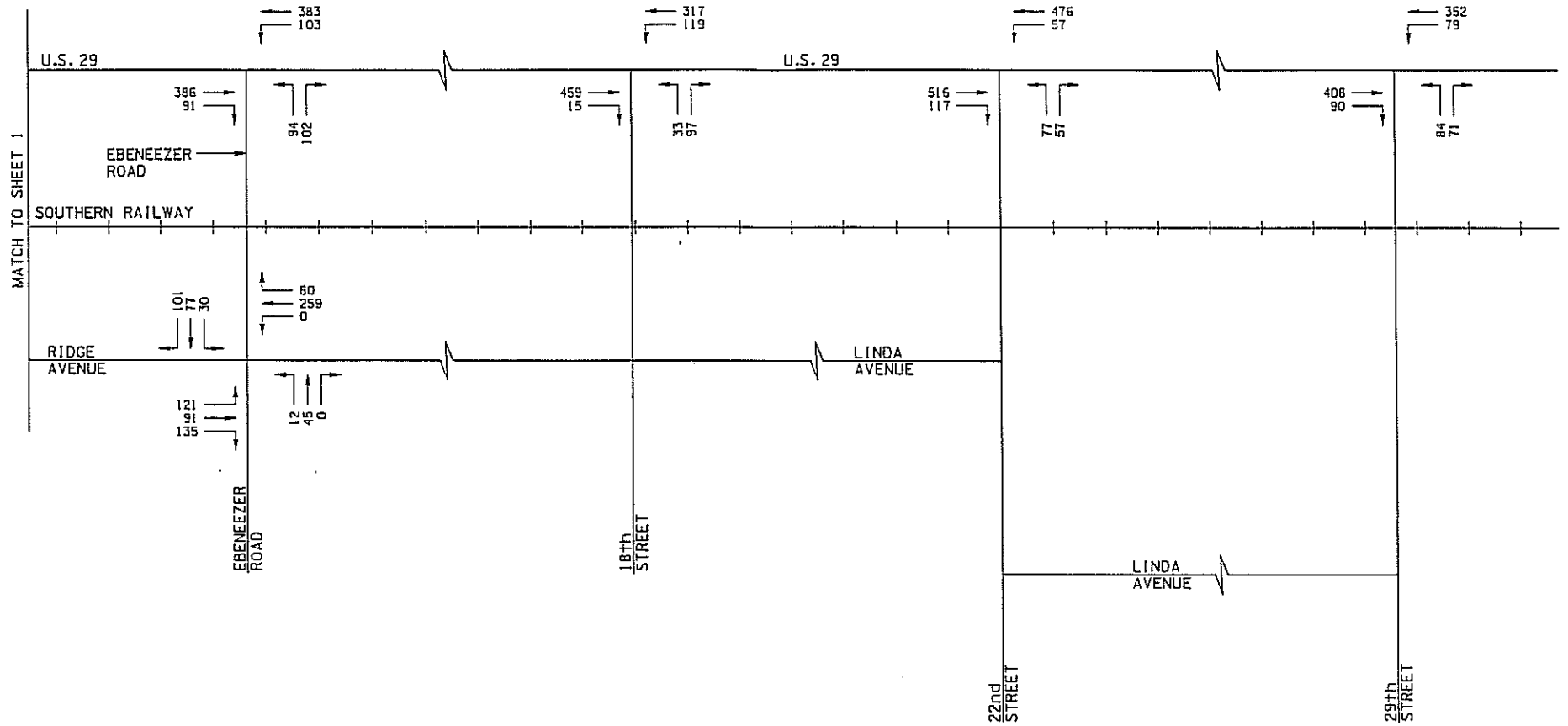
LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 2 2010 NO BUILD PEAK HOUR TRAFFIC VOLUMES

Gannett Fleming
ENGINEERS AND PLANNERS

FILE: c:\traffic\30709\us29nc2.dgn
DATE: 24-Apr-97 10:09



NO SCALE 2/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

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PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 2 2010 NO BUILD PEAK HOUR TRAFFIC VOLUMES

FILE: c:\traffic\30709\us29nc2a.dgn
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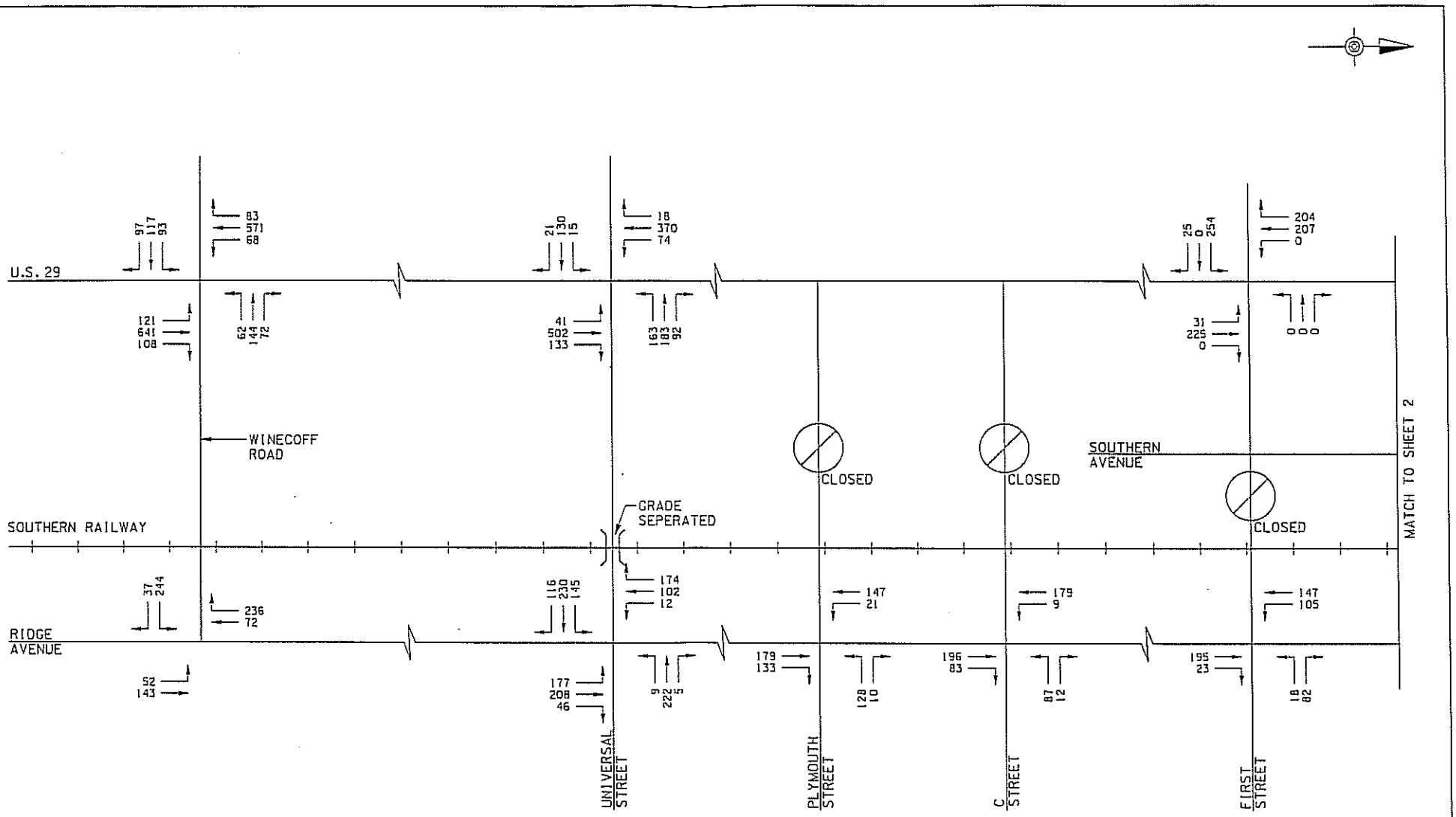

NO SCALE 1/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

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PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 3 2010 BUILD 1 PEAK HOUR TRAFFIC VOLUMES

FILE: c:\traffic\30709\us29no3.dgn
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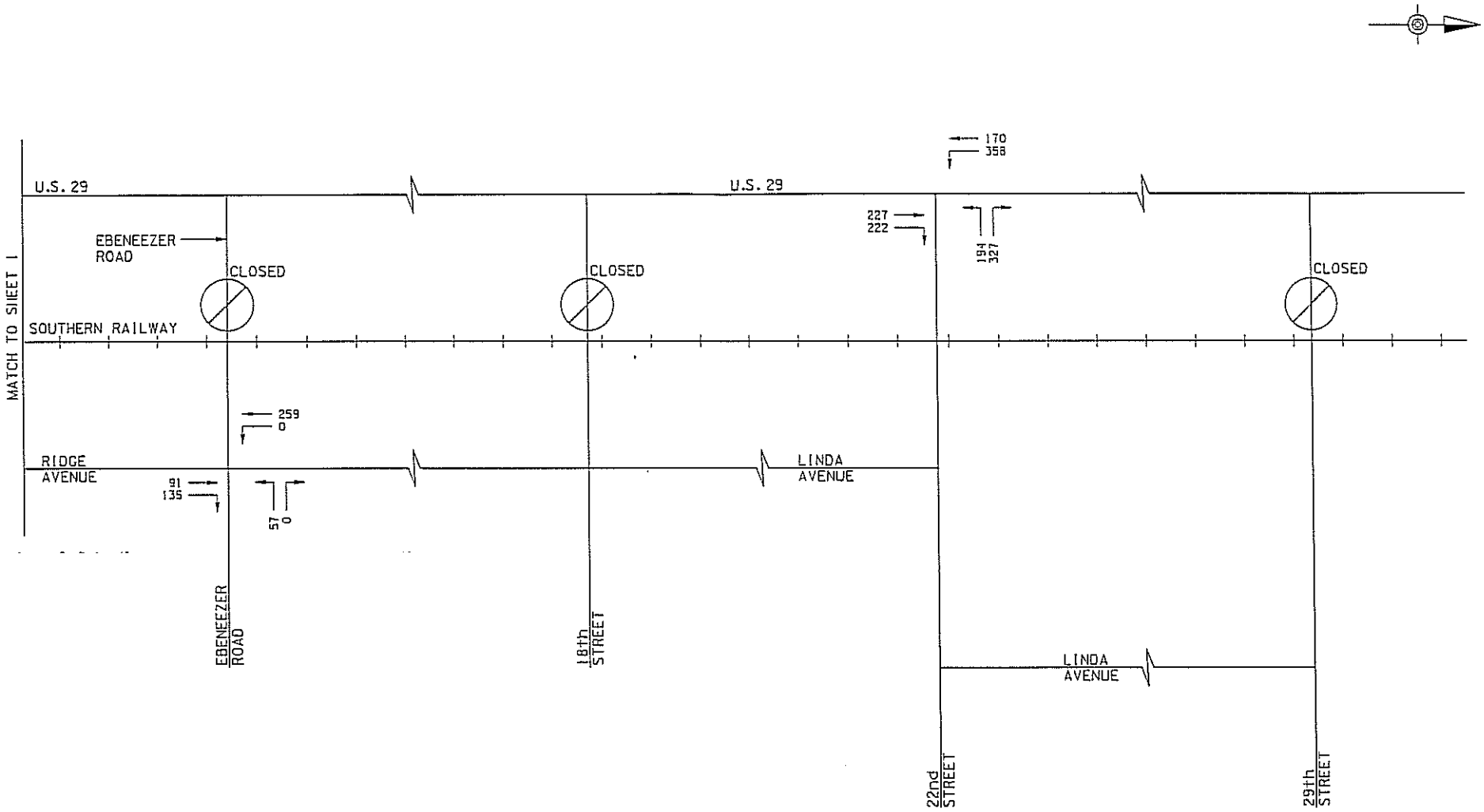


NO SCALE 2/2

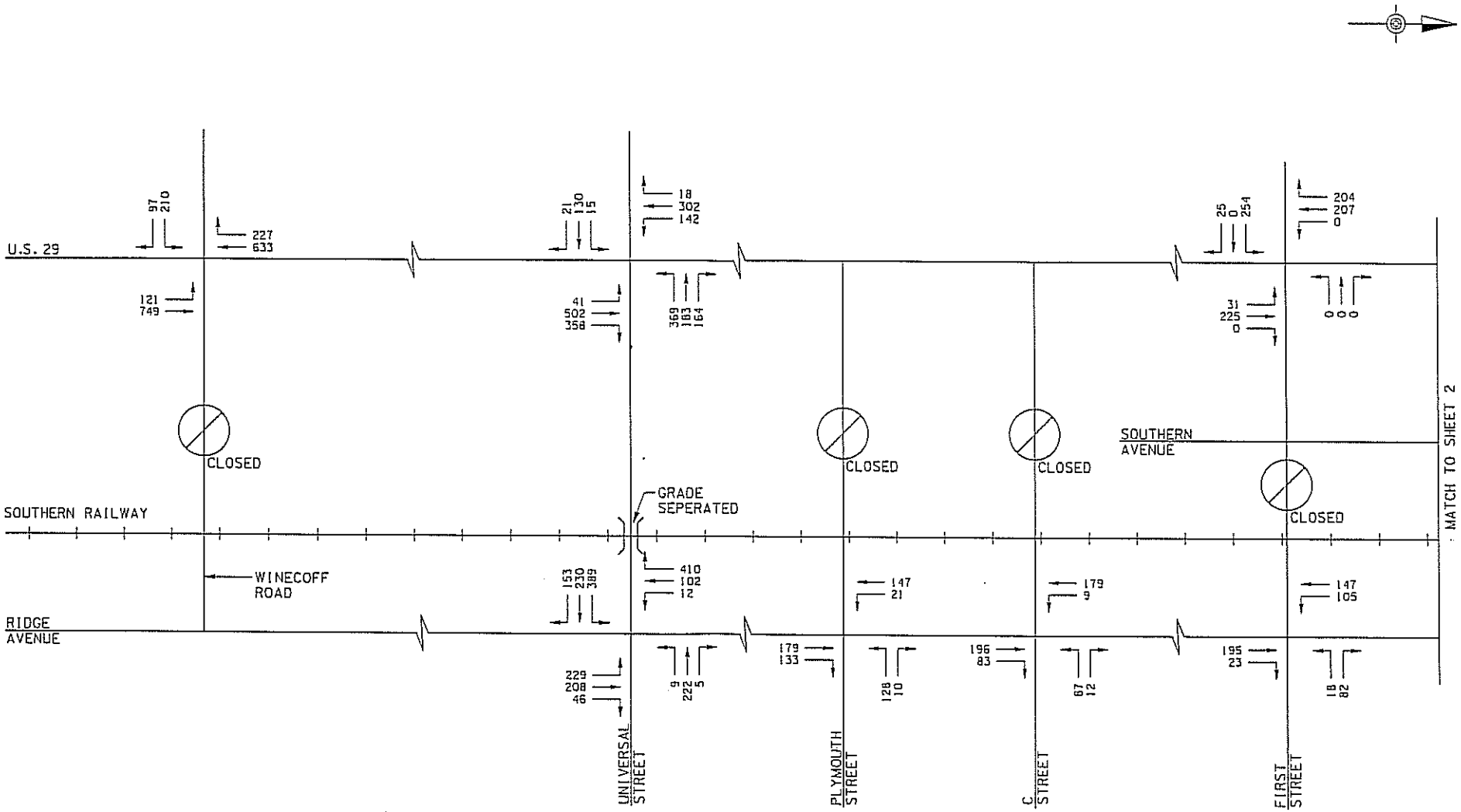
LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 3 2010 BUILD 1 PEAK HOUR TRAFFIC VOLUMES

Gannett Fleming
ENGINEERS AND PLANNERS

FILE: c:\traffic\30709\us29nc3a.dgn
DATE: 25-Apr-97 08:08



NO SCALE 1/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

Gannett Fleming
ENGINEERS AND PLANNERS

PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 4 2010 BUILD 2 PEAK HOUR TRAFFIC VOLUMES

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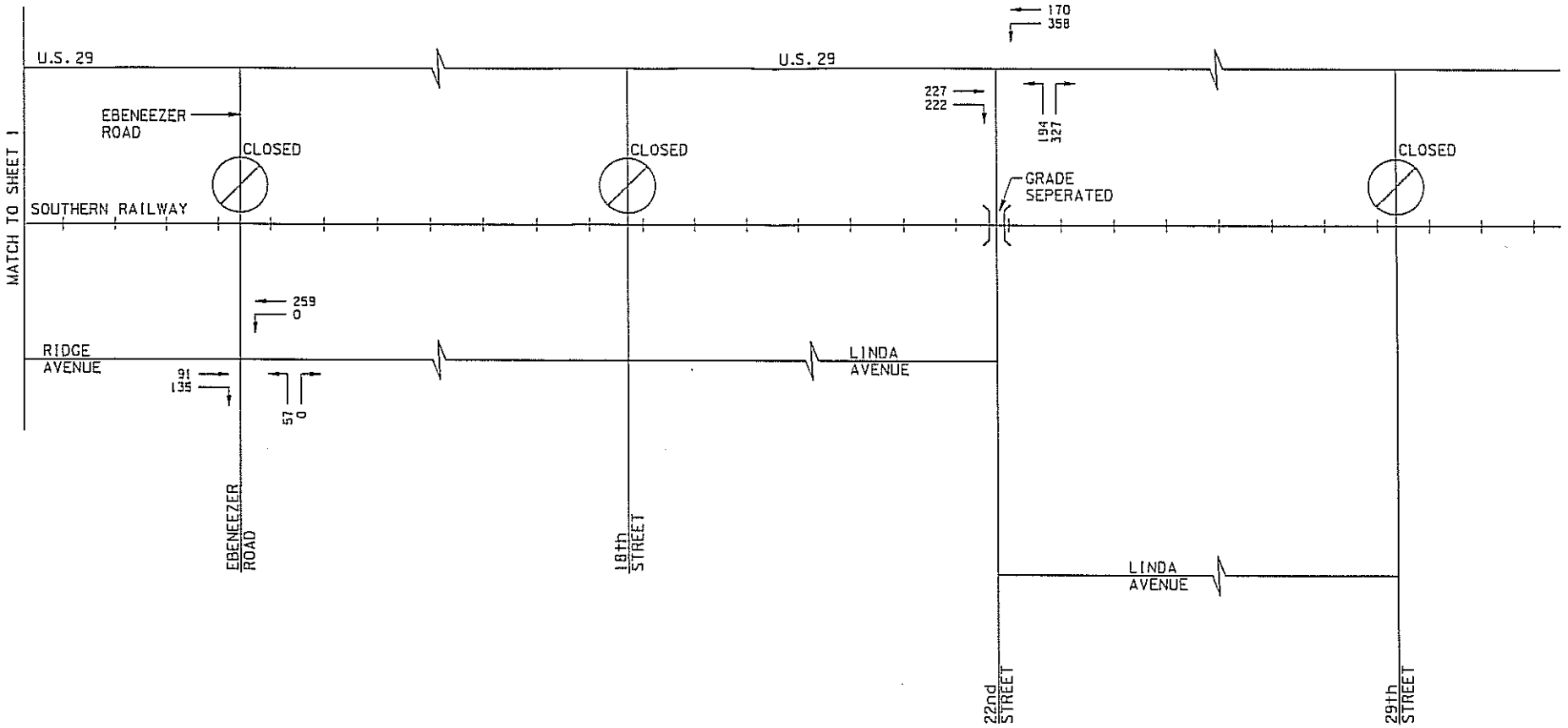
DATE: 25-Apr-97 08:17



NO SCALE 2/2

LEGEND

AM PEAK HOUR
(PM PEAK HOUR)

PIEDMONT HIGH SPEED RAIL CORRIDOR STUDY KANNAPOLIS STUDY SECTION	APRIL 1997	EXHIBIT 4 2010 BUILD 2 PEAK HOUR TRAFFIC VOLUMES

Gannett Fleming
ENGINEERS AND PLANNERS

FILE: c:\traffic\30709\us29no4a.dgn
DATE: 24-Apr-97 10:43

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) WINECOFF ROAD (N-S) MAIN STREET
Analyst: PNF File Name: 01EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<	1	1	<	1	1	<
Volumes	72	91	75	48	112	56	94	497	84	53	443	64
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	15.0A				Green 35.0P			
Yellow/AR	5.5				Yellow/AR 5.5			

Cycle Length: 61 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	361	1259	0.695	0.287	16.4	C	16.4	C
WB	LTR	390	1361	0.584	0.287	13.7	B	13.7	B
NB	L	234	381	0.423	0.615	4.7	A	4.8	A
	TR	1121	1823	0.545	0.615	4.8	A		
SB	L	173	282	0.323	0.615	4.0	A	4.3	A
	TR	1124	1828	0.474	0.615	4.4	A		

Intersection Delay = 7.4 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.593

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) WINECOFF ROAD (N-S) MAIN STREET
Analyst: PNF File Name: 01NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1 <			> 1 <		1	1 <		1	1 <	
Volumes	93	117	97	62	144	72	121	641	108	68	571	83
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	15.0A				Green 25.0P			
Yellow/AR	5.5				Yellow/AR 5.5			

Cycle Length: 51 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	408	1188	0.792	0.343	16.8	C	16.8	C
WB	LTR	447	1304	0.655	0.343	11.6	B	11.6	B
NB	L	146	271	0.869	0.539	33.3	D	12.9	B
	TR	982	1822	0.803	0.539	9.6	B		
SB	L	146	271	0.493	0.539	6.9	B	7.1	B
	TR	985	1827	0.698	0.539	7.2	B		

Intersection Delay = 11.4 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.839

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) WINECOFF ROAD (N-S) MAIN STREET
Analyst: PNF File Name: 01B1.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<	1	1	<	1	1	<
Volumes	93	117	97	62	144	72	121	641	108	68	571	83
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	15.0A				Green	25.0P			
Yellow/AR	5.5				Yellow/AR	5.5			

Cycle Length: 51 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group:	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	408	1188	0.792	0.343	16.8	C	16.8	C
WB	LTR	447	1304	0.655	0.343	11.6	B	11.6	B
NB	L	146	271	0.869	0.539	33.3	D	12.9	B
	TR	982	1822	0.803	0.539	9.6	B		
SB	L	146	271	0.493	0.539	6.9	B	7.1	B
	TR	985	1827	0.698	0.539	7.2	B		

Intersection Delay = 11.4 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.839

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) WINECOFF ROAD (N-S) MAIN STREET
Analyst: PNF File Name: 01B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 2 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		>	<				1	1			1	<
Volumes	210		97				121	749			633	227
Lane W (ft)		12.0					12.0	12.0			12.0	
RTOR Vols			0						0			0
Lost Time	3.00		3.00				3.00	3.00			3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	13.0A				Green	27.0P			
Yellow/AR	5.5				Yellow/AR	5.5			

Cycle Length: 51 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LR	469	1544	0.688	0.304	13.0	B	13.0	B
NB	L	146	253	0.868	0.578	32.3	D	10.4	B
	T	1078	1863	0.731	0.578	6.9	B		
SB	TR	931	1610	0.972	0.578	23.7	C	23.7	C

Intersection Delay = 16.4 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.874

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) WINECOFF ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes	40	111			56	183	189		29			
PHF	.95	.95			.95	.95	.95		.95			
Grade		0			0			0				
MC's (%)	0						0		0			
SU/RV's (%)	0						0		0			
CV's (%)	2						2		2			
PCE's	1.02						1.02		1.02			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)		156
Potential Capacity: (pcph)		1154
Movement Capacity: (pcph)		1154
Prob. of Queue-Free State:		0.97

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)		252
Potential Capacity: (pcph)		1300
Movement Capacity: (pcph)		1300
Prob. of Queue-Free State:		0.97
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.96

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)		314
Potential Capacity: (pcph)		697
Major LT, Minor TH Impedance Factor:		0.96
Adjusted Impedance Factor:		0.96
Capacity Adjustment Factor due to Impeding Movements		0.96
Movement Capacity: (pcph)		672

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	203	672 >					
				713	7.5	1.6	B	7.5
EB	R	32	1154 >					
NB	L	43	1300		2.9	0.0	A	0.8

Intersection Delay = 2.9 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) WINECOFF ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes	52	143			72	236	244		37			
PHF	.95	.95			.95	.95	.95		.95			
Grade		0			0			0				
MC's (%)	0						0		0			
SU/RV's (%)	0						0		0			
CV's (%)	2						2		2			
PCE's	1.02						1.02		1.02			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)		200
Potential Capacity: (pcph)		1096
Movement Capacity: (pcph)		1096
Prob. of Queue-Free State:		0.96

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)		324
Potential Capacity: (pcph)		1201
Movement Capacity: (pcph)		1201
Prob. of Queue-Free State:		0.95
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.95

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)		406
Potential Capacity: (pcph)		616
Major LT, Minor TH Impedance Factor:		0.95
Adjusted Impedance Factor:		0.95
Capacity Adjustment Factor due to Impeding Movements		0.95
Movement Capacity: (pcph)		584

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	262	584 >					
			623	11.1	2.7	C	11.1
EB R	40	1096 >					
NB L	56	1201		3.1	0.0	A	0.8

Intersection Delay = 4.2 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) WINECOFF ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....BUILD 1 CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	0	0	1	< 0	0	> 0	< 0	0	0	0
Stop/Yield			N			N						
Volumes	52	143			72	236	244		37			
PHF	.95	.95			.95	.95	.95		.95			
Grade		0			0			0				
MC's (%)	0						0		0			
SU/RV's (%)	0						0		0			
CV's (%)	2						2		2			
PCE's	1.02						1.02		1.02			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)		200
Potential Capacity: (pcph)		1096
Movement Capacity: (pcph)		1096
Prob. of Queue-Free State:		0.96
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)		324
Potential Capacity: (pcph)		1201
Movement Capacity: (pcph)		1201
Prob. of Queue-Free State:		0.95
TH Saturation Flow Rate: (pcphpl)		1700
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:		0.95
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)		406
Potential Capacity: (pcph)		616
Major LT, Minor TH Impedance Factor:		0.95
Adjusted Impedance Factor:		0.95
Capacity Adjustment Factor due to Impeding Movements		0.95
Movement Capacity: (pcph)		584

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	262	584 >	623	11.1	2.7	C	11.1
EB	R	40	1096 >					
NB	L	56	1201		3.1	0.0	A	0.8

Intersection Delay = 4.2 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) MAIN STREET
Analyst: RJT File Name: 03EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<	1	1	<	1	1	<
Volumes	12	101	16	96	142	71	32	424	68	57	317	14
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	20.0A				Green	40.0P			
Yellow/AR	4.0				Yellow/AR	4.0			

Cycle Length: 68 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	472	1530	0.288	0.309	11.6	B	11.6	B
WB	LTR	431	1395	0.754	0.309	18.8	C	18.8	C
NB	L	434	719	0.078	0.603	3.6	A	5.0	A
	TR	1100	1824	0.471	0.603	5.1	B		
SB	L	236	392	0.254	0.603	4.2	A	4.3	A
	TR	1116	1851	0.313	0.603	4.3	A		

Intersection Delay = 8.6 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.567

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) MAIN STREET
Analyst: RJT File Name: 03NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1 <			> 1 <		1	1 <		1	1 <	
Volumes	15	130	21	124	183	92	41	547	88	74	409	18
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	18.0A				Green 28.0P			
Yellow/AR	4.0				Yellow/AR 4.0			

Cycle Length: 54 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	524	1489	0.334	0.352	8.5	B	8.5	B
WB	LTR	472	1342	0.892	0.352	23.9	C	23.9	C
NB	L	261	486	0.165	0.537	4.1	A	7.1	B
	TR	980	1824	0.683	0.537	7.3	B		
SB	L	138	257	0.565	0.537	9.2	B	5.8	B
	TR	994	1851	0.453	0.537	5.2	B		

Intersection Delay = 10.7 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.766

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) MAIN STREET
Analyst: RJT File Name: 03B1.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<	1	1	<	1	1	<
Volumes	15	130	21	163	183	92	41	502	133	74	370	18
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	20.0A				Green	28.0P			
Yellow/AR	4.0				Yellow/AR	4.0			

Cycle Length: 56 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	549	1463	0.319	0.375	8.1	B	8.1	B
WB	LTR	478	1276	0.966	0.375	35.0	D	35.0	D
NB	L	298	576	0.144	0.518	4.6	A	8.3	B
	TR	934	1804	0.715	0.518	8.5	B		
SB	L	133	257	0.586	0.518	10.7	B	6.4	B
	TR	958	1850	0.426	0.518	5.6	B		

Intersection Delay = 14.5 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.820

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) MAIN STREET
Analyst: RJT File Name: 03B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 2 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<	1	1	<	1	1	<
Volumes	15	130	21	369	183	164	41	502	358	142	302	18
Lane W (ft)		12.0			12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	20.0A				Green	28.0P			
Yellow/AR	4.0				Yellow/AR	4.0			

Cycle Length: 56 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	537	1433	0.326	0.375	8.2	B	8.2	B
WB	LTR	423	1129	1.781	0.375	*	*	*	*
NB	L	370	715	0.116	0.518	4.5	A	30.7	D
	TR	904	1746	1.001	0.518	31.9	D		
SB	L	133	257	1.120	0.518	*	*	*	*
	TR	956	1847	0.352	0.518	5.2	B		

Intersection Delay = * (sec/veh) Intersection LOS = *

(g/C)*(V/c) is greater than one. Calculation of D1 is infeasable.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) MAIN STREET
Analyst: RJT File Name: 03B2WI.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 2 CONDITIONS WITH IMPROVEMENTS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<	1	1	1	1	1	1	1	1	<
Volumes	15	130	21	369	183	164	41	502	358	142	302	18
Lane W (ft)		12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	20.0A				Green 28.0P			
Yellow/AR	4.0				Yellow/AR 4.0			

Cycle Length: 56 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	593	1581	0.295	0.375	8.0	B	8.0	B
WB	L	430	1146	0.903	0.375	26.2	D	17.4	C
	T	699	1863	0.276	0.375	7.9	B		
	R	594	1583	0.291	0.375	8.0	B		
NB	L	370	715	0.116	0.518	4.5	A	6.1	B
	T	965	1863	0.547	0.518	6.4	B		
	R	820	1583	0.460	0.518	5.8	B		
SB	L	176	339	0.849	0.518	28.1	D	12.3	B
	TR	956	1847	0.352	0.518	5.2	B		

Intersection Delay = 11.1 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.871

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 04EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	33	178	63	7	172	4	103	196	36	9	106	52
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	20.0P				Green 40.0A			
Yellow/AR	4.0				Yellow/AR 4.0			

Cycle Length: 68 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	466	1508	0.618	0.309	14.7	B	14.7	B
WB	LTR	505	1636	0.380	0.309	12.1	B	12.1	B
NB	LTR	820	1360	0.429	0.603	4.9	A	4.9	A
SB	LTR	933	1548	0.189	0.603	3.9	A	3.9	A

Intersection Delay = 8.9 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.493

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 04NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	43	230	81	9	222	5	132	253	46	12	137	67
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	20.0P				Green 40.0A			
Yellow/AR	4.0				Yellow/AR 4.0			

Cycle Length: 68 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group:	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
	Mvmts								
EB	LTR	458	1483	0.812	0.309	21.4	C	21.4	C
WB	LTR	501	1621	0.495	0.309	13.0	B	13.0	B
NB	LTR	764	1267	0.593	0.603	6.3	B	6.3	B
SB	LTR	906	1503	0.252	0.603	4.1	A	4.1	A

Intersection Delay = 11.5 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.667

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 04B1.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	145	230	116	9	222	5	177	208	46	12	102	174
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	28.0P				Green	28.0A			
Yellow/AR	4.0				Yellow/AR	4.0			

Cycle Length: 64 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	560	1235	0.924	0.453	25.9	D	25.9	D
WB	LTR	721	1591	0.344	0.453	7.4	B	7.4	B
NB	LTR	465	1027	0.973	0.453	37.0	D	37.0	D
SB	LTR	657	1449	0.461	0.453	8.2	B	8.2	B

Intersection Delay = 22.7 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.949

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 04B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 2 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	389	230	153	9	222	5	229	208	46	12	102	410
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	28.0P				Green	28.0A			
Yellow/AR	4.0				Yellow/AR	4.0			

Cycle Length: 64 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Adj Sat Flow Cap	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	440	972	1.844	0.453	*	*	*	*
WB	LTR	659	1455	0.376	0.453	7.6	B	7.6	B
NB	LTR	239	528	2.123	0.453	*	*	*	*
SB	LTR	646	1426	0.854	0.453	17.7	C	17.7	C

Intersection Delay = * (sec/veh) Intersection LOS = *

(g/C)*(V/c) is greater than one. Calculation of D1 is infeasable.

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) UNIVERSAL STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 04B2WI.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 2 CONDITIONS WITH IMPROVEMENTS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1 <			> 1 <		1	1 <			> 1	1
Volumes	389	230	153	9	222	5	229	208	46	12	102	410
Lane W (ft)	12.0	12.0			12.0		12.0	12.0			12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	28.0P				Green 28.0A			
Yellow/AR	4.0				Yellow/AR 4.0			

Cycle Length: 64 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	423	934	0.966	0.453	36.9	D	22.8	C
	TR	793	1751	0.508	0.453	8.5	B		
WB	LTR	735	1623	0.337	0.453	7.4	B	7.4	B
NB	L	586	1294	0.411	0.453	7.9	B	7.6	B
	TR	822	1813	0.325	0.453	7.3	B		
SB	LT	799	1764	0.150	0.453	6.6	B	8.9	B
	R	717	1583	0.602	0.453	9.5	B		

Intersection Delay = 13.7 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.784

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) PLYMOUTH STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		1	1	0	0	0	0	0 > 0 < 0		
Stop/Yield			N			N						
Volumes		387	35	80	405					30		86
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	426	
Potential Capacity: (pcph)	842	
Movement Capacity: (pcph)	842	
Prob. of Queue-Free State:	0.89	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	444	
Potential Capacity: (pcph)	1053	
Movement Capacity: (pcph)	1053	
Prob. of Queue-Free State:	0.92	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	936	
Potential Capacity: (pcph)	304	
Major LT, Minor TH Impedance Factor:	0.92	
Adjusted Impedance Factor:	0.92	
Capacity Adjustment Factor due to Impeding Movements	0.92	
Movement Capacity: (pcph)	279	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	33	279 >					
				551	8.5	0.9	B	8.5
WB	R	93	842 >					
SB	L	86	1053		3.7	0.2	A	0.6

Intersection Delay = 1.3 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) PLYMOUTH STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes		499	45	103	522					39		111
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	548	
Potential Capacity: (pcph)	731	
Movement Capacity: (pcph)	731	
Prob. of Queue-Free State:	0.84	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	572	
Potential Capacity: (pcph)	915	
Movement Capacity: (pcph)	915	
Prob. of Queue-Free State:	0.88	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	1206	
Potential Capacity: (pcph)	212	
Major LT, Minor TH Impedance Factor:	0.88	
Adjusted Impedance Factor:	0.88	
Capacity Adjustment Factor due to Impeding Movements	0.88	
Movement Capacity: (pcph)	187	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	42	187 >					
			416	14.0	1.9	C	14.0
WB R	119	731 >					
SB L	110	915		4.5	0.4	A	0.7

Intersection Delay = 1.9 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) PLYMOUTH STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 06EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	7	79	27	16	83	8	35	139	24	16	114	14
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	22.0P				Green	30.0P			
Yellow/AR	5.5				Yellow/AR	5.5			

Cycle Length: 63 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	LTR	620	1595	0.190	0.389	9.7	B	9.7	B
WB	LTR	616	1585	0.182	0.389	9.6	B	9.6	B
NB	LTR	786	1524	0.265	0.516	6.5	B	6.5	B
SB	LTR	809	1569	0.188	0.516	6.2	B	6.2	B

Intersection Delay = 7.7 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.233

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) PLYMOUTH STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 06NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes		> 1	<		> 1	<		> 1	<		> 1	<
Volumes	9	102	35	21	107	10	45	179	31	21	147	18
Lane W (ft)		12.0			12.0			12.0			12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	22.0P				Green	30.0P			
Yellow/AR	5.5				Yellow/AR	5.5			

Cycle Length: 63 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group:	Adj Sat Cap	Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
	Mvmts								
EB	LTR	617	1586	0.248	0.389	9.9	B	9.9	B
WB	LTR	607	1560	0.241	0.389	9.9	B	9.9	B
NB	LTR	767	1486	0.350	0.516	7.0	B	7.0	B
SB	LTR	791	1533	0.248	0.516	6.5	B	6.5	B

Intersection Delay = 8.0 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.306

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) PLYMOUTH STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 06B1B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 AND BUILD 2 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes				>	<			1	<		> 1	
Volumes				128		10		179	133	21	147	
Lane W (ft)					12.0			12.0			12.0	
RTOR Vols						0			0			0
Lost Time				3.00		3.00		3.00	3.00	3.00	3.00	

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left			
Thru					Thru *			
Right					Right *			
Peds					Peds			
WB Left	*				SB Left *			
Thru					Thru *			
Right	*				Right			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	22.0P				Green 30.0P			
Yellow/AR	5.5				Yellow/AR 5.5			

Cycle Length: 63 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
WB	LR	616	1584	0.237	0.389	9.9	B	9.9	B
NB	TR	809	1569	0.405	0.516	7.3	B	7.3	B
SB	LT	869	1684	0.204	0.516	6.3	B	6.3	B

Intersection Delay = 7.6 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.333

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) C STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes		207	62	37	245					73		25
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	250	
Potential Capacity: (pcph)	1034	
Movement Capacity: (pcph)	1034	
Prob. of Queue-Free State:	0.97	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	283	
Potential Capacity: (pcph)	1257	
Movement Capacity: (pcph)	1257	
Prob. of Queue-Free State:	0.97	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	548	
Potential Capacity: (pcph)	510	
Major LT, Minor TH Impedance Factor:	0.97	
Adjusted Impedance Factor:	0.97	
Capacity Adjustment Factor due to Impeding Movements	0.97	
Movement Capacity: (pcph)	494	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	79	494 >	570	7.8	0.7	B	7.8
WB	R	27	1034 >					
SB	L	40	1257		3.0	0.0	A	0.4

Intersection Delay = 1.3 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) C STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes		267	80	48	315					94		32
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	323	
Potential Capacity: (pcph)	950	
Movement Capacity: (pcph)	950	
Prob. of Queue-Free State:	0.96	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	365	
Potential Capacity: (pcph)	1149	
Movement Capacity: (pcph)	1149	
Prob. of Queue-Free State:	0.95	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	706	
Potential Capacity: (pcph)	413	
Major LT, Minor TH Impedance Factor:	0.95	
Adjusted Impedance Factor:	0.95	
Capacity Adjustment Factor due to Impeding Movements	0.95	
Movement Capacity: (pcph)	394	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	101	394 >					
			464	10.9	1.3	C	10.9
WB R	35	950 >					
SB L	52	1149		3.3	0.0	A	0.4

Intersection Delay = 1.8 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) C STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	13	155	8	7	145	39	39	57	37	20	47	9
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	2			2			2	2	2	2	2	2
PCE's	1.02			1.02			1.02	1.02	1.02	1.02	1.02	1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	167	174
Potential Capacity: (pcph)	1139	1130
Movement Capacity: (pcph)	1139	1130
Prob. of Queue-Free State:	0.99	0.96
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	171	194
Potential Capacity: (pcph)	1421	1386
Movement Capacity: (pcph)	1421	1386
Prob. of Queue-Free State:	1.00	0.99
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.99	0.99
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	382	366
Potential Capacity: (pcph)	688	701
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	676	689
Prob. of Queue-Free State:	0.93	0.91
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	411	390
Potential Capacity: (pcph)	612	629
Major LT, Minor TH Impedance Factor:	0.90	0.91
Adjusted Impedance Factor:	0.92	0.93
Capacity Adjustment Factor due to Impeding Movements	0.89	0.92
Movement Capacity: (pcph)	543	581

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	42	581	>					
EB	T	61	689	>	729	6.1	0.8	B	6.1
EB	R	40	1130	>					
WB	L	21	543	>					
WB	T	50	676	>	664	6.2	0.4	B	6.2
WB	R	9	1139	>					
NB	L	14	1386			2.6	0.0	A	0.2
SB	L	7	1421			2.5	0.0	A	0.1

Intersection Delay = 2.3 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) C STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	17	200	10	9	187	50	50	73	48	26	61	12
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	2			2			2	2	2	2	2	2
PCE's	1.02			1.02			1.02	1.02	1.02	1.02	1.02	1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	216	224
Potential Capacity: (pcph)	1076	1066
Movement Capacity: (pcph)	1076	1066
Prob. of Queue-Free State:	0.99	0.95
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	222	250
Potential Capacity: (pcph)	1344	1303
Movement Capacity: (pcph)	1344	1303
Prob. of Queue-Free State:	0.99	0.99
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	0.99	0.98
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	494	472
Potential Capacity: (pcph)	601	617
Capacity Adjustment Factor due to Impeding Movements	0.98	0.98
Movement Capacity: (pcph)	587	602
Prob. of Queue-Free State:	0.89	0.87
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	531	506
Potential Capacity: (pcph)	522	539
Major LT, Minor TH Impedance Factor:	0.85	0.87
Adjusted Impedance Factor:	0.88	0.90
Capacity Adjustment Factor due to Impeding Movements	0.84	0.89
Movement Capacity: (pcph)	439	479

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	54	479	>					
EB	T	79	602	>	632	8.0	1.3	B	8.0
EB	R	52	1066	>					
WB	L	28	439	>					
WB	T	65	587	>	568	7.8	0.7	B	7.8
WB	R	13	1076	>					
NB	L	18	1303			2.8	0.0	A	0.2
SB	L	9	1344			2.7	0.0	A	0.1

Intersection Delay = 3.0 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) C STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....BUILD 1 AND BUILD 2 CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		196	83	9	179					87		12
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	250	
Potential Capacity: (pcph)	1034	
Movement Capacity: (pcph)	1034	
Prob. of Queue-Free State:	0.99	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	293	
Potential Capacity: (pcph)	1243	
Movement Capacity: (pcph)	1243	
Prob. of Queue-Free State:	0.99	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.99	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	446	
Potential Capacity: (pcph)	584	
Major LT, Minor TH Impedance Factor:	0.99	
Adjusted Impedance Factor:	0.99	
Capacity Adjustment Factor due to Impeding Movements	0.99	
Movement Capacity: (pcph)	579	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	94	579 >					
				612	7.1	0.7	B	7.1
WB	R	13	1034 >					
SB	L	9	1243		2.9	0.0	A	0.1

Intersection Delay = 1.3 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) MAIN STREET
Analyst: RJT File Name: 09EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2 <		1	1	1	1	1 <		1	1	1
Volumes	92	105	19	14	83	5	24	199	27	17	198	75
Lane W (ft)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			NB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
WB Left	*	*			SB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	15.0P	25.0P			Green 25.0P			
Yellow/AR	5.7	5.7			Yellow/AR 6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	881	1770	0.110	0.585	5.7	B	10.8	B
	TR	1219	3640	0.113	0.335	14.4	B		
WB	L	840	1770	0.018	0.585	5.5	B	13.3	B
	T	624	1863	0.139	0.335	14.6	B		
	R	530	1583	0.009	0.335	13.9	B		
NB	L	293	856	0.085	0.342	14.0	B	15.6	C
	TR	626	1830	0.378	0.342	15.8	C		
SB	L	250	730	0.072	0.342	13.9	B	15.0	B
	T	638	1863	0.326	0.342	15.4	C		
	R	542	1583	0.146	0.342	14.3	B		

Intersection Delay = 13.9 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.259

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) MAIN STREET
Analyst: RJT File Name: 09NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2 <		1	1	1	1	1 <		1	1	1
Volumes	119	135	25	18	107	6	31	257	35	22	255	97
Lane W (ft)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			NB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
WB Left	*	*			SB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	15.0P	25.0P			Green 25.0P			
Yellow/AR	5.7	5.7			Yellow/AR 6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	792	1770	0.158	0.585	5.9	B	11.0	B
	TR	1219	3639	0.144	0.335	14.6	B		
WB	L	805	1770	0.024	0.585	5.5	B	13.5	B
	T	624	1863	0.181	0.335	14.8	B		
	R	530	1583	0.011	0.335	14.0	B		
NB	L	213	621	0.155	0.342	14.4	B	16.6	C
	TR	626	1829	0.492	0.342	16.9	C		
SB	L	173	506	0.133	0.342	14.3	B	15.6	C
	T	638	1863	0.420	0.342	16.2	C		
	R	542	1583	0.188	0.342	14.6	B		

Intersection Delay = 14.5 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.336

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-25-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) MAIN STREET
Analyst: RJT File Name: 09B1B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 AND BUILD 2 CONDITIONS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	<	1	1	1	1	1	<	1	1	1
Volumes	254	1	25	1	1	1	31	225	1	1	207	204
Lane W (ft)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*	*			NB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
WB Left	*	*			SB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	15.0P	25.0P			Green	25.0P			
Yellow/AR	5.7	5.7			Yellow/AR	6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	1035	1770	0.258	0.585	6.4	B	7.1	B
	TR	1067	3187	0.026	0.335	14.0	B		
WB	L	985	1770	0.001	0.585	5.4	B	11.1	B
	T	624	1863	0.002	0.335	13.9	B		
	R	530	1583	0.002	0.335	13.9	B		
NB	L	277	810	0.119	0.342	14.2	B	15.6	C
	TR	637	1862	0.374	0.342	15.8	C		
SB	L	248	726	0.004	0.342	13.6	B	15.8	C
	T	638	1863	0.342	0.342	15.5	C		
	R	542	1583	0.397	0.342	16.0	C		

Intersection Delay = 13.2 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.332

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) MAIN STREET

Analyst: RJT File Name: 09B1B2WI.HC9

Area Type: Other 4-23-97 PEAK

Comment: BUILD 1 AND BUILD 2 CONDITIONS WITH IMPROVEMENTS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1		1	1	1	1	1	1	<	1	1	1
Volumes	254		25	1	1	1	31	225	1	1	207	204
Lane W (ft)	12.0		12.0	12.0	12.0	12.0	12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*	*			NB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
WB Left	*	*			SB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	15.0P	25.0P			Green	25.0P			
Yellow/AR	5.7	5.7			Yellow/AR	6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	1035	1770	0.258	0.585	6.4	B	7.1	B
	R	530	1583	0.049	0.335	14.1	B		
WB	L	1037	1770	0.001	0.585	5.4	B	11.1	B
	TR	624	1863	0.002	0.335	13.9	B		
	R	530	1583	0.002	0.335	13.9	B		
NB	L	277	810	0.119	0.342	14.2	B	15.6	C
	TR	637	1862	0.374	0.342	15.8	C		
SB	L	248	726	0.004	0.342	13.6	B	15.8	C
	T	638	1863	0.342	0.342	15.5	C		
	R	542	1583	0.397	0.342	16.0	C		

Intersection Delay = 13.2 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.340

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 10EX.HC9
Area Type: Other 4-23-97 PEAK
Comment: EXISTING CONDITIONS - SAME TIMINGS AS MAIN STREET

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	<	1	1	<	1	1	<	1	1	1
Volumes	39	74	6	14	60	4	3	190	18	8	153	45
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	*	*			NB	Left	*			
	Thru		*				Thru	*			
	Right		*				Right	*			
	Peds						Peds				
WB	Left	*	*			SB	Left	*			
	Thru		*				Thru	*			
	Right		*				Right	*			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		15.0P	25.0P			Green		25.0P			
Yellow/AR		5.7	5.7			Yellow/AR		6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	910	1770	0.045	0.585	5.5	B	11.6	B
	TR	617	1843	0.136	0.335	14.6	B		
WB	L	886	1770	0.017	0.585	5.5	B	12.8	B
	TR	618	1846	0.108	0.335	14.4	B		
NB	L	353	1033	0.008	0.342	13.6	B	15.6	C
	TR	629	1839	0.348	0.342	15.6	C		
SB	L	275	805	0.029	0.342	13.7	B	14.7	B
	T	638	1863	0.253	0.342	14.9	B		
	R	542	1583	0.087	0.342	14.0	B		

Intersection Delay = 14.1 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.211

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 10NB.HC9
Area Type: Other 4-23-97 PEAK
Comment: NO BUILD CONDITIONS - SAME TIMINGS AS MAIN STREET

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	<	1	1	<	1	1	<	1	1	1
Volumes	50	95	8	18	77	5	4	245	23	10	197	58
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*	*			NB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
WB Left	*	*			SB Left *			
Thru		*			Thru *			
Right		*			Right *			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	15.0P	25.0P			Green 25.0P			
Yellow/AR	5.7	5.7			Yellow/AR 6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	883	1770	0.060	0.585	5.6	B	11.7	B
	TR	617	1842	0.175	0.335	14.8	B		
WB	L	800	1770	0.024	0.585	5.5	B	12.9	B
	TR	619	1847	0.139	0.335	14.6	B		
NB	L	295	861	0.014	0.342	13.7	B	16.4	C
	TR	629	1839	0.448	0.342	16.4	C		
SB	L	198	578	0.056	0.342	13.9	B	15.1	C
	T	638	1863	0.325	0.342	15.4	C		
	R	542	1583	0.113	0.342	14.1	B		

Intersection Delay = 14.6 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.271

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 1ST STREET (N-S) RIDGE AVENUE
Analyst: RJT File Name: 10B1B2.HC9
Area Type: Other 4-23-97 PEAK
Comment: BUILD 1 AND BUILD 2 CONDITIONS - SAME TIMINGS AS MAIN STREET

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes				1		1		1	<	1	1	
Volumes				18		82		195	23	105	147	
Lane W (ft)				12.0		12.0		12.0		12.0	12.0	
RTOR Vols						0			0			0
Lost Time				3.00		3.00		3.00	3.00	3.00	3.00	

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*	*			NB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
WB Left	*	*			SB Left	*			
Thru		*			Thru	*			
Right		*			Right	*			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	15.0P	25.0P			Green	25.0P			
Yellow/AR	5.7	5.7			Yellow/AR	6.3			

Cycle Length: 83 secs Phase combination order: #1 #2 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
WB	L	1037	1770	0.018	0.585	5.5	B	13.0	B
	R	530	1583	0.162	0.335	14.7	B		
NB	TR	565	1650	0.406	0.342	16.1	C	16.1	C
SB	L	224	655	0.495	0.342	17.8	C	16.1	C
	T	638	1863	0.243	0.342	14.9	B		

Intersection Delay = 15.5 sec/veh Intersection LOS = C

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.263

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) EBNEEZER ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 2		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		299	71	80	297					73		79
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	352	
Potential Capacity: (pcph)	918	
Movement Capacity: (pcph)	918	
Prob. of Queue-Free State:	0.91	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	390	
Potential Capacity: (pcph)	1117	
Movement Capacity: (pcph)	1117	
Prob. of Queue-Free State:	0.92	
TH Saturation Flow Rate: (pcphpl)	3400	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.92	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	750	
Potential Capacity: (pcph)	390	
Major LT, Minor TH Impedance Factor:	0.92	
Adjusted Impedance Factor:	0.92	
Capacity Adjustment Factor due to Impeding Movements	0.92	
Movement Capacity: (pcph)	357	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	79	357 >					
				522	10.0	1.4	C	10.0
WB	R	85	918 >					
SB	L	86	1117		3.5	0.2	A	0.7

Intersection Delay = 2.0 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) EBNEEZER ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 2		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		386	91	103	383					94		102
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	454	
Potential Capacity: (pcph)	815	
Movement Capacity: (pcph)	815	
Prob. of Queue-Free State:	0.87	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	502	
Potential Capacity: (pcph)	988	
Movement Capacity: (pcph)	988	
Prob. of Queue-Free State:	0.89	
TH Saturation Flow Rate: (pcphpl)	3400	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.87	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	965	
Potential Capacity: (pcph)	292	
Major LT, Minor TH Impedance Factor:	0.87	
Adjusted Impedance Factor:	0.87	
Capacity Adjustment Factor due to Impeding Movements	0.87	
Movement Capacity: (pcph)	255	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	101	255 >					
			396	18.9	3.0	C	18.9
WB R	109	815 >					
SB L	110	988		4.1	0.3	A	0.9

Intersection Delay = 3.6 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) EBENEEZER ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	94	71	105	0	201	62	23	60	78	9	35	0
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	2			2			2	2	2	2	2	2
PCE's	1.02			1.02			1.02	1.02	1.02	1.02	1.02	1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	130	244
Potential Capacity: (pcph)	1190	1042
Movement Capacity: (pcph)	1190	1042
Prob. of Queue-Free State:	1.00	0.92
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	186	277
Potential Capacity: (pcph)	1398	1265
Movement Capacity: (pcph)	1398	1265
Prob. of Queue-Free State:	1.00	0.92
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	1.00	0.91
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	506	530
Potential Capacity: (pcph)	592	575
Capacity Adjustment Factor due to Impeding Movements	0.91	0.91
Movement Capacity: (pcph)	539	523
Prob. of Queue-Free State:	0.93	0.88
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	546	492
Potential Capacity: (pcph)	511	549
Major LT, Minor TH Impedance Factor:	0.80	0.85
Adjusted Impedance Factor:	0.85	0.88
Capacity Adjustment Factor due to Impeding Movements	0.78	0.88
Movement Capacity: (pcph)	397	484

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	24	484	>					
EB	T	64	523	>	681	7.1	1.1	B	7.1
EB	R	84	1042	>					
WB	L	9	397	>					
WB	T	38	539	>	504	7.9	0.2	B	7.9
WB	R	0	1190	>					
NB	L	101	1265			3.1	0.2	A	1.1
SB	L	0	1398			2.6	0.0	A	0.0

Intersection Delay = 2.4 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) EBENEEZER ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0	0	> 1	< 0
Stop/Yield			N			N						
Volumes	121	91	135	0	259	80	30	77	101	12	45	0
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)	0			0			0	0	0	0	0	0
SU/RV's (%)	0			0			0	0	0	0	0	0
CV's (%)	2			2			2	2	2	2	2	2
PCE's	1.02			1.02			1.02	1.02	1.02	1.02	1.02	1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	167	315
Potential Capacity: (pcph)	1139	959
Movement Capacity: (pcph)	1139	959
Prob. of Queue-Free State:	1.00	0.89
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	238	357
Potential Capacity: (pcph)	1320	1159
Movement Capacity: (pcph)	1320	1159
Prob. of Queue-Free State:	1.00	0.89
TH Saturation Flow Rate: (pcphpl)	1700	1700
RT Saturation Flow Rate: (pcphpl)	1700	1700
Major LT Shared Lane Prob. of Queue-Free State:	1.00	0.87
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	651	680
Potential Capacity: (pcph)	497	480
Capacity Adjustment Factor due to Impeding Movements	0.87	0.87
Movement Capacity: (pcph)	432	417
Prob. of Queue-Free State:	0.89	0.80
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	702	632
Potential Capacity: (pcph)	415	456
Major LT, Minor TH Impedance Factor:	0.70	0.77
Adjusted Impedance Factor:	0.77	0.83
Capacity Adjustment Factor due to Impeding Movements	0.68	0.83
Movement Capacity: (pcph)	282	376

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)		Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB	L	33	376	>					
EB	T	83	417	>	561	10.6	2.0	C	10.6
EB	R	108	959	>					
WB	L	13	282	>					
WB	T	48	432	>	388	11.0	0.6	C	11.0
WB	R	0	1139	>					
NB	L	130	1159			3.5	0.4	A	1.2
SB	L	0	1320			2.7	0.0	A	0.0

Intersection Delay = 3.4 sec/veh

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209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) RIDGE AVENUE (E-W) EBENEEZER ROAD
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....BUILD 1 AND BUILD 2 BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	0	> 1	0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes		91	135	0	259					57		0
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	167	
Potential Capacity: (pcph)	1139	
Movement Capacity: (pcph)	1139	
Prob. of Queue-Free State:	1.00	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	238	
Potential Capacity: (pcph)	1320	
Movement Capacity: (pcph)	1320	
Prob. of Queue-Free State:	1.00	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	1.00	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	440	
Potential Capacity: (pcph)	589	
Major LT, Minor TH Impedance Factor:	1.00	
Adjusted Impedance Factor:	1.00	
Capacity Adjustment Factor due to Impeding Movements	1.00	
Movement Capacity: (pcph)	589	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	61	589 >	589	6.8	0.3	B	6.8
WB	R	0	1139 >					
SB	L	0	1320		2.7	0.0	A	0.0

Intersection Delay = 0.7 sec/veh

Gannett Fleming, Inc.
209 Senate Avenue
Camp Hill, PA 17011-
Ph: (717) 763-7211

Streets: (N-S) MAIN STREET (E-W) 18TH STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0 < 0		
Stop/Yield			N			N						
Volumes		356	12	92	246					26		75
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	382	
Potential Capacity: (pcph)	887	
Movement Capacity: (pcph)	887	
Prob. of Queue-Free State:	0.91	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	388	
Potential Capacity: (pcph)	1120	
Movement Capacity: (pcph)	1120	
Prob. of Queue-Free State:	0.91	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.90	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	738	
Potential Capacity: (pcph)	396	
Major LT, Minor TH Impedance Factor:	0.90	
Adjusted Impedance Factor:	0.90	
Capacity Adjustment Factor due to Impeding Movements	0.90	
Movement Capacity: (pcph)	355	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	28	355 >					
				640	6.8	0.6	B	6.8
WB	R	81	887 >					
SB	L	99	1120		3.5	0.2	A	1.0

Intersection Delay = 1.3 sec/veh

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Streets: (N-S) MAIN STREET (E-W) 18TH STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		459	15	119	317					33		97
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	491	
Potential Capacity: (pcph)	781	
Movement Capacity: (pcph)	781	
Prob. of Queue-Free State:	0.87	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	499	
Potential Capacity: (pcph)	992	
Movement Capacity: (pcph)	992	
Prob. of Queue-Free State:	0.87	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.84	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	950	
Potential Capacity: (pcph)	298	
Major LT, Minor TH Impedance Factor:	0.84	
Adjusted Impedance Factor:	0.84	
Capacity Adjustment Factor due to Impeding Movements	0.84	
Movement Capacity: (pcph)	251	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	36	251 >					
			506	9.8	1.2	B	9.8
WB R	104	781 >					
SB L	127	992		4.2	0.4	A	1.1

Intersection Delay = 1.7 sec/veh

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Streets: (N-S) MAIN STREET (E-W) 22ND STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		400	91	44	369					60		44
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	469	
Potential Capacity: (pcph)	801	
Movement Capacity: (pcph)	801	
Prob. of Queue-Free State:	0.94	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	517	
Potential Capacity: (pcph)	972	
Movement Capacity: (pcph)	972	
Prob. of Queue-Free State:	0.95	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.94	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	903	
Potential Capacity: (pcph)	318	
Major LT, Minor TH Impedance Factor:	0.94	
Adjusted Impedance Factor:	0.94	
Capacity Adjustment Factor due to Impeding Movements	0.94	
Movement Capacity: (pcph)	298	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	64	298 >					
				406	12.2	1.2	C	12.2
WB	R	47	801 >					
SB	L	47	972		3.9	0.0	A	0.4

Intersection Delay = 1.4 sec/veh

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Streets: (N-S) MAIN STREET (E-W) 22ND STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0	> 1	0	0	0	0	0	> 0	< 0
Stop/Yield			N			N						
Volumes		516	117	57	476					77		57
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	604	
Potential Capacity: (pcph)	684	
Movement Capacity: (pcph)	684	
Prob. of Queue-Free State:	0.91	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	666	
Potential Capacity: (pcph)	826	
Movement Capacity: (pcph)	826	
Prob. of Queue-Free State:	0.93	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.90	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	1166	
Potential Capacity: (pcph)	224	
Major LT, Minor TH Impedance Factor:	0.90	
Adjusted Impedance Factor:	0.90	
Capacity Adjustment Factor due to Impeding Movements	0.90	
Movement Capacity: (pcph)	201	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	83	201 >					
				287	24.5	2.6	D	24.5
WB	R	61	684 >					
SB	L	61	826		4.7	0.1	A	0.5

Intersection Delay = 2.7 sec/veh

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Streets: (N-S) MAIN STREET (E-W) 22ND STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....BUILD 1 AND BUILD 2 CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 <	0	0 >	1	0	0	0	0	0 >	0 <	0
Stop/Yield			N			N						
Volumes		227	222	358	170					194		327
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	356	
Potential Capacity: (pcph)	914	
Movement Capacity: (pcph)	914	
Prob. of Queue-Free State:	0.62	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	473	
Potential Capacity: (pcph)	1020	
Movement Capacity: (pcph)	1020	
Prob. of Queue-Free State:	0.62	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.58	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	912	
Potential Capacity: (pcph)	314	
Major LT, Minor TH Impedance Factor:	0.58	
Adjusted Impedance Factor:	0.58	
Capacity Adjustment Factor due to Impeding Movements	0.58	
Movement Capacity: (pcph)	182	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	208	182 >	366	272.8	28.5	F	272.8
WB	R	351	914 >					
SB	L	385	1020		5.7	1.9	B	3.8

Intersection Delay = 96.2 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4d 04-24-1997

Gannett Fleming, Inc.

Streets: (E-W) 22ND STREET (N-S) MAIN STREET

Analyst: RJT File Name: 14B1B2WI.HC9

Area Type: Other 4-23-97 PEAK

Comment: BUILD 1 AND BUILD 2 CONDITIONS WITH IMPROVEMENTS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes				1		1		1	1	1	1	
Volumes				194		327		227	222	358	170	
Lane W (ft)				12.0		12.0		12.0	12.0	12.0	12.0	
RTOR Vols						0			0			0
Lost Time				3.00		3.00		3.00	3.00	3.00	3.00	

Signal Operations

Phase Combination		1	2	3	4		5	6	7	8
EB	Left					NB	Left			
	Thru						Thru	*		
	Right						Right	*		
	Peds						Peds			
WB	Left	*				SB	Left	*	*	
	Thru						Thru	*	*	
	Right	*					Right			
	Peds						Peds			
NB	Right	*				EB	Right			
SB	Right					WB	Right	*		
Green		15.0A				Green		10.0A	20.0P	
Yellow/AR		5.0				Yellow/AR		5.0	5.0	

Cycle Length: 60 secs Phase combination order: #1 #5 #6

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
WB	L	502	1770	0.407	0.283	11.6	B	7.8	B
	R	844	1583	0.407	0.533	5.6	B		
NB	T	683	1863	0.350	0.367	9.1	B	5.6	B
	R	1108	1583	0.211	0.700	2.1	A		
SB	L	639	1770	0.590	0.617	5.0	A	4.4	A
	T	1149	1863	0.156	0.617	3.2	A		

Intersection Delay = 5.9 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.522

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Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....EXISTING CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0 < 0		
Stop/Yield			N			N						
Volumes		316	70	61	273					65		55
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	370	
Potential Capacity: (pcph)	899	
Movement Capacity: (pcph)	899	
Prob. of Queue-Free State:	0.93	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	407	
Potential Capacity: (pcph)	1097	
Movement Capacity: (pcph)	1097	
Prob. of Queue-Free State:	0.94	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.93	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	721	
Potential Capacity: (pcph)	405	
Major LT, Minor TH Impedance Factor:	0.93	
Adjusted Impedance Factor:	0.93	
Capacity Adjustment Factor due to Impeding Movements	0.93	
Movement Capacity: (pcph)	376	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	69	376 >					
				514	9.3	1.1	B	9.3
WB	R	59	899 >					
SB	L	65	1097		3.5	0.1	A	0.6

Intersection Delay = 1.6 sec/veh

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Streets: (N-S) MAIN STREET (E-W) 29TH STREET
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... RJT
Date of Analysis..... 4/24/97
Other Information.....NO BUILD CONDITIONS
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1 < 0		0 > 1		0	0	0	0	0 > 0		< 0
Stop/Yield			N			N						
Volumes		408	90	79	352					84		71
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)				0						0		0
SU/RV's (%)				0						0		0
CV's (%)				2						2		2
PCE's				1.02						1.02		1.02

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	3.40

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	476	
Potential Capacity: (pcph)	795	
Movement Capacity: (pcph)	795	
Prob. of Queue-Free State:	0.90	

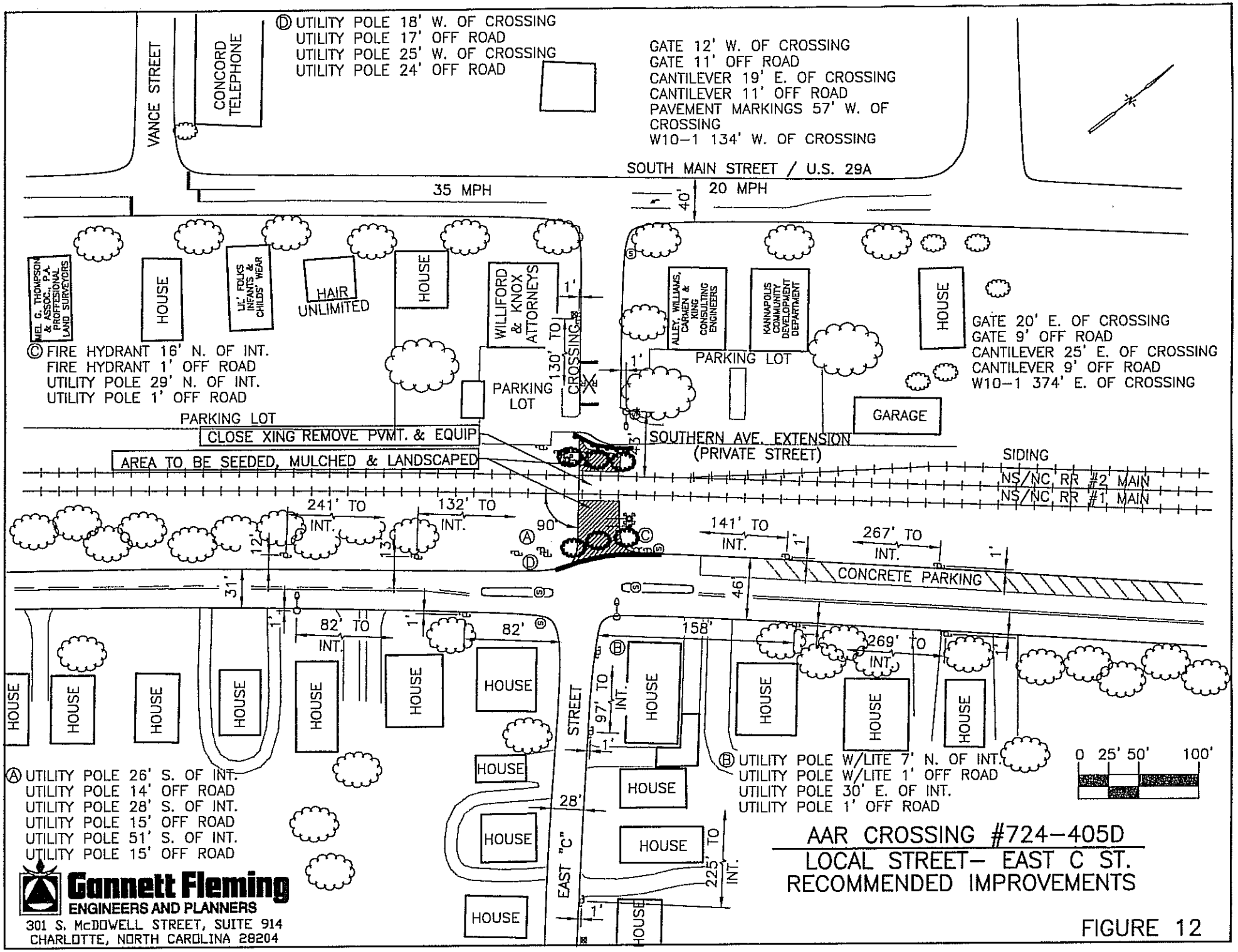
Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	524	
Potential Capacity: (pcph)	965	
Movement Capacity: (pcph)	965	
Prob. of Queue-Free State:	0.91	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-Free State:	0.89	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	930	
Potential Capacity: (pcph)	306	
Major LT, Minor TH Impedance Factor:	0.89	
Adjusted Impedance Factor:	0.89	
Capacity Adjustment Factor due to Impeding Movements	0.89	
Movement Capacity: (pcph)	272	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	90	272 >					
				389	16.0	2.1	C	16.0
WB	R	76	795 >					
SB	L	85	965		4.1	0.2	A	0.7

Intersection Delay = 2.6 sec/veh


Ⓓ UTILITY POLE 18' W. OF CROSSING
UTILITY POLE 17' OFF ROAD
UTILITY POLE 25' W. OF CROSSING
UTILITY POLE 24' OFF ROAD
GATE 12' W. OF CROSSING
GATE 11' OFF ROAD
CANTILEVER 19' E. OF CROSSING
CANTILEVER 11' OFF ROAD
PAVEMENT MARKINGS 57' W. OF CROSSING
W10-1 134' W. OF CROSSING
VANCE STREET
CONCORD TELEPHONE
SOUTH MAIN STREET / U.S. 29A
35 MPH
20 MPH
40'
MEL G. THOMPSON & ASSOC., P.A. PROFFESIONAL LAND SURVEYORS
HOUSE
LIL' FOLKS INFANTS & CHILDS' WEAR
HAIR UNLIMITED
HOUSE
WILLIFORD & KNOX ATTORNEYS
1'
TO CROSSING
130'
ALLEY, WILLIAMS, CARMEN & KING CONSULTING ENGINEERS
KANNAPOLIS COMMUNITY DEVELOPMENT DEPARTMENT
HOUSE
GATE 20' E. OF CROSSING
GATE 9' OFF ROAD
CANTILEVER 25' E. OF CROSSING
CANTILEVER 9' OFF ROAD
W10-1 374' E. OF CROSSING
Ⓒ FIRE HYDRANT 16' N. OF INT.
FIRE HYDRANT 1' OFF ROAD
UTILITY POLE 29' N. OF INT.
UTILITY POLE 1' OFF ROAD
PARKING LOT
PARKING LOT
PARKING LOT
GARAGE
CLOSE XING REMOVE PVMT. & EQUIP
AREA TO BE SEEDED, MULCHED & LANDSCAPED
43'
SOUTHERN AVE. EXTENSION
(PRIVATE STREET)
SIDING
NS/NC RR #2 MAIN
NS/NC RR #1 MAIN
241' TO INT.
132' TO INT.
12'
13'
90
Ⓐ
Ⓓ
Ⓒ
141' TO INT.
267' TO INT.
1'
CONCRETE PARKING
31'
46'
82' TO INT.
82'
158'
269' TO INT.
97' TO INT.
STREET
HOUSE
HOUSE
HOUSE
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Ⓐ UTILITY POLE 26' S. OF INT.
UTILITY POLE 14' OFF ROAD
UTILITY POLE 28' S. OF INT.
UTILITY POLE 15' OFF ROAD
UTILITY POLE 51' S. OF INT.
UTILITY POLE 15' OFF ROAD
Ⓑ UTILITY POLE W/LITE 7' N. OF INT.
UTILITY POLE W/LITE 1' OFF ROAD
UTILITY POLE 30' E. OF INT.
UTILITY POLE 1' OFF ROAD
28'
EAST "C"
225' TO INT.
0 25' 50' 100'
Gannett Fleming
ENGINEERS AND PLANNERS
301 S. McDOWELL STREET, SUITE 914
CHARLOTTE, NORTH CAROLINA 28204
AAR CROSSING #724-405D
LOCAL STREET- EAST C ST.
RECOMMENDED IMPROVEMENTS
FIGURE 12

Date: 2/20/97 Time: 4:00-6:00PM Weather: Sunny		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: 29A/S. Main St. @ Winecoff School Rd.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	16	108	8	132
4:15-4:30	NB	16	120	19	155
4:30-4:45	NB	26	112	25	163
4:45-5:00	NB	12	121	25	158
5:00-5:15	NB	32	124	23	179
5:15-5:30	NB	24	140	11	175
5:30-5:45	NB	17	126	11	154
5:45-6:00	NB	18	116	13	147
TOTAL		161	967	135	1263
4:00-4:15	SB	17	95	10	122
4:15-4:30	SB	16	100	11	127
4:30-4:45	SB	14	102	9	125
4:45-5:00	SB	16	103	15	134
5:00-5:15	SB	10	117	25	152
5:15-5:30	SB	13	121	15	149
5:30-5:45	SB	13	100	21	134
5:45-6:00	SB	14	97	14	125
TOTAL		113	835	120	1068

Date: 2/20/97 Time: 4:00-6:00 PM Weather: Sunny		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Winecoff School Rd. @ 29A/S. Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	21	22	24	67
4:15-4:30	EB	10	32	18	60
4:30-4:45	EB	14	14	15	43
4:45-5:00	EB	11	28	23	62
5:00-5:15	EB	24	26	21	71
5:15-5:30	EB	23	23	16	62
5:30-5:45	EB	23	27	22	72
5:45-6:00	EB	17	29	24	70
TOTAL		143	201	163	507
4:00-4:15	WB	6	29	13	48
4:15-4:30	WB	19	22	14	55
4:30-4:45	WB	16	31	15	62
4:45-5:00	WB	11	19	14	44
5:00-5:15	WB	11	24	15	50
5:15-5:30	WB	10	38	12	60
5:30-5:45	WB	6	28	15	49
5:45-6:00	WB	14	40	11	65
TOTAL		93	231	109	433

Date: 2/20/97 Time: 4:00-6:00 PM Weather: Sunny		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Winecoff School Rd. @ Ridge Rd.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	38	N/A	4	42
4:15-4:30	EB	58	N/A	8	66
4:30-4:45	EB	44	N/A	6	50
4:45-5:00	EB	60	N/A	8	68
5:00-5:15	EB	49	N/A	9	58
5:15-5:30	EB	36	N/A	6	42
5:30-5:45	EB	42	N/A	8	50
5:45-6:00	EB	47	N/A	8	55
TOTAL		374		57	431
4:00-4:15					
4:15-4:30					
4:30-4:45					
4:45-5:00					
5:00-5:15					
5:15-5:30					
5:30-5:45					
5:45-6:00					
TOTAL					

Date: 2/20/97 Time: 4:00-6:00PM Weather: Sunny		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Ridge Rd @ Winecoff School Rd.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	11	17	N/A	28
4:15-4:30	NB	13	21	N/A	34
4:30-4:45	NB	12	28	N/A	40
4:45-5:00	NB	6	20	N/A	26
5:00-5:15	NB	10	28	N/A	38
5:15-5:30	NB	12	35	N/A	47
5:30-5:45	NB	10	20	N/A	30
5:45-6:00	NB	11	20	N/A	31
TOTAL		85	189		274
4:00-4:15	SB	N/A	17	35	52
4:15-4:30	SB	N/A	26	42	68
4:30-4:45	SB	N/A	16	52	68
4:45-5:00	SB	N/A	14	40	54
5:00-5:15	SB	N/A	10	36	46
5:15-5:30	SB	N/A	16	55	71
5:30-5:45	SB	N/A	11	44	55
5:45-6:00	SB	N/A	8	41	49
TOTAL			118	345	463

Date: 2/24/97 Time: 4:00-6:00PM Weather: SUNNY-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Main St./29A @ Universal St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	9	126	24	159
4:15-4:30	NB	9	125	17	151
4:30-4:45	NB	6	110	16	132
4:45-5:00	NB	8	63	11	82
5:00-5:15	NB	6	98	22	126
5:15-5:30	NB	7	120	24	151
5:30-5:45	NB	11	97	22	130
5:45-6:00	NB	15	90	19	124
TOTAL		71	829	155	1055
4:00-4:15	SB	17	88	1	106
4:15-4:30	SB	9	84	7	100
4:30-4:45	SB	11	73	2	86
4:45-5:00	SB	20	72	4	96
5:00-5:15	SB	8	113	7	128
5:15-5:30	SB	11	58	5	74
5:30-5:45	SB	7	62	4	73
5:45-6:00	SB	8	50	4	62
TOTAL		91	600	34	725

Date: 2/24/97 Time: 4:00-6:00 PM Weather: SUNNY-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Universal St. @ Main St./29A	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	5	45	6	56
4:15-4:30	EB	5	22	2	29
4:30-4:45	EB	1	9	3	13
4:45-5:00	EB	1	25	5	31
5:00-5:15	EB	6	31	0	37
5:15-5:30	EB	1	22	1	24
5:30-5:45	EB	5	27	2	34
5:45-6:00	EB	3	37	3	43
TOTAL		27	218	22	267
4:00-4:15	WB	21	47	17	85
4:15-4:30	WB	27	28	25	80
4:30-4:45	WB	17	26	16	59
4:45-5:00	WB	31	41	13	85
5:00-5:15	WB	23	41	12	76
5:15-5:30	WB	14	32	17	63
5:30-5:45	WB	20	33	11	64
5:45-6:00	WB	20	40	12	72
TOTAL		173	288	123	584

Date: 2/24/97 Time: 4:00-6:00 PM Weather: SUNNY-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Universal St. @ Ridge Road	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	8	53	20	81
4:15-4:30	EB	10	31	22	63
4:30-4:45	EB	9	34	9	52
4:45-5:00	EB	6	40	23	69
5:00-5:15	EB	8	43	16	67
5:15-5:30	EB	8	45	13	66
5:30-5:45	EB	8	40	16	64
5:45-6:00	EB	9	50	18	77
TOTAL		66	336	137	539
4:00-4:15	WB	3	38	9	50
4:15-4:30	WB	3	40	3	46
4:30-4:45	WB	2	39	2	43
4:45-5:00	WB	2	37	3	42
5:00-5:15	WB	1	43	0	44
5:15-5:30	WB	2	45	2	49
5:30-5:45	WB	1	36	1	38
5:45-6:00	WB	3	48	1	52
TOTAL		17	326	21	364

Date: 2/24/97 Time: 4:00-6:00PM Weather: SUNNY-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ridge Rd. @ Universal St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	21	43	6	70
4:15-4:30	NB	36	34	8	78
4:30-4:45	NB	28	32	2	62
4:45-5:00	NB	33	38	14	85
5:00-5:15	NB	26	53	8	87
5:15-5:30	NB	19	54	10	83
5:30-5:45	NB	23	47	12	82
5:45-6:00	NB	35	42	6	83
TOTAL		221	343	66	630
4:00-4:15	SB	1	28	5	34
4:15-4:30	SB	0	21	6	27
4:30-4:45	SB	3	26	9	38
4:45-5:00	SB	5	25	14	44
5:00-5:15	SB	3	28	18	49
5:15-5:30	SB	2	27	13	42
5:30-5:45	SB	3	33	13	49
5:45-6:00	SB	1	18	8	27
TOTAL		18	206	86	310

Date: 2/25/97 Time: 4:00-6:00PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 29A/Main St. @ Plymouth St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	51	5	56
4:15-4:30	NB	N/A	91	10	101
4:30-4:45	NB	N/A	99	9	108
4:45-5:00	NB	N/A	88	7	95
5:00-5:15	NB	N/A	97	7	104
5:15-5:30	NB	N/A	103	12	115
5:30-5:45	NB	N/A	96	1	97
5:45-6:00	NB	N/A	85	7	92
TOTAL		N/A	710	58	768
4:00-4:15	SB	17	80	N/A	97
4:15-4:30	SB	16	90	N/A	106
4:30-4:45	SB	15	104	N/A	119
4:45-5:00	SB	22	93	N/A	115
5:00-5:15	SB	24	112	N/A	136
5:15-5:30	SB	19	96	N/A	115
5:30-5:45	SB	21	89	N/A	110
5:45-6:00	SB	13	77	N/A	90
TOTAL		147	742	N/A	888

Date: 2/25/97 Time: 4:00-6:00 PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Plymouth St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	10	N/A	18	28
4:15-4:30	WB	5	N/A	15	20
4:30-4:45	WB	4	N/A	18	22
4:45-5:00	WB	10	N/A	20	30
5:00-5:15	WB	11	N/A	28	39
5:15-5:30	WB	5	N/A	20	25
5:30-5:45	WB	7	N/A	13	20
5:45-6:00	WB	6	N/A	25	31
TOTAL		58	N/A	157	215

Date: 2/25/97 Time: 4:00-6:00 PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Plymouth St. @ Ridge Rd.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	3	19	2	24
4:15-4:30	EB	3	18	8	29
4:30-4:45	EB	3	17	3	23
4:45-5:00	EB	0	22	4	26
5:00-5:15	EB	1	22	12	35
5:15-5:30	EB	2	22	8	32
5:30-5:45	EB	1	12	3	16
5:45-6:00	EB	0	18	7	25
TOTAL		13	150	47	210
4:00-4:15	WB	0	13	1	14
4:15-4:30	WB	3	18	1	22
4:30-4:45	WB	3	14	4	21
4:45-5:00	WB	4	21	1	26
5:00-5:15	WB	6	30	2	38
5:15-5:30	WB	2	19	3	24
5:30-5:45	WB	2	15	1	18
5:45-6:00	WB	2	24	2	28
TOTAL		22	154	15	191

Date: 2/25/97 Time: 4:00-6:00PM Weather: SUNNY-60°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ridge Ave. @ Plymouth St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	10	23	8	41
4:15-4:30	NB	6	35	6	47
4:30-4:45	NB	8	35	7	50
4:45-5:00	NB	11	39	8	58
5:00-5:15	NB	10	30	3	43
5:15-5:30	NB	3	24	5	32
5:30-5:45	NB	3	39	3	45
5:45-6:00	NB	11	48	3	62
TOTAL		62	273	43	378
4:00-4:15	SB	0	23	2	25
4:15-4:30	SB	6	23	2	31
4:30-4:45	SB	3	33	6	42
4:45-5:00	SB	4	21	1	26
5:00-5:15	SB	3	37	5	45
5:15-5:30	SB	1	20	3	24
5:30-5:45	SB	4	23	1	28
5:45-6:00	SB	4	12	1	17
TOTAL		25	192	21	238

Date: 2/27/97 Time: 4:00-6:00PM Weather: CLOUDY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 29A/Main St. @ C. St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	66	10	76
4:15-4:30	NB	N/A	41	14	55
4:30-4:45	NB	N/A	72	18	90
4:45-5:00	NB	N/A	43	17	60
5:00-5:15	NB	N/A	40	20	60
5:15-5:30	NB	N/A	52	7	59
5:30-5:45	NB	N/A	35	14	49
5:45-6:00	NB	N/A	53	6	59
TOTAL		N/A	402	106	508
4:00-4:15	SB	6	56	N/A	62
4:15-4:30	SB	5	32	N/A	37
4:30-4:45	SB	4	53	N/A	57
4:45-5:00	SB	8	65	N/A	73
5:00-5:15	SB	15	68	N/A	83
5:15-5:30	SB	10	59	N/A	69
5:30-5:45	SB	5	36	N/A	41
5:45-6:00	SB	8	50	N/A	58
TOTAL		61	419	N/A	480

Date: 2/27/97 Time: 4:00-6:00 PM Weather: CLOUDY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: C St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	15	N/A	6	21
4:15-4:30	WB	15	N/A	8	23
4:30-4:45	WB	16	N/A	9	25
4:45-5:00	WB	17	N/A	2	19
5:00-5:15	WB	25	N/A	6	31
5:15-5:30	WB	16	N/A	4	20
5:30-5:45	WB	11	N/A	4	15
5:45-6:00	WB	16	N/A	4	20
TOTAL		131	N/A	43	174

Date: 2/27/97 Time: 4:00-6:00 PM Weather: CLOUDY-70°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: East C St. @ Ridge Ave.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	8	12	2	22
4:15-4:30	EB	5	18	5	28
4:30-4:45	EB	10	11	6	27
4:45-5:00	EB	10	13	11	34
5:00-5:15	EB	14	15	15	44
5:15-5:30	EB	5	10	8	23
5:30-5:45	EB	6	19	3	28
5:45-6:00	EB	8	12	2	22
TOTAL		66	110	52	228
4:00-4:15	WB	5	7	6	18
4:15-4:30	WB	5	14	5	24
4:30-4:45	WB	3	11	0	14
4:45-5:00	WB	6	11	1	18
5:00-5:15	WB	6	11	3	20
5:15-5:30	WB	1	10	1	12
5:30-5:45	WB	2	11	4	17
5:45-6:00	WB	5	12	6	23
TOTAL		33	87	26	146

Date: 2/27/96 Time: 4:00-6:00PM Weather: CLOUDY-70°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ridge Ave. @ East C St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	4	40	3	47
4:15-4:30	NB	2	34	2	38
4:30-4:45	NB	4	39	3	46
4:45-5:00	NB	2	35	2	39
5:00-5:15	NB	5	47	1	53
5:15-5:30	NB	3	31	7	41
5:30-5:45	NB	1	40	7	48
5:45-6:00	NB	1	42	2	45
TOTAL		22	308	27	357
4:00-4:15	SB	2	39	4	45
4:15-4:30	SB	1	36	10	47
4:30-4:45	SB	1	46	8	55
4:45-5:00	SB	3	34	7	44
5:00-5:15	SB	2	29	14	45
5:15-5:30	SB	2	35	6	43
5:30-5:45	SB	4	27	9	40
5:45-6:00	SB	0	33	7	40
TOTAL		15	279	65	359

Date: 2/26/97 Time: 4:00-6:00PM Weather: RAIN		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 29A/Main St. @ 1st St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	2	41	7	50
4:15-4:30	NB	2	43	5	50
4:30-4:45	NB	2	41	12	55
4:45-5:00	NB	4	49	6	59
5:00-5:15	NB	7	59	6	72
5:15-5:30	NB	6	43	9	58
5:30-5:45	NB	7	48	6	61
5:45-6:00	NB	6	35	3	44
TOTAL		36	359	54	449
4:00-4:15	SB	5	36	4	45
4:15-4:30	SB	3	34	1	38
4:30-4:45	SB	4	26	7	37
4:45-5:00	SB	4	45	12	61
5:00-5:15	SB	6	64	30	100
5:15-5:30	SB	5	45	16	66
5:30-5:45	SB	2	44	17	63
5:45-6:00	SB	2	53	13	68
TOTAL		31	347	100	478

Date: 2/26/97 Time: 4:00-6:00 PM Weather: RAIN		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 1st St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	12	18	1	31
4:15-4:30	EB	17	15	2	34
4:30-4:45	EB	14	15	4	33
4:45-5:00	EB	17	23	4	44
5:00-5:15	EB	41	53	11	105
5:15-5:30	EB	17	14	4	35
5:30-5:45	EB	17	15	0	32
5:45-6:00	EB	12	20	1	33
TOTAL		147	173	27	347
4:00-4:15	WB	3	21	1	25
4:15-4:30	WB	4	20	0	24
4:30-4:45	WB	6	31	1	38
4:45-5:00	WB	3	19	1	23
5:00-5:15	WB	8	31	0	39
5:15-5:30	WB	2	16	3	21
5:30-5:45	WB	1	17	1	19
5:45-6:00	WB	2	20	3	25
TOTAL		29	175	10	214

Date: 2/26/97 Time: 4:00-6:00 PM Weather: LIGHT RAIN-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: 1st St. @ Ridge Ave.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	9	10	0	19
4:15-4:30	EB	6	13	1	20
4:30-4:45	EB	13	15	1	29
4:45-5:00	EB	10	14	1	25
5:00-5:15	EB	21	36	4	61
5:15-5:30	EB	9	15	2	26
5:30-5:45	EB	6	17	0	23
5:45-6:00	EB	3	8	0	11
TOTAL		77	128	9	214
4:00-4:15	WB	2	17	1	20
4:15-4:30	WB	2	19	2	23
4:30-4:45	WB	5	24	3	32
4:45-5:00	WB	2	13	0	15
5:00-5:15	WB	2	23	1	26
5:15-5:30	WB	6	14	1	21
5:30-5:45	WB	4	10	2	16
5:45-6:00	WB	2	13	2	17
TOTAL		25	133	12	170

Date: 2/26/97 Time: 4:00-6:00PM Weather: LIGHT RAIN-50°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ridge Ave. @ 1st St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	1	36	2	39
4:15-4:30	NB	1	36	1	38
4:30-4:45	NB	3	43	0	46
4:45-5:00	NB	0	38	4	42
5:00-5:15	NB	0	56	5	61
5:15-5:30	NB	2	52	4	58
5:30-5:45	NB	0	42	5	47
5:45-6:00	NB	1	40	4	45
TOTAL		8	343	25	376
4:00-4:15	SB	2	26	12	40
4:15-4:30	SB	2	28	11	41
4:30-4:45	SB	2	29	18	49
4:45-5:00	SB	4	25	8	37
5:00-5:15	SB	2	34	11	47
5:15-5:30	SB	2	36	10	48
5:30-5:45	SB	2	42	12	56
5:45-6:00	SB	2	41	12	55
TOTAL		18	261	94	373

Date: 3/3/97 Time: 4:00-6:00PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 29A/Main @ Ebenezer	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	68	18	86
4:15-4:30	NB	N/A	69	19	88
4:30-4:45	NB	N/A	71	12	83
4:45-5:00	NB	N/A	82	23	105
5:00-5:15	NB	N/A	77	17	94
5:15-5:30	NB	N/A	80	20	100
5:30-5:45	NB	N/A	75	14	89
5:45-6:00	NB	N/A	59	11	70
TOTAL		N/A	581	134	715
4:00-4:15	SB	16	45	N/A	61
4:15-4:30	SB	17	88	N/A	105
4:30-4:45	SB	23	65	N/A	88
4:45-5:00	SB	26	68	N/A	94
5:00-5:15	SB	14	76	N/A	90
5:15-5:30	SB	16	68	N/A	84
5:30-5:45	SB	22	44	N/A	66
5:45-6:00	SB	18	34	N/A	52
TOTAL		152	488	N/A	640

Date: 3/3/97 Time: 4:00-6:00 PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: Ebenezer @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	18	N/A	15	33
4:15-4:30	WB	16	N/A	15	31
4:30-4:45	WB	16	N/A	22	38
4:45-5:00	WB	22	N/A	17	39
5:00-5:15	WB	19	N/A	25	44
5:15-5:30	WB	17	N/A	16	33
5:30-5:45	WB	21	N/A	21	42
5:45-6:00	WB	23	N/A	21	44
TOTAL		152	N/A	152	304

Date: 3/3/97 Time: 4:00-6:00 PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ebenezer @ Ridge Ave.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	5	7	21	33
4:15-4:30	EB	5	14	20	39
4:30-4:45	EB	6	13	20	39
4:45-5:00	EB	4	19	25	48
5:00-5:15	EB	8	14	13	35
5:15-5:30	EB	7	15	11	33
5:30-5:45	EB	4	13	19	36
5:45-6:00	EB	3	11	15	29
TOTAL		42	106	144	292
4:00-4:15	WB	2	7	1	10
4:15-4:30	WB	2	10	0	12
4:30-4:45	WB	4	9	0	13
4:45-5:00	WB	3	9	0	12
5:00-5:15	WB	0	7	0	7
5:15-5:30	WB	3	12	0	15
5:30-5:45	WB	3	8	0	11
5:45-6:00	WB	4	12	0	16
TOTAL		21	74	1	96

Date: 3/3/97 Time: 4:00-6:00PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: Ridge Ave. @ Ebenezer	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	22	18	24	64
4:15-4:30	NB	21	22	25	68
4:30-4:45	NB	24	19	22	65
4:45-5:00	NB	19	11	24	54
5:00-5:15	NB	30	19	34	83
5:15-5:30	NB	24	20	24	68
5:30-5:45	NB	21	9	21	51
5:45-6:00	NB	25	13	21	59
TOTAL		186	131	195	512
4:00-4:15	SB	0	59	8	67
4:15-4:30	SB	0	56	17	73
4:30-4:45	SB	0	58	12	70
4:45-5:00	SB	0	43	19	62
5:00-5:15	SB	0	44	14	58
5:15-5:30	SB	1	53	13	67
5:30-5:45	SB	0	49	13	62
5:45-6:00	SB	0	46	16	62
TOTAL		1	408	112	521

Date: 3/4/97 Time: 4:00-6:00PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 29A/Main St. @ 18th St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	116	7	123
4:15-4:30	NB	N/A	92	3	95
4:30-4:45	NB	N/A	65	0	65
4:45-5:00	NB	N/A	83	2	85
5:00-5:15	NB	N/A	88	3	91
5:15-5:30	NB	N/A	71	0	71
5:30-5:45	NB	N/A	55	5	60
5:45-6:00	NB	N/A	60	3	63
TOTAL		N/A	630	23	653
4:00-4:15	SB	21	66	N/A	87
4:15-4:30	SB	25	64	N/A	89
4:30-4:45	SB	20	58	N/A	78
4:45-5:00	SB	26	58	N/A	84
5:00-5:15	SB	10	71	N/A	81
5:15-5:30	SB	26	50	N/A	76
5:30-5:45	SB	12	36	N/A	48
5:45-6:00	SB	18	65	N/A	83
TOTAL		158	468	N/A	626

Date: 3/4/97 Time: 4:00-6:00 PM Weather: SUNNY		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: BKC Location: 18th St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	8	N/A	19	27
4:15-4:30	WB	9	N/A	17	26
4:30-4:45	WB	3	N/A	17	20
4:45-5:00	WB	6	N/A	22	28
5:00-5:15	WB	8	N/A	17	25
5:15-5:30	WB	10	N/A	22	32
5:30-5:45	WB	7	N/A	10	17
5:45-6:00	WB	7	N/A	16	23
TOTAL		58	N/A	140	198

Date: 3/4/97 Time: 4:00-6:00PM Weather: SUNNY-70°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: 29A/Main St. @ E. 22nd St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	105	15	120
4:15-4:30	NB	N/A	104	25	129
4:30-4:45	NB	N/A	84	23	107
4:45-5:00	NB	N/A	105	18	123
5:00-5:15	NB	N/A	107	25	132
5:15-5:30	NB	N/A	102	19	121
5:30-5:45	NB	N/A	80	20	100
5:45-6:00	NB	N/A	79	15	94
TOTAL		N/A	766	160	926
4:00-4:15	SB	5	69	N/A	74
4:15-4:30	SB	8	100	N/A	108
4:30-4:45	SB	12	79	N/A	91
4:45-5:00	SB	12	100	N/A	112
5:00-5:15	SB	12	90	N/A	102
5:15-5:30	SB	12	83	N/A	95
5:30-5:45	SB	13	68	N/A	81
5:45-6:00	SB	7	82	N/A	89
TOTAL		81	671	N/A	752

Date: 3/4/97 Time: 4:00-6:00 PM Weather: SUNNY-70°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: E. 22nd St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	13	N/A	8	21
4:15-4:30	WB	17	N/A	11	28
4:30-4:45	WB	13	N/A	14	27
4:45-5:00	WB	12	N/A	7	19
5:00-5:15	WB	18	N/A	12	30
5:15-5:30	WB	20	N/A	8	28
5:30-5:45	WB	11	N/A	11	22
5:45-6:00	WB	19	N/A	12	31
TOTAL		123	N/A	83	206

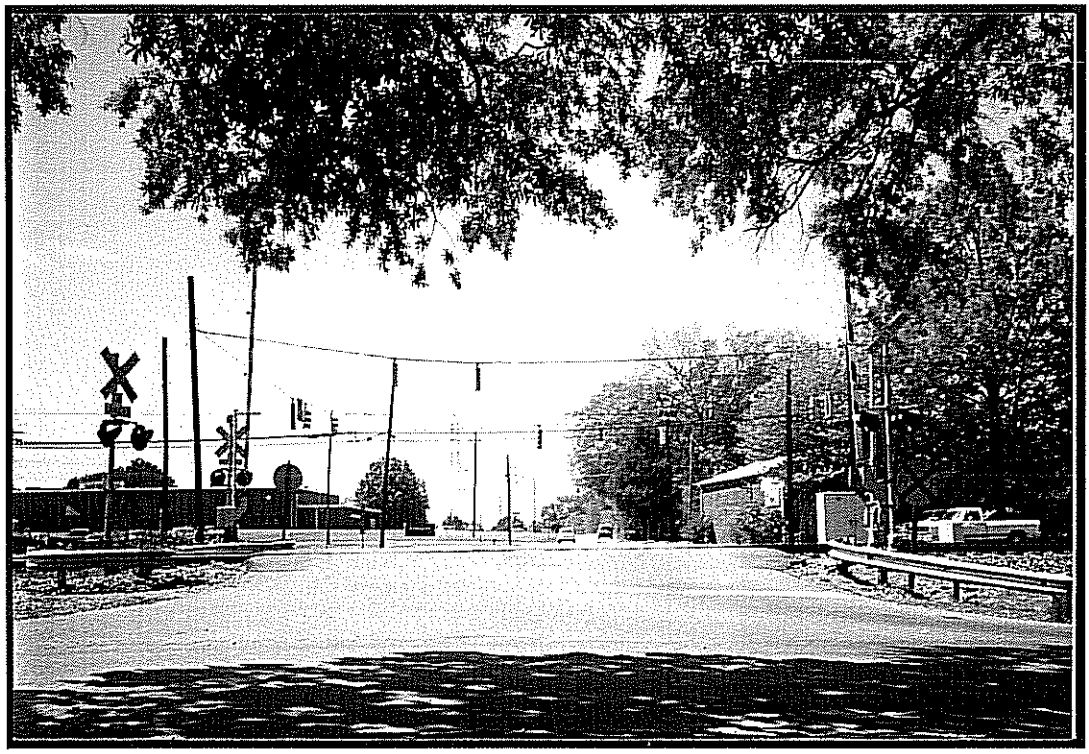
Date: 3/5/97 Time: 4:00-6:00PM Weather: CLOUDY-75°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: 29A/Main St. @ E 29th St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	NB	N/A	64	21	85
4:15-4:30	NB	N/A	67	11	78
4:30-4:45	NB	N/A	71	15	86
4:45-5:00	NB	N/A	77	16	93
5:00-5:15	NB	N/A	90	22	112
5:15-5:30	NB	N/A	78	17	95
5:30-5:45	NB	N/A	66	24	90
5:45-6:00	NB	N/A	67	26	93
TOTAL		N/A	580	152	732
4:00-4:15	SB	4	99	N/A	103
4:15-4:30	SB	8	75	N/A	83
4:30-4:45	SB	12	72	N/A	84
4:45-5:00	SB	19	62	N/A	81
5:00-5:15	SB	14	83	N/A	97
5:15-5:30	SB	16	56	N/A	72
5:30-5:45	SB	12	64	N/A	76
5:45-6:00	SB	10	54	N/A	64
TOTAL		95	565	N/A	660

Date: 3/5/97 Time: 4:00-6:00 PM Weather: CLOUDY-75°		MANUAL TRAFFIC COUNT SUMMARY IN PASSENGER CAR EQUIVALENTS (PCE'S)		Counted by: RLC Location: E. 29th St. @ 29A/Main St.	
Time	**Approach**	**Left-Turn**	**Through**	**Right-Turn**	**Total**
4:00-4:15	EB	N/A	N/A	N/A	N/A
4:15-4:30	EB	N/A	N/A	N/A	N/A
4:30-4:45	EB	N/A	N/A	N/A	N/A
4:45-5:00	EB	N/A	N/A	N/A	N/A
5:00-5:15	EB	N/A	N/A	N/A	N/A
5:15-5:30	EB	N/A	N/A	N/A	N/A
5:30-5:45	EB	N/A	N/A	N/A	N/A
5:45-6:00	EB	N/A	N/A	N/A	N/A
TOTAL		N/A	N/A	N/A	N/A
4:00-4:15	WB	13	N/A	12	25
4:15-4:30	WB	16	N/A	10	26
4:30-4:45	WB	18	N/A	15	33
4:45-5:00	WB	13	N/A	12	25
5:00-5:15	WB	19	N/A	17	36
5:15-5:30	WB	15	N/A	11	26
5:30-5:45	WB	11	N/A	18	29
5:45-6:00	WB	26	N/A	13	39
TOTAL		131	N/A	108	239

Municipality: Kannapolis

Crossing Number: 724410A *Street Name:* Winecoff Sch. Rd.

Eastbound Approach



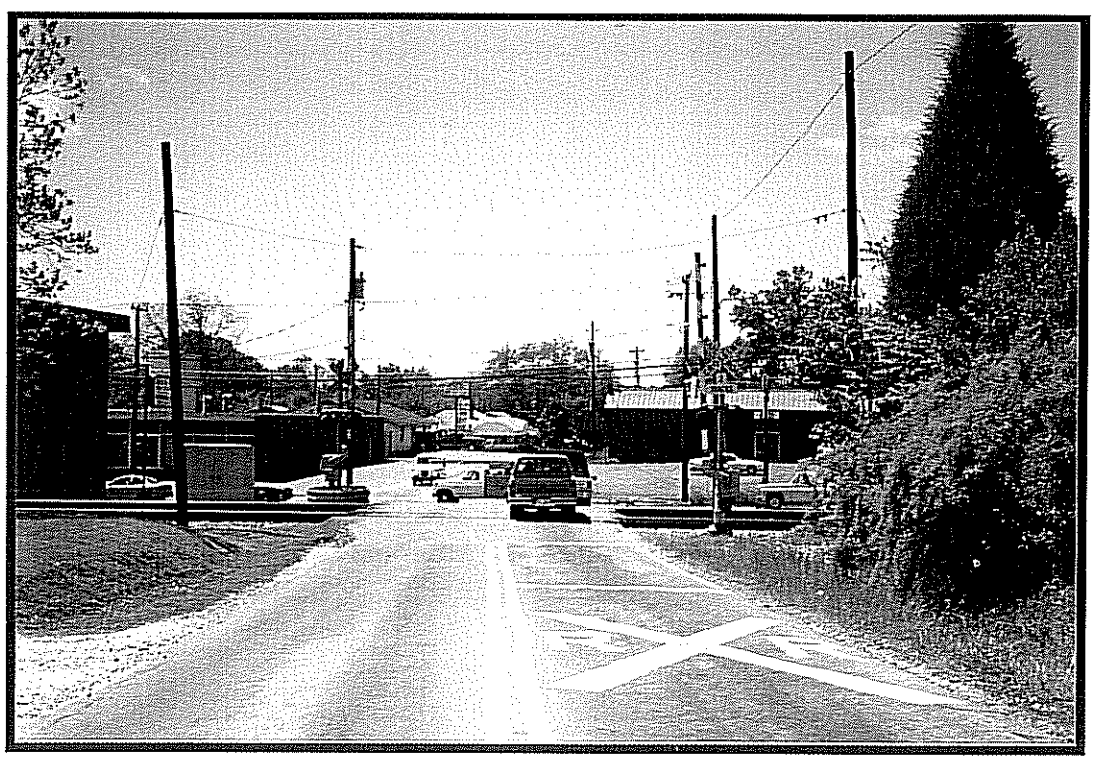
Westbound Approach

FIGURE 5

Municipality: Kannapolis

Crossing Number: 724408Y *Street Name:* Universal St.

Eastbound Approach

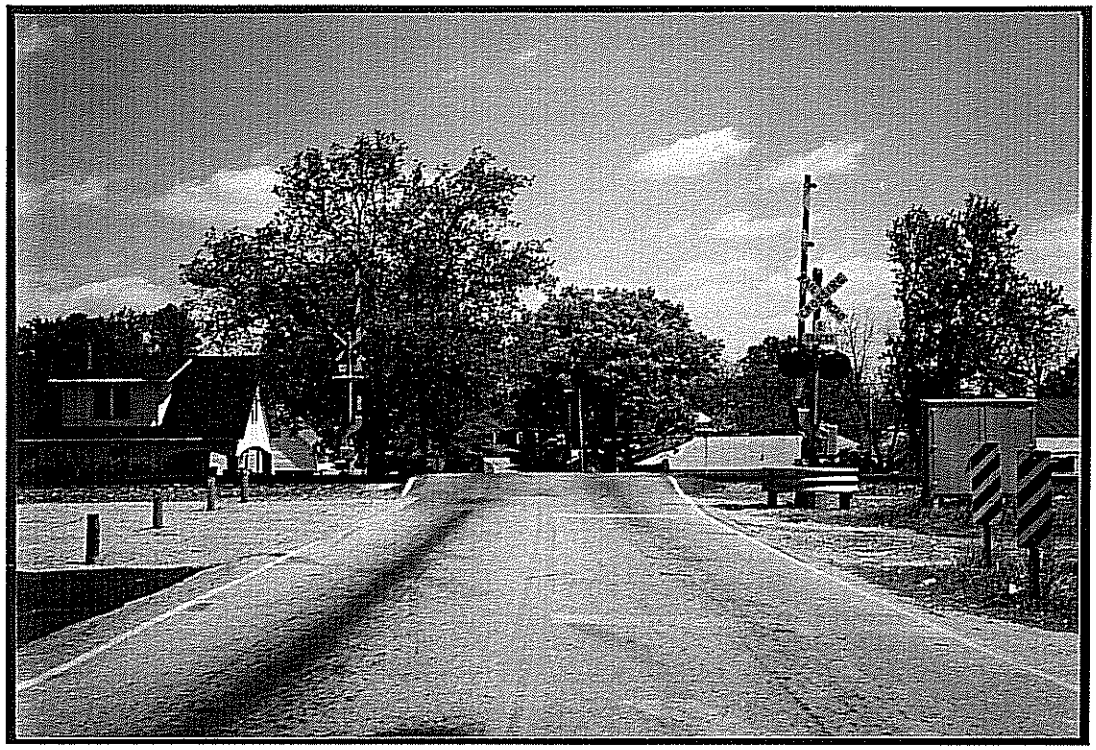


Westbound Approach

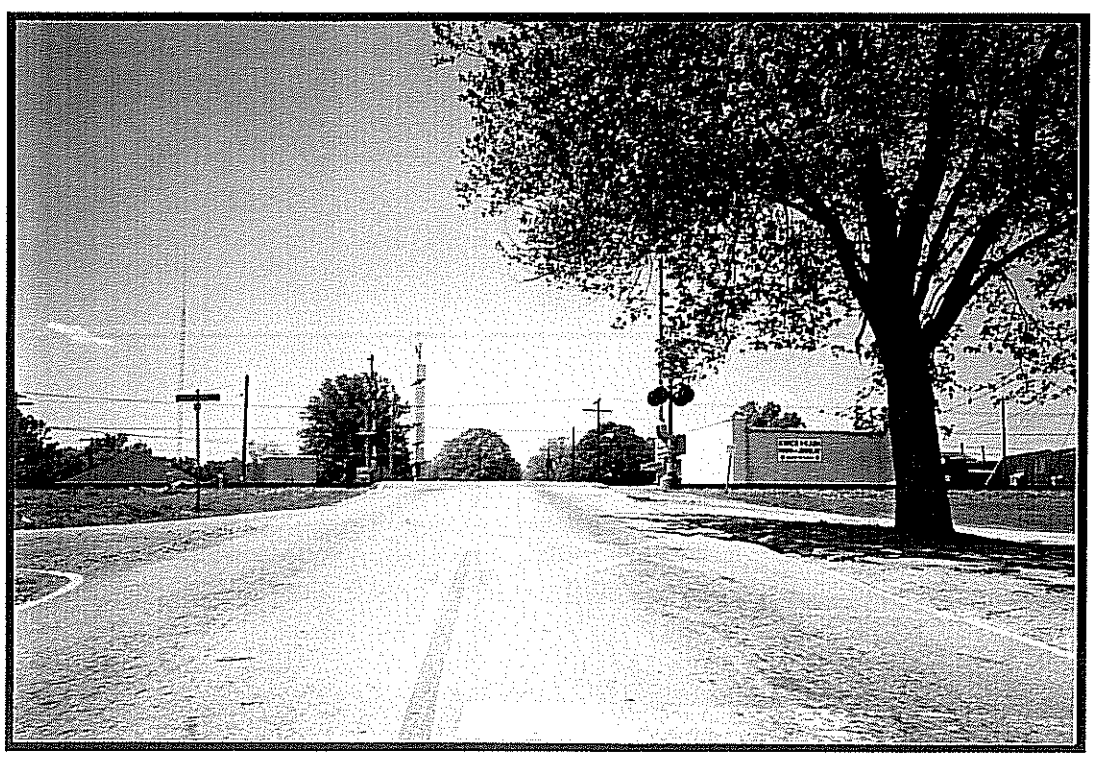
FIGURE 7

Municipality: Kannapolis

Crossing Number: 724407S *Street Name:* Plymouth St.



Eastbound Approach



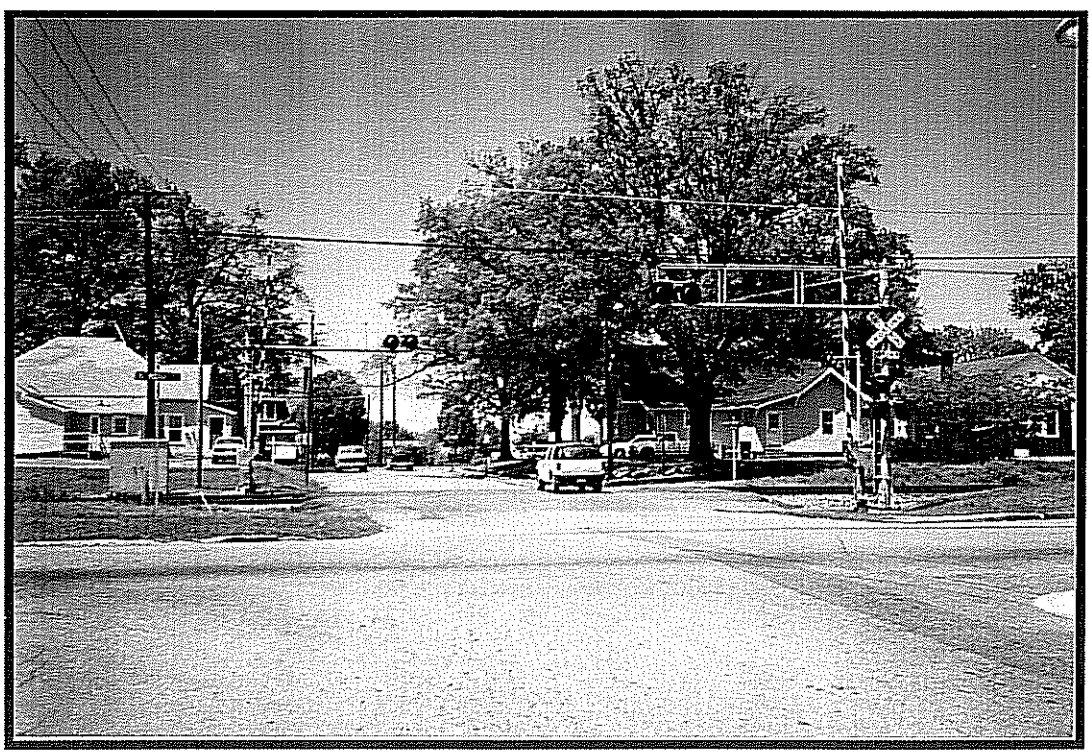
Westbound Approach

FIGURE 9

Municipality: Kannapolis

Crossing Number: 724405D *Street Name:* East C St.

Eastbound Approach



Westbound Approach

FIGURE 11

Municipality: Kannapolis

Crossing Number: 724404W *Street Name:* East 1st St.

Eastbound Approach

Westbound Approach

FIGURE 13

Municipality: Kannapolis

Crossing Number: 724400U *Street Name:* Ebenezer Rd.

Eastbound Approach

Westbound Approach

FIGURE 15

Municipality: Kannapolis

Crossing Number: 724399C *Street Name:* East 18th St.

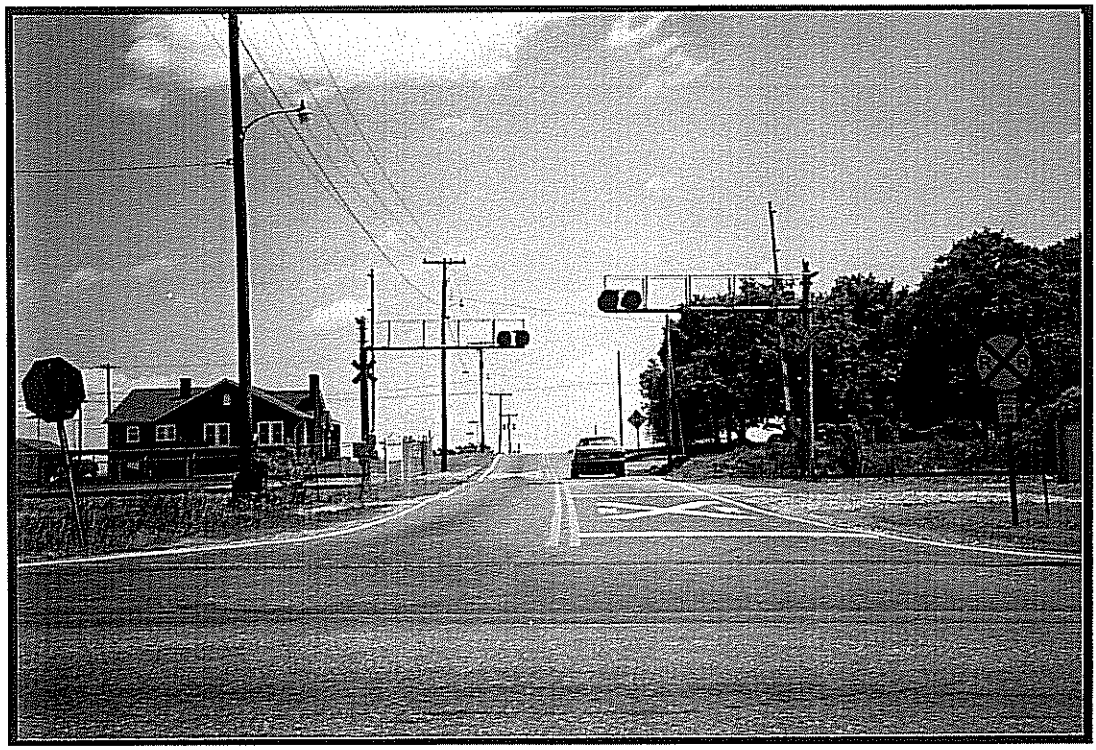
Eastbound Approach

Westbound Approach

FIGURE 17

Municipality: Kannapolis

Crossing Number: 724398V *Street Name:* East 22nd St.



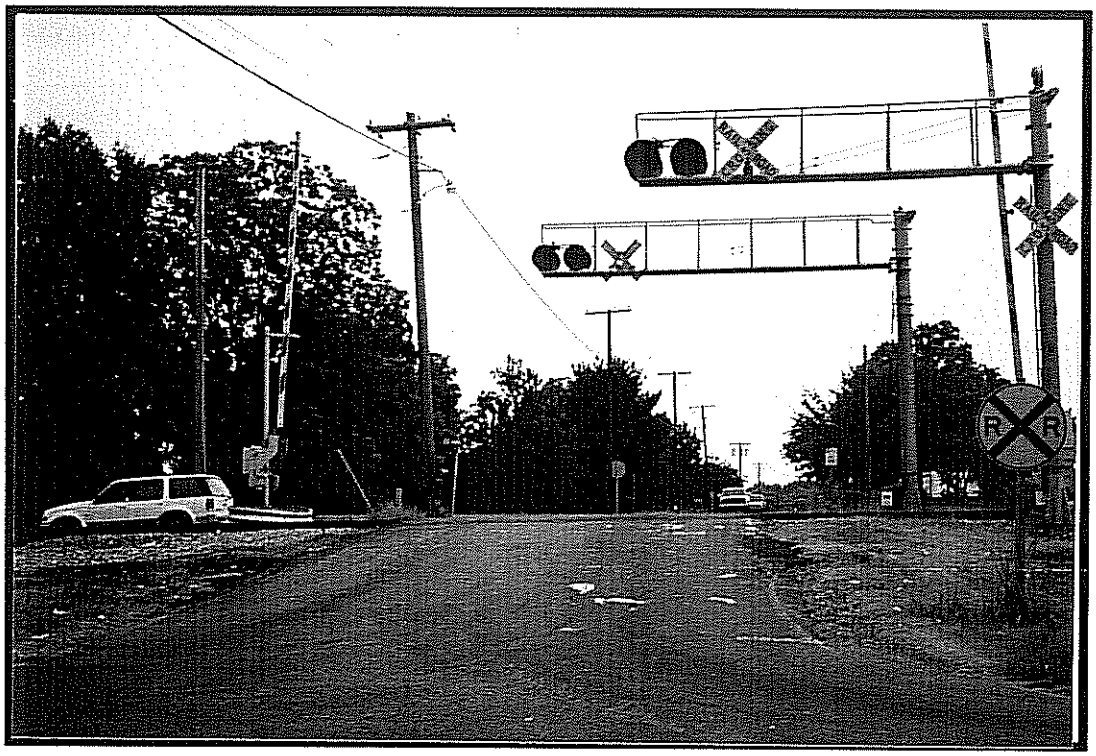
Eastbound Approach

Westbound Approach

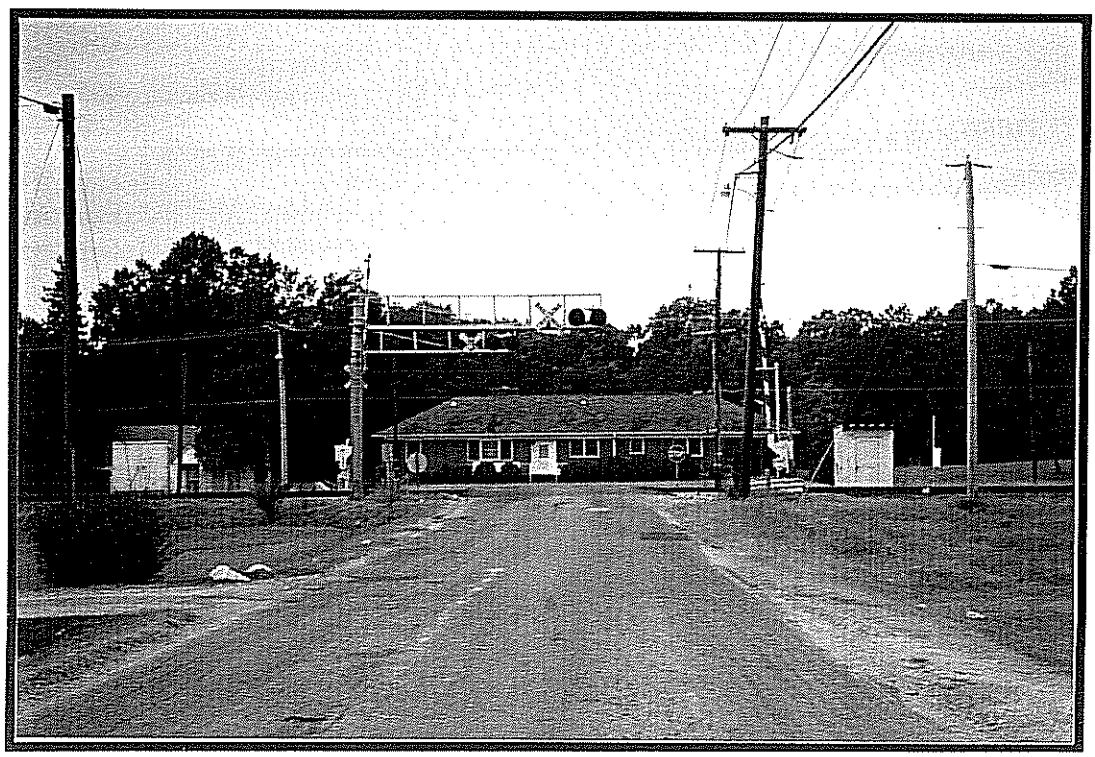
FIGURE 19

Municipality: Kannapolis

Crossing Number: 724397N *Street Name:* East 29th St.



Eastbound Approach



Westbound Approach

FIGURE 21