12.0 APPENDICES

APPENDIX A LEGAL DESCRIPTION

APPENDIX B TRAFFIC ACCESS ANALYSIS

APPENDIX C POLICE SECURITY STANDARDS

Page 9 • NEW DEFINITION

11. Individual Property Developer(s): shall refer to the Kontos Enterprises property located at the southeast corner of the Archibald Center Specific Plan, their successor or their agent. This definition shall also refer to any other individual property developer(s) in the Support Commercial Zone.

Page 25 • Paragraph 4

3.3 LAND USE PLAN

.....The small portion of the site in this category (3.9 acres) will provide for commercial use that.....

Page 26 • Table

LAND USE SUMMARY

Land Use Category	Approximate Acreage	Percent Acreage	Building Numbers
Business Park	10.9	37.2%	1-17
Bulk Warehouse Retail	14.5	49.6%	18-20
Support Commercial	3.9	13.2%	21-25
Total Site Area	**29.3 Acres**	**100%**	

Interior public streets will occupy approximately 1.8 additional acres.

Page 33 • Paragraph 1

3.4.3 SUPPORT COMMERCIAL CATEGORY

The Support Commercial Category includes approximately 3.9 acres and is.....

Page 35 • Paragraph 2

3.4.3.2 Conditionally Permitted Uses

*Remove "Liquor Store" from 3.4.3.2 and add it to:

3.4.3.3 Prohibited Uses

- Liquor Store

Page 82 • Table

3.5.5.2 Minimum Building and Parking Area Setbacks

	Parking	Building
Archibald Avenue	13'	45'
Philadelphia Street	20'	45'
Local Street	10'	20'
Pomona Freeway	5'	15'
Cucamonga Creek Channel	5'	5'
Interior Property Line	5'	None

(continued)

Rear Property Line	None	None

The Kontos Enterprises property, which lies directly to the southeast of the Archibald Center Specific Plan, is herein included in the Archibald Center Specific Plan and shall have a building setback of thirty-five (35) feet on Archibald Avenue.

Page 83 • Paragraph 3

3.5.5.5 Minimum Parking Requirements

- The minimum stall width for standard spaces shall be nine (9) feet.

Page 90 • Paragraph 2

3.5.6.7 Permanent Freestanding Building Identification (Monument) Signs

Any parcel in the Support Commercial zone that is physically adjacent to the right-of-way of the Pomona 60 State Freeway shall be allowed a freestanding sign which shall not exceed thirty-five (35') feet in height if the adjacent freeway segment is at or below the grade of the site on which the sign is located or shall not exceed forty-five (45') in height if the adjacent freeway segment is above the grade of the site, and shall be subject to the following limitations:

- The area of a freeway oriented sign shall not exceed 150 square feet on any display surface.
- Any advertisement text, symbols, or other indications displayed on the sign face shall be limited to not more than five (5) words, letters numbers figures symbols, or other indications used as a substitute for words.
- No vertical or horizontal dimension of the display surface shall exceed twenty (20') feet.

Page 90 • Paragraph 3

3.5.6.8 Permanent Vehicular Directional Signs

The signs may be illuminated.

Page 111 • Paragraph 1

4.2.1 POMONA FREEWAY

The Pomona Freeway Edge consists of two components. The first, a five (5) foot wide landscape strip for the Support Commercial and a ten (10) foot wide landscape strip for the Bulk Wharehouse Retail, is outside of.....

Page 116 • Paragraph 7• NEW LAST PARAGRAPH

4.3.1 GENERAL GUIDELINES

The Individual Property Developer(s) shall not be limited to only the plant materials shown on the plant palette and will be subject to review by the City of Ontario's Public Facilities plan check section.

Page 144 • NEW LAST PARAGRAPH

10.0 DEVELOPMENT PHASING

Individual Property Developers are not considered a part of this section.

13.0 APPENDICES

APPENDIX A LEGAL DESCRIPTION

APPENDIX B TRAFFIC ACCESS ANALYSIS

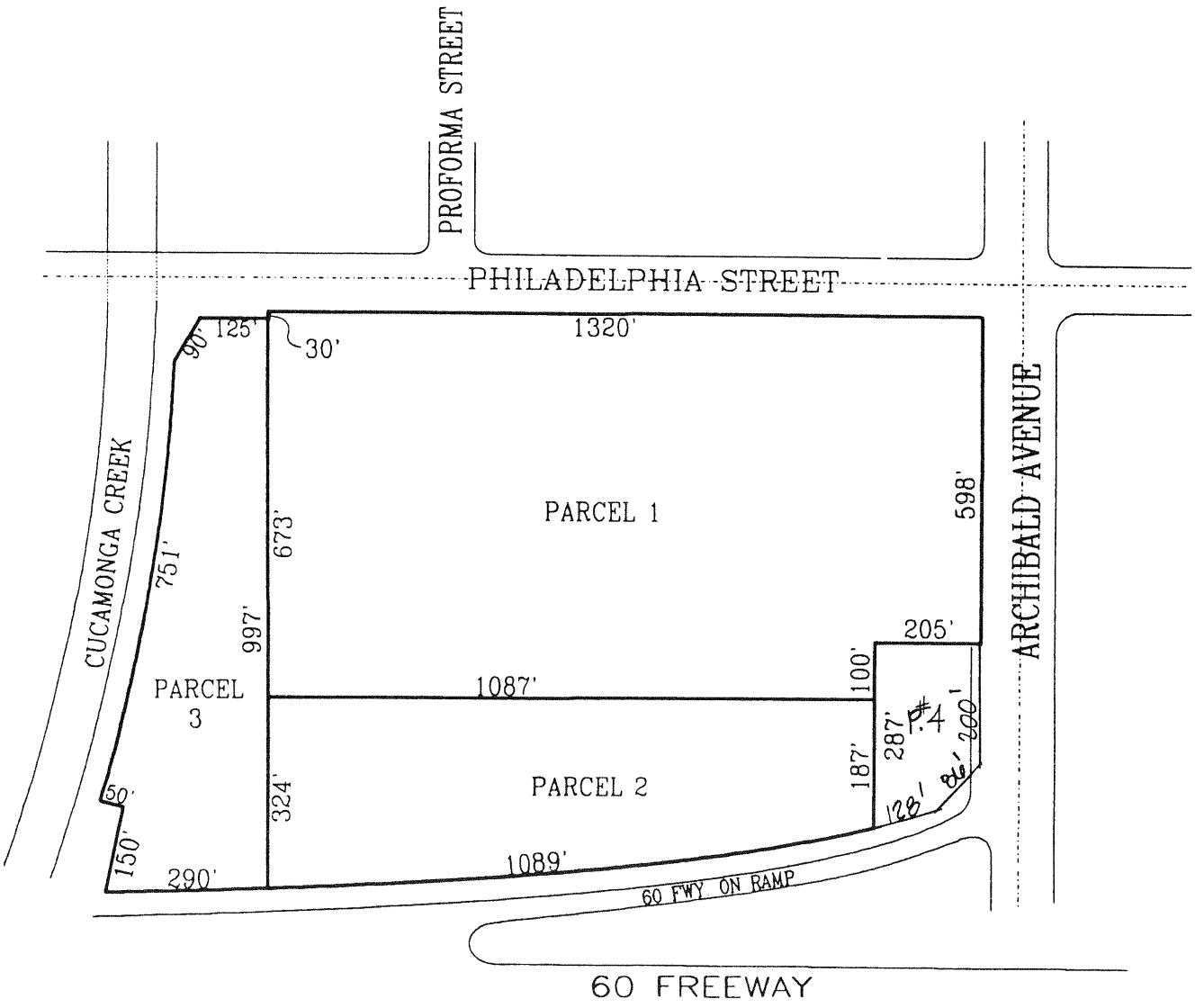
APPENDIX C POLICE SECURITY STANDARDS

LEGAL DESCRIPTION:

PARCEL NO. 4:

THE NORTHWEST QUADRANT OF ROUTE 60 AND ARCHIBALD AVENUE IN ONTARIO, COUNTY OF SAN BERNADINO, STATE OF CALIFORNIA.

PARCEL NUMBER 1 OF PARCEL MAP NO. 139, AS PER PLAT RECORDED IN BOOK 2 OF PARCEL MAPS, PAGE 43, RECORDS OF SAID COUNTY.
EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE STATE OF CALIFORNIA BY DEED RECORDED MAY 15, 1969 IN BOOK 7232, PAGE 585, OFFICIAL RECORDS.



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ARCHIBALD CENTER SPECIFIC PLAN

ONTARIO, CALIFORNIA

N

TRAFFIC STUDY REPORT
ONTARIO HOME FURNISHING CENTER
Ontario, California

Prepared For:

SDC DEVELOPMENT
1601 Avocado
Newport Beach, CA 92660

Prepared By:

LINSCOTT, LAW & GREENSPAN, ENGINEERS
1580 Corporate Drive
Suite 122
Costa Mesa, California 92626

July, 1990

2-901420-1

LINSCOTT, LAW & GREENSPAN, ENGINEERS
TRANSPORTATION PLANNING • TRAFFIC ENGINEERING • PARKING

1580 CORPORATE DRIVE, SUITE 122, COSTA MESA, CALIFORNIA 92626 • (714) 641-1587

PHILIP M. LINSCOTT, P.E.
JACK M. GREENSPAN, P.E.
WILLIAM A. LAW, P.E.
PAUL W. WILKINSON, P.E.
LEON D. WARD, P.E.
DONALD W. BARKER, P.E.

July 3, 1990

Mr. Steven A. Lichtenberger
SDC DEVELOPMENT
1601 Avocado
Newport Beach, CA 92660

Subject: TRAFFIC IMPACT ANALYSIS
ONTARIO HOME FURNISHINGS CENTER
Ontario, California

Dear Steven:

Pursuant to your authorization, we are pleased to submit this Traffic Study Report for the Ontario Home Furnishing Center located northwest of the Pomona Freeway and Archibald Avenue in Ontario.

The report addresses the potential traffic impacts associated with the industrial/freeway showroom project in a near-term (1995) and buildout (2010) cumulative traffic setting. A summary of our findings and recommendations is located on page 17 of the report.

Linscott, Law & Greenspan has welcomed the opportunity to provide this analysis and are prepared to provide additional consultation as may be required. Please feel free to call if you have any questions or need further assistance.

Very truly yours,

LINSCOTT, LAW & GREENSPAN, ENGINEERS

Jay L. Nelson
Transportation Engineer II

JLN/1420-1

Submittal:

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LIST OF EXHIBITS

INTRODUCTION

This report evaluates the potential traffic impacts associated with the proposed Ontario Home Furnishing Center. The planned industrial/freeway showroom project is located north of the Pomona Freeway (SR-60) and south of Philadelphia Street, between Archibald Avenue and the Cucamonga Creek Channel in Ontario. The analysis evaluates the near-term 1995 and buildout (2010) traffic conditions during the critical PM peak hour at key intersections with and without the proposed project development. The access opportunities and constraints for the freeway showroom and other support commercial uses were evaluated in a prior letter report completed by Linscott, Law and Greenspan, dated March 9, 1990. The prior analysis included preliminary schematic street plans to illustrate recommended access locations and potential striping and median layout along the freeway showroom and support commercial project frontage.

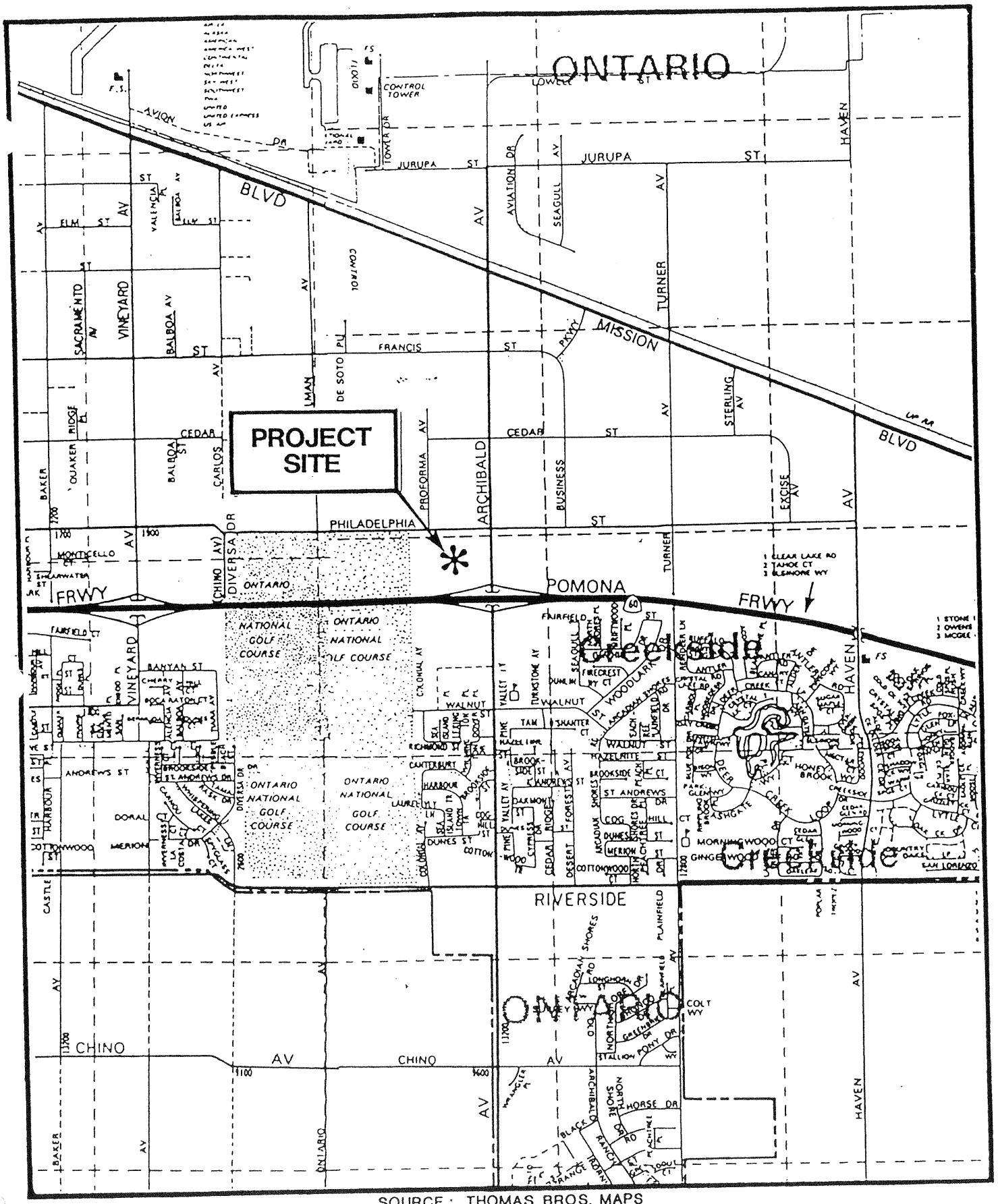
PROJECT DESCRIPTION AND LOCATION

The project is located on a 28 acre site, and will include light industrial, freeway showroom, and support commercial uses. General light industrial uses with a total building area of 157,082 square-feet are planned on the northwest portion of the site. The remainder of the project includes 206,091 square-feet of freeway showroom space, two fast-food restaurants with a combined building area of approximately 8,000 square-feet, and a service station.

The project location and surrounding street system is presented in Exhibit 1. Access to the project will be provided from Archibald Avenue and Philadelphia Street. Access to the Pomona Freeway is provided by a diamond interchange adjacent to the project on Archibald and west of the project at Vineyard.

The site plan for the project is illustrated in Exhibit 2. For the showroom and support commercial portion of the project two driveways are planned on both Archibald Avenue and Philadelphia Street, at the locations recommended in the prior traffic access analysis for the project.

The main project driveway on Archibald is located 365 feet south of Philadelphia (centerline to centerline) and would provide left- and right-turn ingress, but the raised median would be constructed to prohibit left-turn egress from the project onto Archibald. A second driveway on Archibald would be located 220 feet south of the major driveway and would be restricted to right-turn access only. Access to the World Oil Parcel (labeled as not a part on the site plan) is not considered in this analysis.



SOURCE : THOMAS BROS. MAPS

1

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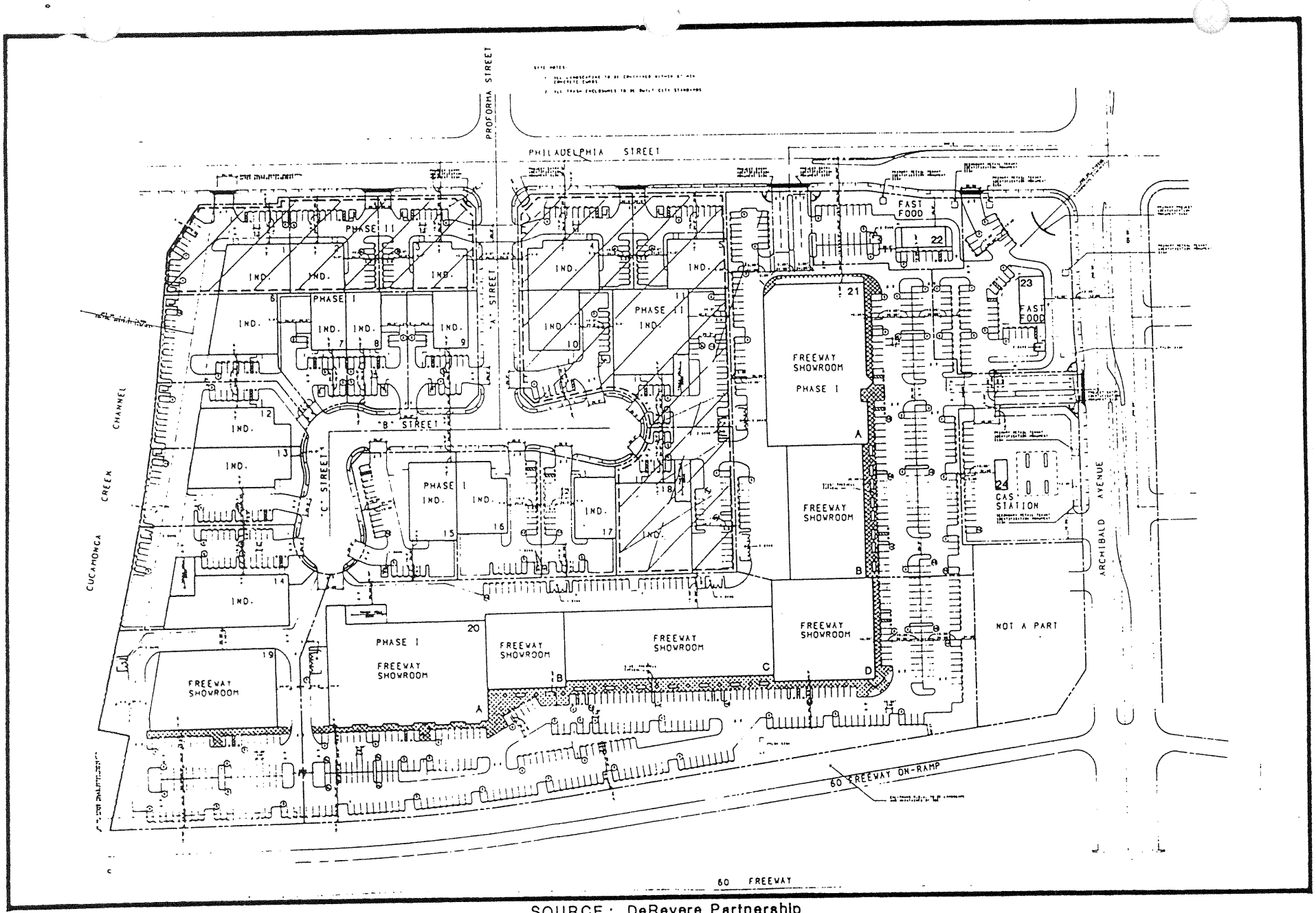
Linscott, Law & Greenspan, Engineers

2

VICINITY MAP
ONTARIO HOME FURNISHING CENTER



SOURCE : DeRevere Partnership

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SITE PLAN
ONTARIO HOME FURNISHING CENTER

LG Linscott, Law & Greenspan, Engineers

On Philadelphia a full access driveway will be located 508 feet west of Archibald (centerline to centerline). A second driveway will be restricted to right-turn access only and will be located about 245 feet west of Archibald. Additional access will be provided via the cul-de-sac planned in the industrial portion of the project. This access would primarily be used by service vehicles and employees.

A new cul-de-sac is proposed opposite Proforma Street as the major access for the industrial component of the project. As shown on the site plan, three additional driveways are proposed on Philadelphia to access the industrial buildings.

TRAFFIC FORECASTING AND IMPACT EVALUATION METHODOLOGY

In order to estimate the traffic impact characteristics of the project, a multi-step process has been utilized. The first step is traffic generation, which estimates the total arriving and departing traffic at the site on a peak hour and daily basis. The traffic generation potential of the site is estimated by applying the appropriate trip generation rates for each of the proposed land uses.

The second step of the evaluation process is traffic distribution which identifies the origins and destinations of inbound and outbound project traffic. These origins and destinations are based on available travel routes and the general demographics of the area.

The third step is traffic assignment, which involves the allocation of project traffic estimates to area streets and intersections. Traffic assignment is typically based on minimization of travel time which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic approach distribution patterns are indicated by general percentage orientation, while traffic assignment is based on specific volume forecasts related to development conditions.

With the forecasting process complete and project traffic assignments developed, the impact of the project is analyzed by comparing the operational conditions at the intersections adjacent to the project for near term (1995) and buildout (2010) scenarios both with and without anticipated project traffic.

TRAFFIC GENERATION FORECAST

Traffic generation is expressed in terms of vehicle trip ends (TE) where a trip end is a one-way vehicular movement either entering or departing the study site. Generation factors for retail and industrial land uses are typically developed based upon the number of trip ends per 1,000 square feet of gross floor

area (TE/1,000 SF). The forecast is accomplished by multiplying the floor area (in thousands of square-feet) by the appropriate generation factors.

Traditional sources for traffic generation factors include Trip Generation: An Informational Report published by the Institute of Transportation Engineers (ITE), various Progress Reports on Trip Ends Generation Research Counts by Caltrans, and published or unpublished in-house studies by other transportation agencies and professionals. For this analysis trip generation rates from the 4th Edition of Trip Generation, published by ITE were used.

Table 1 summarizes the trip generation rates, and presents the forecasted project traffic. As shown in Table 1, the project is expected to generate 7,800 trips on a daily basis (one half arriving, one half departing), with 535 trips anticipated during the PM peak hour (210 inbound, 325 outbound).

Most of the showroom space planned for the center is expected to open after the typical morning peak period which occurs between 7:00 and 9:00 AM. Therefore, only the trip generation forecast for the evening peak hour has been completed for the project.

A significant portion of the trips associated with the fast food restaurants and the service station are not new trips, but represent vehicles already on the street that will merely stop off at the project as they pass by. Assuming 50 percent of the trips to the fast food and service station are vehicles passing by on their way to another destination a total of 145 PM peak hour project trips would be existing pass-by traffic. However, in this analysis the project traffic has not been reduced for pass-by traffic and therefore depicts a "worst-case" condition.

TRAFFIC DISTRIBUTION AND ASSIGNMENT

The general distribution of project traffic is based on anticipated travel patterns in the area. Approximately 40 percent of the project traffic is expected to be oriented to and from the Pomona Freeway at Archibald, with twenty percent of the project traffic distributed each direction on the freeway. The remaining project traffic was evenly distributed in the four compass directions on Archibald Avenue and Philadelphia Street.

The anticipated PM peak hour project traffic volumes at each of the proposed driveways and at key intersections are presented in Exhibit 3. These volumes were estimated by applying the distribution pattern discussed above to the PM peak hour traffic forecast in Table 1.

TABLE 1

TRAFFIC GENERATION FORECAST
Ontario Home Furnishing Center

	PM PEAK HOUR INBOUND	OUTBOUND	TOTAL	DAILY 2-WAY
GENERATION FACTORS[1]				
General Light Industrial (TE/TSF)	0.13	0.91	1.04	6.97
Freeway Showroom (TE/TSF)	0.20	0.19	0.39	4.35
Fast Food Restaurant (TE/TSF)	17.11	16.15	33.26	632.13
Service Station (TE/Station)	13.00	12.00	25.00	748.00
GENERATION FORECAST[2]				
General Light Industrial (157,082 SF)	20	145	165	1,090
Freeway Showroom (206,091 SF)	40	40	80	900
Fast Food Restaurant (8,000 SF)	135	130	265	5,060
Service Station	15	10	25	750
TOTAL	210	325	535	7,800

1. Source: Institute of Transportation Engineers, Trip Generation, 4th Edition, 1987. Furniture Store trip generation rates (land use 890) were used for the Freeway Showroom.

2. Forecasts are rounded to the nearest 5 vehicles on a peak hour basis and to the nearest 10 vehicles on a daily basis.

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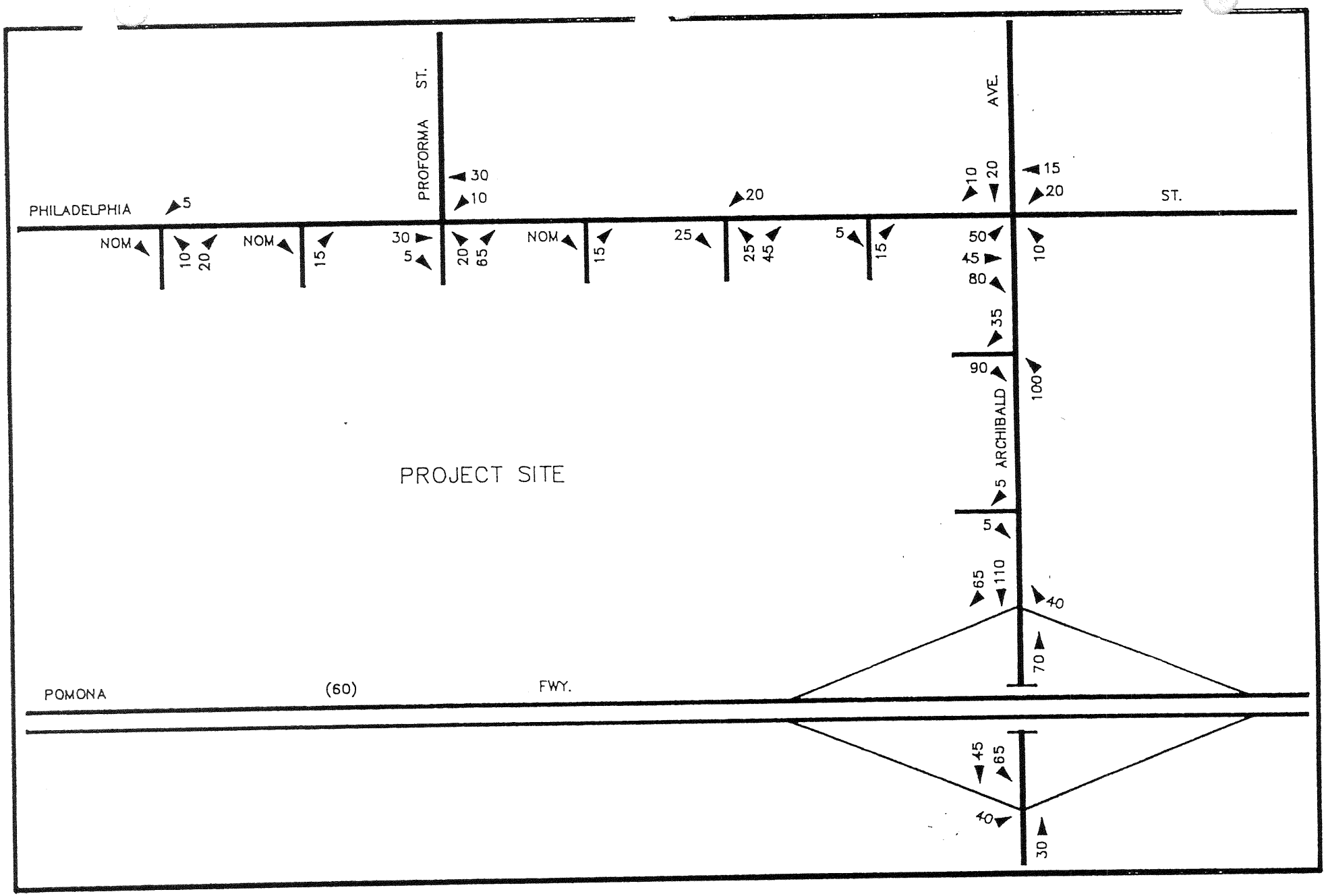

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PM PEAK HOUR PROJECT TRAFFIC

ONTARIO HOME FURNISHING CENTER

Linscott, Law & Greenspan, Engineers

FUTURE 1995 AND 2010 PM PEAK HOUR TRAFFIC VOLUMES

Future 1995 and 2010 PM peak hour traffic volumes for the three key intersections on Archibald were received from Gary Cohoe, at the City of Ontario. The volumes were taken from the Haven Avenue Interchange at Route 60, Traffic Analysis Study completed by Mohle, Grover & Associates. The future traffic volumes were derived by applying a growth rate to the existing traffic volumes to account for development outside of the study area. Then, traffic assignments related to specific developments were added to the background traffic volumes to incorporate planned and future development in the area. A growth rate of ten percent was used for 1995 forecast and thirty percent was applied for the 2010 analysis.

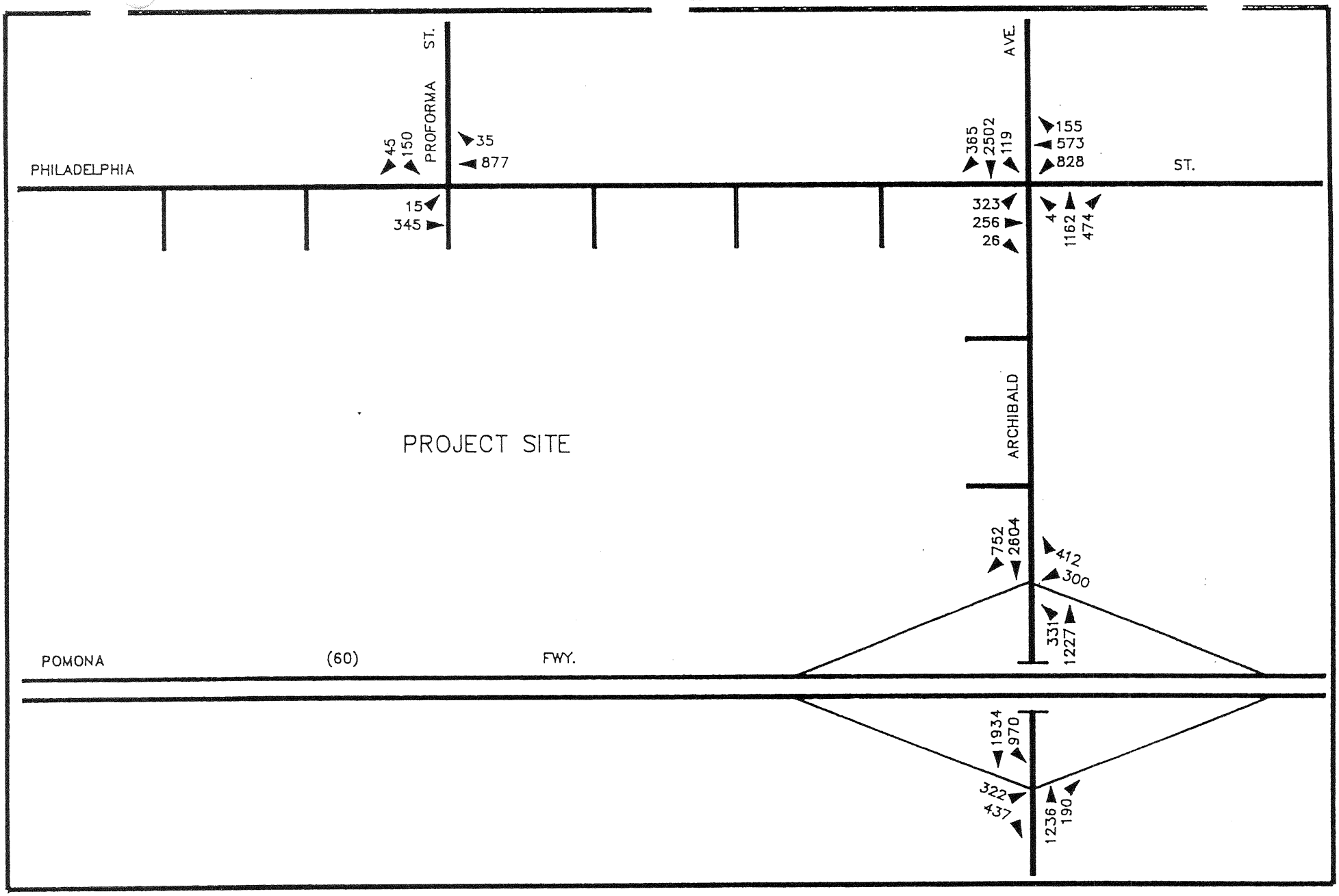
The 1995 and 2010 traffic forecasts completed by Mohle, Grover & Associates assumed light industrial development would occur on the entire proposed Ontario Home Furnishing site and that access to the site would only be provided on Philadelphia Street. Therefore, these future traffic volumes were adjusted to remove the prior traffic forecast for the site to obtain a base 1995 and 2010 traffic condition without any project traffic. The volumes to and from Proforma Street at Philadelphia Street were obtained from the traffic analysis for the Birk Project located north of Philadelphia. The through volumes on Philadelphia at Proforma were calculated from the traffic volumes leaving and approaching the Philadelphia/Archibald intersection.

The 1995 and 2010 PM peak hour traffic volumes without the project are presented in Exhibits 4 and 5, respectively. The PM peak hour project traffic volumes illustrated in Exhibit 3 were then added to the baseline 1995 and 2010 volumes to obtain the 1995 and 2010 PM peak hour traffic volumes with the proposed project. These volumes are shown in Exhibits 6 and 7.

PEAK HOUR INTERSECTION ANALYSIS

The impact of the project has been evaluated for the critical PM peak hour using the Intersection Capacity Utilization (ICU) method at the Archibald/SR-60 Freeway Ramps, Archibald/Philadelphia, and Philadelphia/Proforma intersections. The impact of the proposed project was determined by comparing the future 1995 and 2010 conditions at these locations with and without the anticipated project traffic.

The ICU procedure assumes the traffic flow characteristics of a signalized intersection and computes Level of Service (LOS) for the total intersection based upon a summation of volume to capacity (v/c) ratios for key conflicting movements. The ICU numerical value represents the percent of the signal green time, and thus capacity, required by existing or future traffic.



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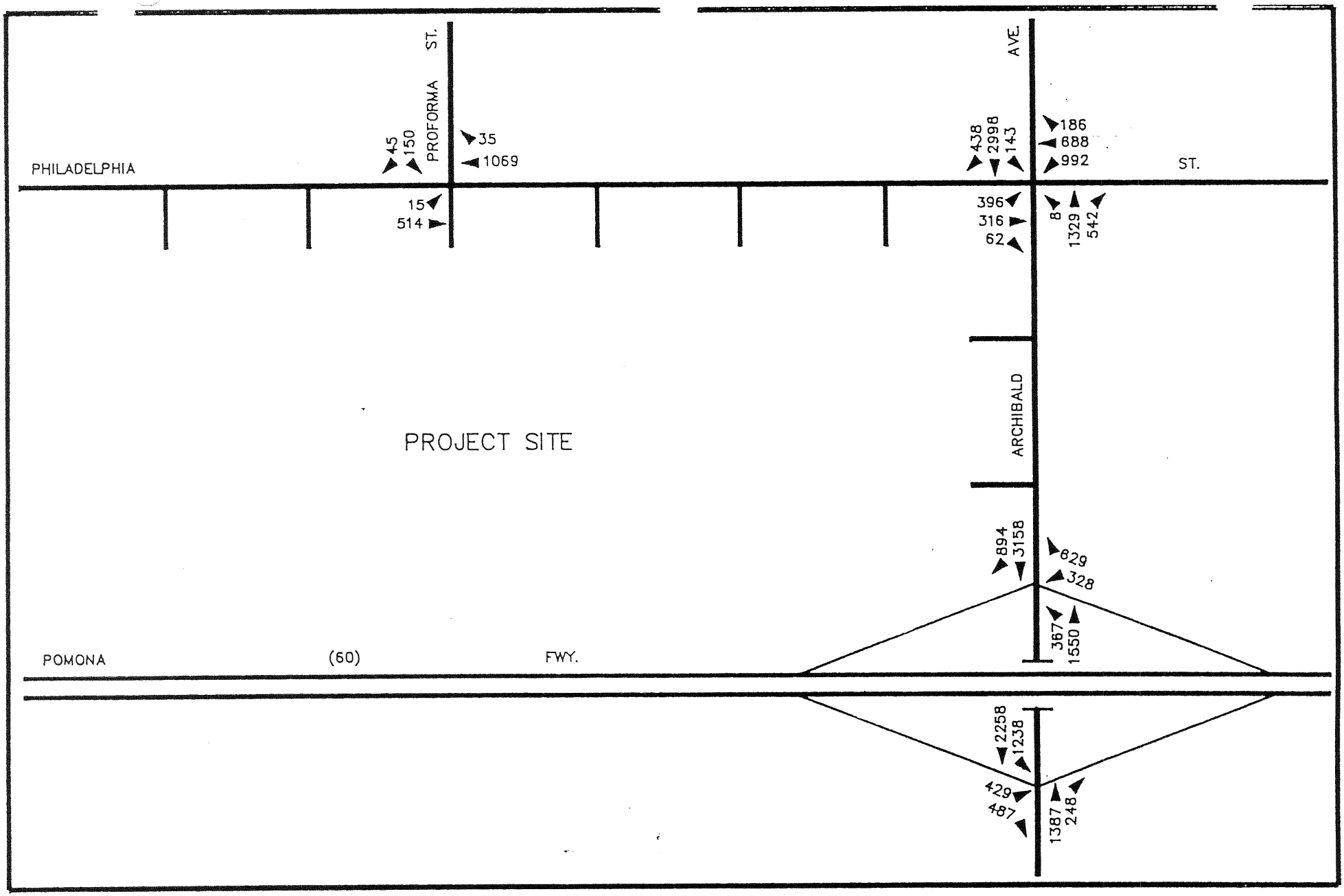
1995 PM PEAK HOUR
TRAFFIC WITHOUT PROJECT
ONTARIO HOME FURNISHING CENTER



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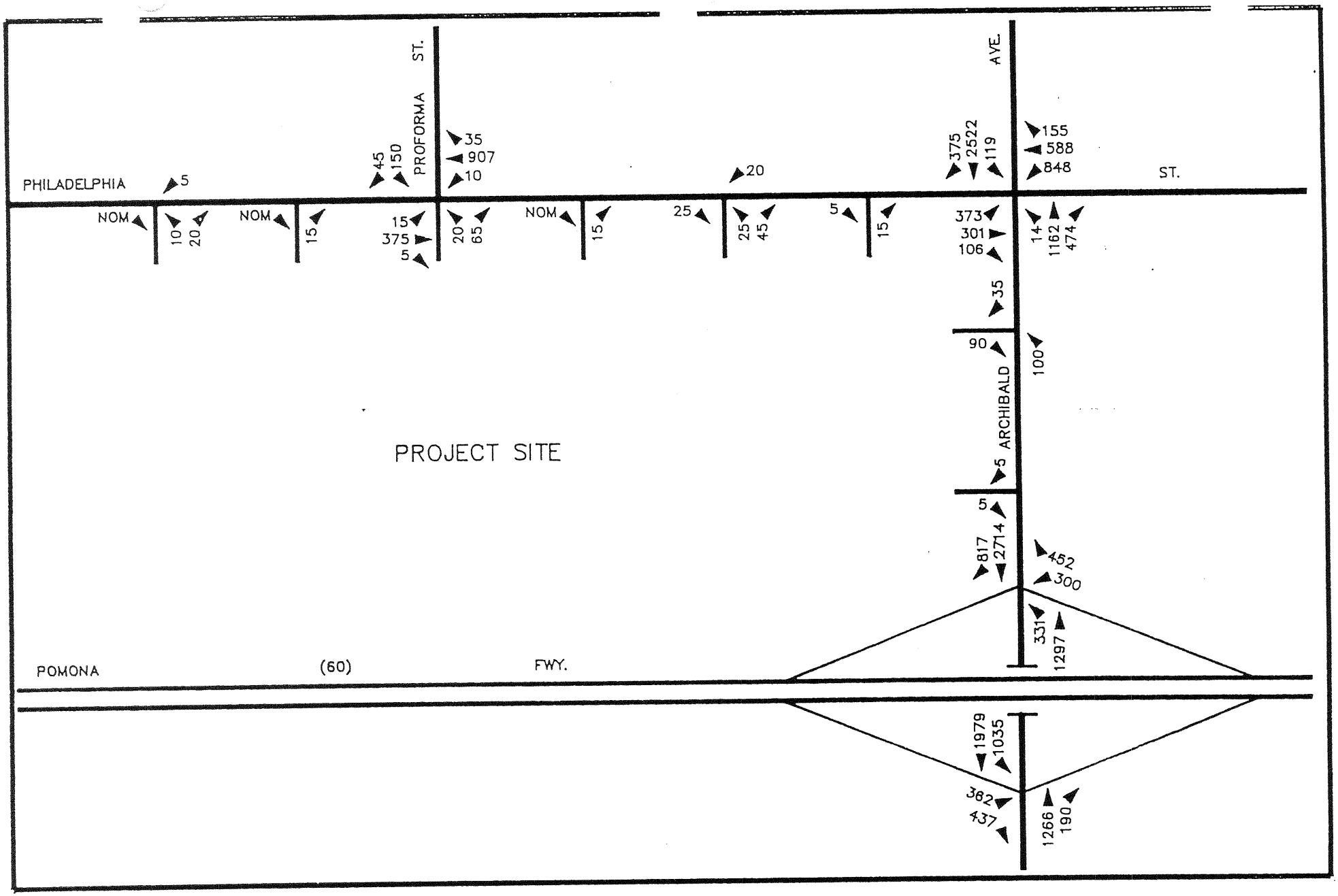
2010 PM PEAK HOUR
TRAFFIC WITHOUT PROJECT



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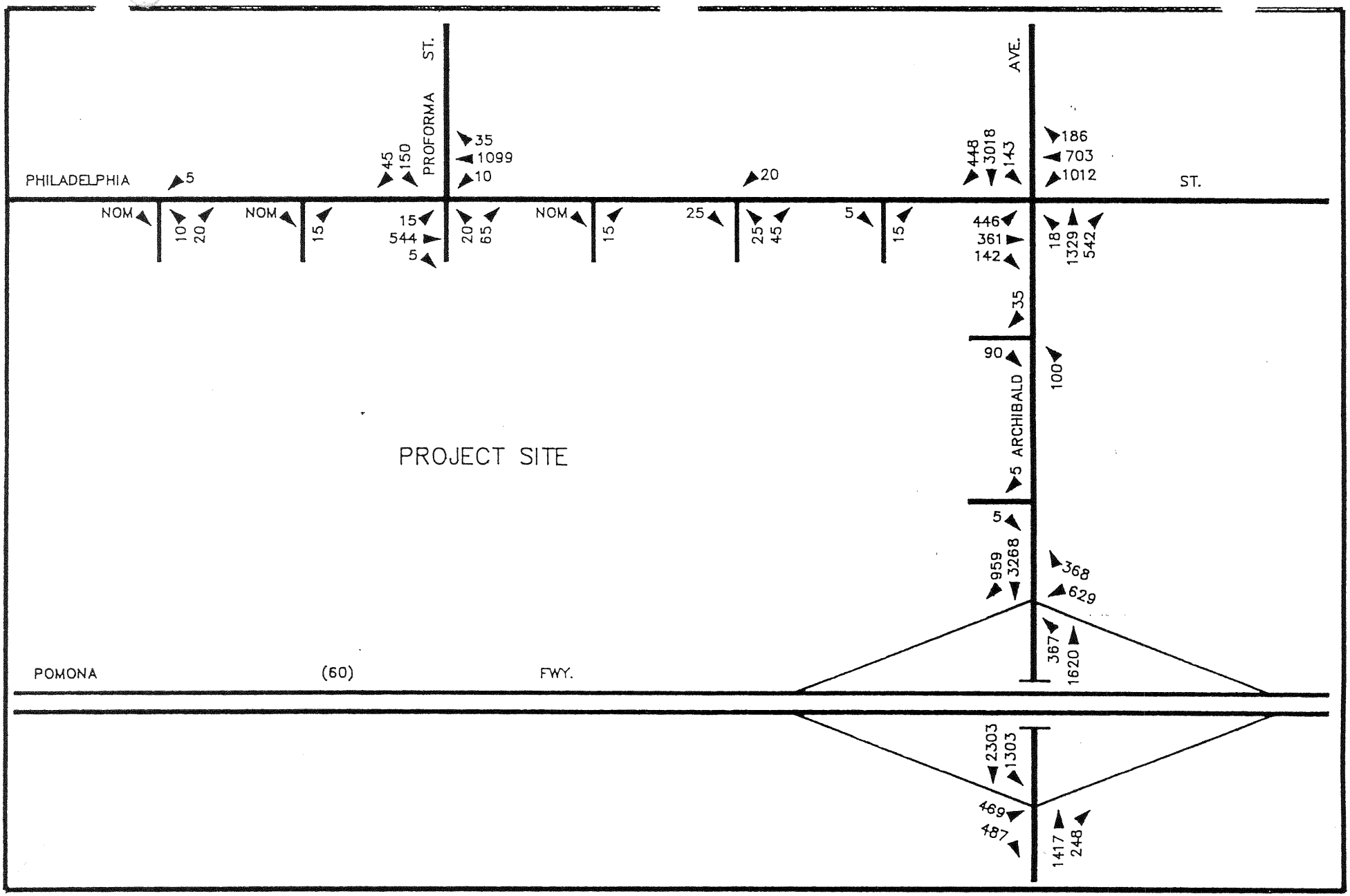
1995 PM PEAK HOUR
TRAFFIC WITH PROJECT

ONTARIO HOME FURNISHING CENTER



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2010 PM PEAK HOUR
TRAFFIC WITH PROJECT

The ICU translates to a Level of Service which is a relative measure of driver satisfaction. Six Levels of Service have been defined ranging from A (ICU of 0.60 or less, representing free flow with little congestion) to F (ICU over 1.00, representing forced flow with significant congestion). Level of Service D (ICU of 0.81 to 0.90), is traditionally considered the maximum acceptable level for urban and suburban peak hour conditions. At Level D, most traffic clears on the first available green phase, but short vehicle queues may occur. Average vehicle speeds are on the order of 20 to 25 miles per hour including stops. Level of Service E is characterized by long queues of waiting vehicles which exist over extended periods of time often blocking nearby intersections and requiring several cycles to clear.

The capacity analysis is based on the planned intersection configurations indicated in prior traffic studies. The planned lane configurations at the four key intersections evaluated in this study are illustrated in Exhibit 8.

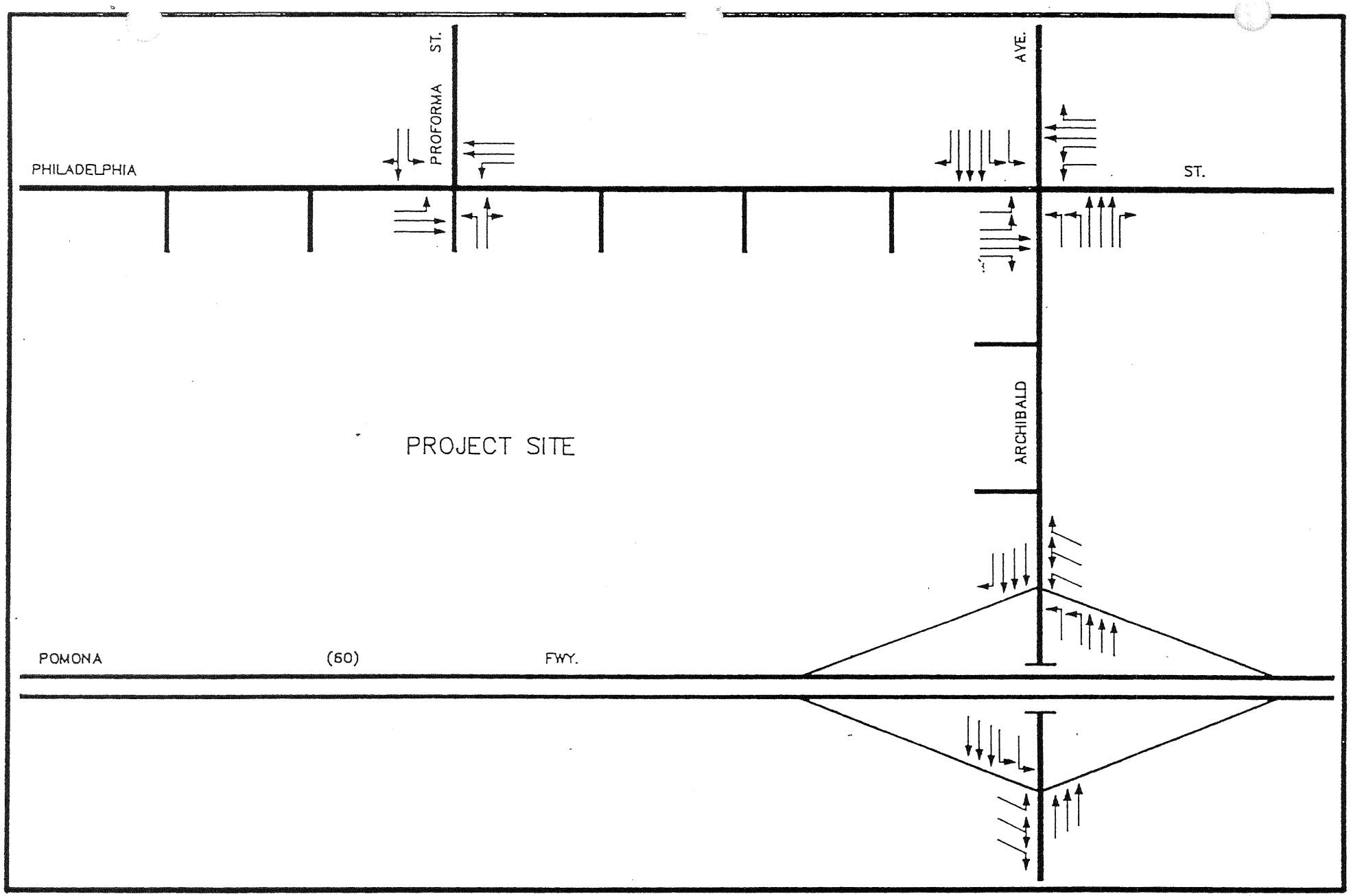
Table 2 presents the ICU/LOS values at the key intersections. The computer-generated ICU calculations are presented at the end of the report. The four following scenarios were evaluated for each intersection:

- 1995 Conditions Without Project Traffic
- 1995 Conditions With Project Traffic
- 2010 Conditions Without Project Traffic
- 2010 Conditions With Project Traffic
- 2010 Conditions With Project & 10% TDM Reduction

As shown in Table 2, all of the key intersections will operate at an acceptable Level of Service (LOS D or better) in 1995 with the completion and full occupancy of the project. The addition of forecasted project traffic is expected to increase the ICU value by 0.02 or 0.03 at the three key intersections for both the near term (1995) and buildout (2010) scenarios. Further, the increase in the ICU value would be smaller if the project traffic was reduced to account for pass-by traffic at the site.

At buildout, which includes more extensive area development and an additional twenty percent increase in existing traffic, LOS E is forecast at the Archibald/Philadelphia intersection, and LOS D is anticipated at the Pomona Freeway ramps on Archibald. The addition of project-related traffic to the baseline 2010 traffic volumes are not expected to change the level of service at any of the key intersections.

Transportation demand management (TDM) programs, required as a result of the South Coast Air Quality Management District's (SCAQMD) Regulation XV, are expected to significantly reduce the buildout 2010 traffic volumes. Regulation XV requires the preparation and implementation of a commute assistance program



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8

PLANNED INTERSECTION CONFIGURATIONS
ONTARIO HOME FURNISHING CENTER

Linscott, Law & Greenspan, Engineers

TABLE 2

PM PEAK HOUR
LEVEL OF SERVICE SUMMARY
Ontario Home Furnishing Center

	ICU - LOS[1]				
LOCATION	1995 WITHOUT PROJECT	1995 WITH PROJECT	2010 WITHOUT PROJECT	2010 WITH PROJECT	2010 WITH 10% TDM RED.
Archibald Avenue/ Philadelphia Street	.80/C	.82/D	.95/E	.98/E	.89/D
Archibald Avenue/ WB SR-60 Ramp	(.77/C)[2] .68/B	(.80/C)[2] .71/C	.83/D	.85/D	.78/C
Archibald Avenue/ EB SR-60 Ramp	.67/B	.70/B	.81/D	.84/D	.76/C
Philadelphia Street/ Proforma Street	.38/A	.44/A	.43/A	.49/A	.45/A

1. Intersection Capacity Utilization/Level of Service, see appendix for an explanation of the ICU/LOS concept and detailed calculations.

2. This ICU value assumes only a single northbound left-turn lane, the other ICU values at this intersection assume two northbound left-turn lanes, as indicated in prior traffic studies.

designed to achieve an Average Vehicle Ridership (AVR) of 1.5 people per vehicle. A conservative estimate of the traffic reduction impacts of regulation XV are also summarized Table 2. TDM programs can reduce traffic volumes by as much as 30 percent. A 10 percent reduction in the buildout 2010 traffic volumes would result in level of service D or better at each of the intersections evaluated in this report.

SITE ACCESS

The location of the freeway showroom and support commercial driveways were evaluated in the traffic access analysis for the project completed in March, and have not been modified. A raised median is planned on Archibald that will permit right-turn-only access at the minor driveway and prohibit the left-turn exit from the site at the major driveway. The 200-foot left-turn pocket proposed at the major driveway on Archibald is expected to provide sufficient storage for the anticipated left-turn volumes into the site. The proposed left-turn lane on Archibald into the project will provide sufficient storage for eight vehicles and an average of less than three vehicles per cycle are anticipated during the PM peak hour.

The number and length of gaps in the through southbound traffic stream on Archibald were evaluated to determine if sufficient gaps were available for traffic to make a left turn from Archibald into Ontario Home Furnishing Center. Based on the Passer II analysis (included in the appendix) the traffic signal timing at intersections on Archibald adjacent to the project were calculated using 100 second cycle lengths. In order to conservatively evaluate left-turn access to the project from Archibald, the 2010 PM peak hour traffic volumes without any reduction for TDM were used in this analysis.

The northbound left-turn phase at Archibald and Philadelphia is expected to create a 10 second gap in the southbound traffic stream during each 100 second cycle. Further, the traffic signal is expected to create additional gaps when traffic on Archibald is stopped to allow traffic on Philadelphia to pass through the intersection. Breaks in the southbound traffic stream on Archibald totaling approximately 19 seconds each cycle are expected to provide adequate gaps for anticipated project traffic to safely make a left-turn from Archibald into the Ontario Home Furnishing site.

TRAFFIC SIGNAL WARRANT ANALYSIS

A signal warrant analysis was performed at the Philadelphia/ Proforma intersection based on Caltrans estimated average daily traffic volumes. Near term 1995 daily traffic volumes were projected from the PM peak hour volumes shown in Exhibit 6 and were

used in the signal warrant analysis. The traffic signal warrant sheet can be found following the ICU calculations at the end of the report. Traffic signal warrants are not met based on the anticipated project traffic volumes at the proposed cul-de-sac which will become the south leg of the intersection. Further, the warrants would not be satisfied even if the proposed cul-de-sac was the only access to the industrial portion of the project. The potential traffic from the development north of Philadelphia is significantly greater than the traffic anticipated from the Ontario Home Furnishing project. However, based on 1995 volumes neither the minimum vehicular warrant or the interruption of continuous traffic warrant are satisfied at the Philadelphia/ Proforma intersection. Therefore we do not recommend that the intersection be signalized until additional analysis indicates that a signal is required.

SUMMARY AND CONCLUSIONS

- The proposed Ontario Home Furnishing Center includes 206,091 square-feet of freeway showroom space, two fast food restaurants, and a service station. General light industrial uses with a total building area of 157,082 square-feet are planned on the northwest portion of the site.

- The project is expected to generate 7,800 trips on a daily basis (one half arriving, one half departing), with 535 trips anticipated during the PM peak hour (210 inbound, 325 outbound).

- At the completion and full occupancy of the project the adjacent intersections are expected to operate at level of service D or better during the PM peak hour.

- At buildout (2010) the Philadelphia/Archibald intersection is expected to operate at LOS E both with or without the proposed project if no traffic reduction is assumed for transportation demand management (TDM) programs. With a ten percent reduction in traffic expected as a result of required TDM programs LOS D is calculated at the intersection. The other key intersections are expected to operate at LOS D or better without assuming any reduction in traffic associated with TDM and LOS C or better with TDM (see Table 2).

- The anticipated project traffic is not expected to change the buildout 2010 level of service at any of the adjacent intersections during the critical PM peak hour.

- Traffic signals are not warranted at any of the project driveways, including the Philadelphia/Proforma intersection.

- The proposed 200-foot left-turn lane on Archibald at the major project driveway is designed to provide sufficient vehicular storage for traffic entering the site.

APPENDIX A

LEVEL OF SERVICE (LOS) AND INTERSECTION CAPACITY UTILIZATION (ICU)

Level of Service is a term used to describe prevailing conditions and their effect on traffic. Broadly interpreted, the Level of Service concept denotes any one of a number of various traffic volumes. Level of Service is a qualitative measure of the effect of such factors as travel speed, travel time, interruptions, freedom to maneuver, safety, driving comfort and convenience.

Six Levels of Service, A through F, have been defined in the Highway Capacity Manual of 1985. Level of Service A describes a condition of free flow, with low traffic volumes and relatively high speeds, while Level of Service F describes forced traffic flow at low speeds with jammed conditions and queues which cannot clear during the green phases.

The Intersection Capacity Utilization (ICU) method of intersection capacity analysis has been used in our studies. It directly relates traffic demand and available capacity for key intersection movements, regardless of present signal timing. The capacity per hour of green time for each approach is calculated based on the methods of the Highway Capacity Manual. The proportion of total signal time needed by each key movement is determined and compared to the total time available (100 percent of the hour). The result of summing the requirements of the conflicting key movements plus an allowance for clearance times is expressed as a decimal fraction. Conflicting key traffic movements are those opposing movements whose combined green time requirements are greatest.

The resulting ICU represents the proportion of the total hour required to accommodate intersection demand volumes if the key conflicting traffic movements are operating at capacity. Other movements may be operating near capacity, or may be operating at significantly better levels. The ICU may be translated to a Level of Service as tabulated below.

The Levels of Service (abbreviated from the Highway Capacity Manual) are listed here with their corresponding ICU and Load Factor equivalents. Load Factor is that proportion of the signal cycles during the peak hour which are fully loaded; i.e., when all of the vehicles waiting at the beginning of green are not able to clear on that green phase.

LEVEL OF SERVICE	LOAD FACTOR	EQUIVALENT
A (free flow)	0.0	0.0 - 0.60
B (rural design)	0.0 - 0.1	0.61 - 0.70
C (urban design)	0.1 - 0.3	0.71 - 0.80
D (maximum urban design)	0.3 - 0.7	0.81 - 0.90
E (capacity)	0.7 - 1.0	0.91 - 1.00
F (forced flow)	Not Applicable	Not Applicable

SERVICE LEVEL A

There are no loaded cycles and few are even close to loaded at this service level. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.

SERVICE LEVEL B

This level represents stable operation where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.

SERVICE LEVEL C

At this level stable operation continues. Loading is still intermittent but more frequent that at Level B. Occasionally drivers may have to wait through more than one red signal indication and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but no objectionably so.

SERVICE LEVEL D

This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak hour, but enough cycles with lower demand occur to permit periodic clearance of queues, thus preventing excessive backups. Drivers frequently have to wait through more than one red signal. This level is the lower limit of acceptable operation to most drivers.

SERVICE LEVEL E

This represents near capacity and capacity operation. At capacity (ICU = 1.0) it represents the most vehicles that the particular intersection can accommodate. However, full utilization of every signal cycle is seldom attained no matter how great the demand. At this level all drivers wait through more than one red signal, and frequently through several.

SERVICE LEVEL F

Jammed conditions. Traffic backed up from a downstream location on one of the streets restricts or prevents movement of traffic through the intersection under consideration.

TABLE 1A
VOLUME-CAPACITY ANALYSIS
PHILADELPHIA STREET & ARCHIBALD AVENUE
PM

MOVEMENT	1995 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO	1995 CONDITION WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	29	3400	0.05 *	-25	4	3400	0.05 *	10	14	3400	0.05 *	-1	13	3400	0.05 *	0	0	0	0.00	0	0	0	0.00
NBT	1162	5700	0.20	0	1162	5700	0.20	0	1162	5700	0.20	-116	1046	5700	0.18	0	0	0	0.00	0	0	0	0.00
NBR	474	1700	0.28	0	474	1700	0.28	0	474	1700	0.28	-47	427	1700	0.25	0	0	0	0.00	0	0	0	0.00
SBL	119	3400	0.05	0	119	3400	0.05	0	119	3400	0.05	-12	107	3400	0.05	0	0	0	0.00	0	0	0	0.00
SBT	2502	5700	0.44 *	0	2502	5700	0.44 *	20	2522	5700	0.44 *	-252	2270	5700	0.40 *	0	0	0	0.00	0	0	0	0.00
SBR	370	1700	0.22	-5	365	1700	0.21	10	375	1700	0.22	-38	337	1700	0.20	0	0	0	0.00	0	0	0	0.00
EBL	368	3400	0.11	-45	323	3400	0.10	50	373	3400	0.11	-37	336	3400	0.10	0	0	0	0.00	0	0	0	0.00
EBT	301	3800	0.08 *	-45	256	3800	0.07 *	45	301	3800	0.08 *	-30	271	3800	0.07 *	0	0	0	0.00	0	0	0	0.00
EBR	181	1700	0.11	-155	26	1700	0.05	75	101	1700	0.06	-11	90	1700	0.05	0	0	0	0.00	0	0	0	0.00
WBL	828	3400	0.24 *	0	828	3400	0.24 *	20	848	3400	0.25 *	-85	763	3400	0.22 *	0	0	0	0.00	0	0	0	0.00
WBT	578	3800	0.15	-5	573	3800	0.15	15	588	3800	0.15	-59	529	3800	0.14	0	0	0	0.00	0	0	0	0.00
WBR	155	1700	0.09	0	155	1700	0.09	0	155	1700	0.09	-16	139	1700	0.08	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.81	ICU VALUE			0.80	ICU VALUE			0.82	ICU VALUE			0.74	ICU VALUE			0.00	ICU VALUE			0.00
			----				----				----				----				----				----
LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			C	LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			C	LEVEL OF SERVICE=				LEVEL OF SERVICE=			

A:1420N1P.ICU

TABLE 1B
VOLUME-CAPACITY ANALYSIS
PHILADELPHIA STREET & ARCHIBALD AVENUE
PM

MOVEMENT	2010 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO		2010 CONDITIONS WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO		PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO		WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO		ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO		ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	
NBL	33	3400	0.05	*	-25	8	3400	0.05	*	10	18	3400	0.05	*	-2	16	3400	0.05	*	0	0	0	0.00		0	0	0	0.00	
NBT	1329	5700	0.23		0	1329	5700	0.23		0	1329	5700	0.23		-133	1196	5700	0.21		0	0	0	0.00		0	0	0	0.00	
NBR	542	1700	0.32		0	542	1700	0.32		0	542	1700	0.32		-54	488	1700	0.29		0	0	0	0.00		0	0	0	0.00	
SBL	143	3400	0.05		0	143	3400	0.05		0	143	3400	0.05		-14	129	3400	0.05		0	0	0	0.00		0	0	0	0.00	
SBT	2998	5700	0.53	*	0	2998	5700	0.53	*	20	3018	5700	0.53	*	-302	2716	5700	0.48	*	0	0	0	0.00		0	0	0	0.00	
SBR	443	1700	0.26		-5	438	1700	0.26		10	448	1700	0.26		-45	403	1700	0.24		0	0	0	0.00		0	0	0	0.00	
EBL	441	3400	0.13		-45	396	3400	0.12		50	446	3400	0.13		-45	401	3400	0.12		0	0	0	0.00		0	0	0	0.00	
EBT	361	3800	0.10	*	-45	316	3800	0.08	*	45	361	3800	0.10	*	-36	325	3800	0.09	*	0	0	0	0.00		0	0	0	0.00	
EBR	217	1700	0.13		-155	62	1700	0.05		75	137	1700	0.08		-14	123	1700	0.07		0	0	0	0.00		0	0	0	0.00	
WBL	992	3400	0.29	*	0	992	3400	0.29	*	20	1012	3400	0.30	*	-101	911	3400	0.27	*	0	0	0	0.00		0	0	0	0.00	
WBT	693	3800	0.18		-5	688	3800	0.18		15	703	3800	0.19		-70	633	3800	0.17		0	0	0	0.00		0	0	0	0.00	
WBR	186	1700	0.11		0	186	1700	0.11		0	186	1700	0.11		-19	167	1700	0.10		0	0	0	0.00		0	0	0	0.00	
CLEARANCE			0.00		CLEARANCE			0.00		CLEARANCE			0.00		CLEARANCE			0.00		CLEARANCE			0.00		CLEARANCE			0.00	
			====					====					====					====					====					====	
ICU VALUE			0.97		ICU VALUE			0.95		ICU VALUE			0.98		ICU VALUE			0.89		ICU VALUE			0.00		ICU VALUE			0.00	
			----					----					----					----					----					----	
LEVEL OF SERVICE=			E		LEVEL OF SERVICE=			E		LEVEL OF SERVICE=			E		LEVEL OF SERVICE=			D		LEVEL OF SERVICE=					LEVEL OF SERVICE=				

A:1420B1P.ICU

TABLE 2A
VOLUME-CAPACITY ANALYSIS
ARCHIBALD AVENUE & WB SR-60 RAMPS
PM

MOVEMENT	1995 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO	1995 CONDITIONS WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	331	1700	0.19 *	0	331	1700	0.19 *	0	331	1700	0.19 *	-33	298	1700	0.18 *	0	0	0	0.00	0	0	0	0.00
NBT	1242	5700	0.22	-15	1227	5700	0.22	70	1297	5700	0.23	-130	1167	5700	0.20	0	0	0	0.00	0	0	0	0.00
NBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBT	2699	5700	0.47	-95	2604	5700	0.46 *	110	2714	5700	0.48 *	-271	2443	5700	0.43 *	0	0	0	0.00	0	0	0	0.00
SBR	812	1700	0.48 *	-60	752	1700	0.44	65	817	1700	0.48	-82	735	1700	0.43	0	0	0	0.00	0	0	0	0.00
EBL	0	0	0.00	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00	0	0	0	0.00
EBT	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	300	0	0.00	0	300	0	0.00	0	300	0	0.00	-30	270	0	0.00	0	0	0	0.00	0	0	0	0.00
WBT	0	5700	0.13 *	0	0	5700	0.12 *	0	0	5700	0.13 *	0	0	5700	0.12 *	0	0	0	0.00	0	0	0	0.00
WBR	422	0	0.00	-10	412	0	0.00	40	452	0	0.00	-45	407	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.80	ICU VALUE			0.77	ICU VALUE			0.80	ICU VALUE			0.73	ICU VALUE			0.00	ICU VALUE			0.00
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LEVEL OF SERVICE= C				LEVEL OF SERVICE= C				LEVEL OF SERVICE= C				LEVEL OF SERVICE= C				LEVEL OF SERVICE=				LEVEL OF SERVICE=			

A:1420N2P.ICU

TABLE 2A.1
VOLUME-CAPACITY ANALYSIS
ARCHIBALD AVENUE & WB SR-60 RAMPS
PM

MOVEMENT	1995 CONDITIONS (Haven/SR-60 Study)			1995 CONDITIONS WITHOUT PROJECT				PLUS PROJECT TRAFFIC				WITH 10% TDM REDUCTION											
	VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	331	3400	0.10 *	0	331	3400	0.10 *	0	331	3400	0.10 *	-33	298	3400	0.09 *	0	0	0	0.00	0	0	0	0.00
NBT	1242	5700	0.22	-15	1227	5700	0.22	70	1297	5700	0.23	-130	1167	5700	0.20	0	0	0	0.00	0	0	0	0.00
NBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBT	2699	5700	0.47	-95	2604	5700	0.46 *	110	2714	5700	0.48 *	-271	2443	5700	0.43 *	0	0	0	0.00	0	0	0	0.00
SBR	812	1700	0.48 *	-60	752	1700	0.44	65	817	1700	0.48	-82	735	1700	0.43	0	0	0	0.00	0	0	0	0.00
EBL	0	0	0.00	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00	0	0	0	0.00
EBT	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	300	0	0.00	0	300	0	0.00	0	300	0	0.00	-30	270	0	0.00	0	0	0	0.00	0	0	0	0.00
WBT	0	5700	0.13 *	0	0	5700	0.12 *	0	0	5700	0.13 *	0	0	5700	0.12 *	0	0	0	0.00	0	0	0	0.00
WBR	422	0	0.00	-10	412	0	0.00	40	452	0	0.00	-45	407	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.71	ICU VALUE			0.68	ICU VALUE			0.71	ICU VALUE			0.64	ICU VALUE			0.00	ICU VALUE			0.00
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LEVEL OF SERVICE= C				LEVEL OF SERVICE= B				LEVEL OF SERVICE= C				LEVEL OF SERVICE= B				LEVEL OF SERVICE=				LEVEL OF SERVICE=			

A:1420N2P.ICU

TABLE 2B
VOLUME-CAPACITY ANALYSIS
ARCHIBALD AVENUE & WB SR-60 RAMPS
PM

MOVEMENT	2010 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO	2010 CONDITIONS WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	367	3400	0.11 *	0	367	3400	0.11 *	0	367	3400	0.11 *	-37	330	3400	0.10 *	0	0	0	0.00	0	0	0	0.00
NBT	1565	5700	0.27	-15	1550	5700	0.27	70	1620	5700	0.28	-162	1458	5700	0.26	0	0	0	0.00	0	0	0	0.00
NBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBT	3253	5700	0.57 *	-95	3158	5700	0.55 *	110	3268	5700	0.57 *	-327	2941	5700	0.52 *	0	0	0	0.00	0	0	0	0.00
SBR	954	1700	0.56	-60	894	1700	0.53	65	959	1700	0.56	-96	863	1700	0.51	0	0	0	0.00	0	0	0	0.00
EBL	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00	0	0	0	0.00
EBT	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	629	0	0.00	0	629	0	0.00	0	629	0	0.00	-63	566	0	0.00	0	0	0	0.00	0	0	0	0.00
WBT	0	5700	0.17 *	0	0	5700	0.17 *	0	0	5700	0.17 *	0	0	5700	0.16 *	0	0	0	0.00	0	0	0	0.00
WBR	338	0	0.00	-10	328	0	0.00	40	368	0	0.00	-37	331	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.85	ICU VALUE			0.83	ICU VALUE			0.85	ICU VALUE			0.78	ICU VALUE			0.00	ICU VALUE			0.00
			----				----				----				----				----				----
LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			C	LEVEL OF SERVICE=				LEVEL OF SERVICE=			

A:1420BP2.ICU

TABLE 3A
VOLUME-CAPACITY ANALYSIS
ARCHIBALD AVENUE & EB SR-60 RAMPS
PM

MOVEMENT	1995 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO	1995 CONDITIONS WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBT	1241	5700	0.25 *	-5	1236	5700	0.25 *	30	1266	5700	0.26 *	-127	1139	5700	0.23 *	0	0	0	0.00	0	0	0	0.00
NBR	190	0	0.00	0	190	0	0.00	0	190	0	0.00	-19	171	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	1030	3400	0.30 *	-60	970	3400	0.29 *	65	1035	3400	0.30 *	-104	931	3400	0.27 *	0	0	0	0.00	0	0	0	0.00
SBT	1969	5700	0.35	-35	1934	5700	0.34	45	1979	5700	0.35	-198	1781	5700	0.31	0	0	0	0.00	0	0	0	0.00
SBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBL	332	0	0.00	-10	322	0	0.00	40	362	0	0.00	-36	326	0	0.00	0	0	0	0.00	0	0	0	0.00
EBT	0	5700	0.13 *	0	0	5700	0.13 *	0	0	5700	0.14 *	0	0	5700	0.13 *	0	0	0	0.00	0	0	0	0.00
EBR	437	0	0.00	0	437	0	0.00	0	437	0	0.00	-44	393	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00	0	0	0	0.00
WBT	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.68	ICU VALUE			0.67	ICU VALUE			0.70	ICU VALUE			0.63	ICU VALUE			0.00	ICU VALUE			0.00
			----				----				----				----				----				----
LEVEL OF SERVICE=			B	LEVEL OF SERVICE=			B	LEVEL OF SERVICE=			B	LEVEL OF SERVICE=			B	LEVEL OF SERVICE=				LEVEL OF SERVICE=			

A:1420N3P.ICU

TABLE 3B
VOLUME-CAPACITY ANALYSIS
ARCHIBALD AVENUE & EB SR-60 RAMPS
PM

MOVEMENT	2010 CONDITIONS (Haven/SR-60 Study) VOLUME	CAP	V/C RATIO	2010 CONDITIONS WITHOUT PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	PLUS PROJECT TRAFFIC ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBT	1392	5700	0.29 *	-5	1387	5700	0.29 *	30	1417	5700	0.29 *	-142	1275	5700	0.26 *	0	0	0	0.00	0	0	0	0.00
NBR	248	0	0.00	0	248	0	0.00	0	248	0	0.00	-25	223	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	1298	3400	0.38 *	-60	1238	3400	0.36 *	65	1303	3400	0.38 *	-130	1173	3400	0.35 *	0	0	0	0.00	0	0	0	0.00
SBT	2293	5700	0.40	-35	2258	5700	0.40	45	2303	5700	0.40	-230	2073	5700	0.36	0	0	0	0.00	0	0	0	0.00
SBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBL	439	0	0.00	-10	429	0	0.00	40	469	0	0.00	-47	422	0	0.00	0	0	0	0.00	0	0	0	0.00
EBT	0	5700	0.16 *	0	0	5700	0.16 *	0	0	5700	0.17 *	0	0	5700	0.15 *	0	0	0	0.00	0	0	0	0.00
EBR	487	0	0.00	0	487	0	0.00	0	487	0	0.00	-49	438	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00 *	0	0	0	0.00	0	0	0	0.00
WBT	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBR	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.83	ICU VALUE			0.81	ICU VALUE			0.84	ICU VALUE			0.76	ICU VALUE			0.00	ICU VALUE			0.00
			----				----				----				----				----				----
LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			D	LEVEL OF SERVICE=			C	LEVEL OF SERVICE=				LEVEL OF SERVICE=			

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TABLE 4A
VOLUME-CAPACITY ANALYSIS
PHILADELPHIA STREET & PROFORMA STREET
PM

MOVEMENT	1995 CONDITIONS WITHOUT PROJECT VOLUME	CAP	V/C RATIO	1995 CONDITIONS WITH PROJECT ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	WITH 10% TDM REDUCTION ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	0	0	0.00	20	20	1700	0.05	-2	18	1700	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBT	0	0	0.00 *	0	0	1900	0.05 *	0	0	1900	0.05 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBR	0	0	0.00	65	65	0	0.00	-6	59	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	150	1700	0.09 *	0	150	1700	0.09 *	-15	135	1700	0.08 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBT	0	1900	0.05	0	0	1900	0.05	0	0	1900	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBR	45	0	0.00	0	45	0	0.00	-4	41	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBL	15	1700	0.05 *	0	15	1700	0.05 *	-2	13	1700	0.05 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBT	345	3800	0.09	30	375	3800	0.10	-38	337	3800	0.09	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBR	0	0	0.00	5	5	0	0.00	-1	4	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	0	0	0.00	10	10	1700	0.05	-1	9	1700	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBT	877	3800	0.24 *	30	907	3800	0.25 *	-91	816	3800	0.22 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBR	35	0	0.00	0	35	0	0.00	-4	31	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
			====				====				====				====				====				====
ICU VALUE			0.38	ICU VALUE			0.44	ICU VALUE			0.40	ICU VALUE			0.00	ICU VALUE			0.00	ICU VALUE			0.00
			----				----				----				----				----				----
LEVEL OF SERVICE= A				LEVEL OF SERVICE= A				LEVEL OF SERVICE= A				LEVEL OF SERVICE=				LEVEL OF SERVICE=				LEVEL OF SERVICE=			

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TABLE 4B
VOLUME-CAPACITY ANALYSIS
PHILADELPHIA STREET & PROFORMA STREET
PM

MOVEMENT	2010 CONDITIONS WITHOUT PROJECT			2010 CONDITIONS WITH PROJECT				WITH 10% TDM REDUCTION											
	VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO	ADD. VOL.	TOTAL VOLUME	CAP	V/C RATIO
NBL	0	0	0.00	20	20	1700	0.05	-2	18	1700	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBT	0	0	0.00 *	0	0	1900	0.05 *	0	0	1900	0.05 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
NBR	0	0	0.00	65	65	0	0.00	-6	59	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBL	150	1700	0.09 *	0	150	1700	0.09 *	-15	135	1700	0.08 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBT	0	1900	0.05	0	0	1900	0.05	0	0	1900	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
SBR	45	0	0.00	0	45	0	0.00	-4	41	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBL	15	1700	0.05 *	0	15	1700	0.05 *	-2	13	1700	0.05 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBT	514	3800	0.14	30	544	3800	0.14	-54	490	3800	0.13	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
EBR	0	0	0.00	5	5	0	0.00	-1	4	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBL	0	0	0.00	10	10	1700	0.05	-1	9	1700	0.05	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBT	1069	3800	0.29 *	30	1099	3800	0.30 *	-110	989	3800	0.27 *	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
WBR	35	0	0.00	0	35	0	0.00	-4	31	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00	CLEARANCE			0.00
ICU VALUE			0.43	ICU VALUE			0.49	ICU VALUE			0.45	ICU VALUE			0.00	ICU VALUE			0.00	ICU VALUE			0.00
LEVEL OF SERVICE=			A	LEVEL OF SERVICE=			A	LEVEL OF SERVICE=			A	LEVEL OF SERVICE=				LEVEL OF SERVICE=				LEVEL OF SERVICE=			

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Figure 9-1D

TRAFFIC SIGNAL WARRANTS

Philadelphia / Proforma - Project Driveway

(Based on Estimated Average Daily Traffic - See Note 2)

Near-Term 1995 Volumes[1]

URBAN X RURAL

1. Minimum Vehicular

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Minimum Requirements EADT: Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)		
		Philadelphia Urban	Rural	Proforma Urban	Rural	Project Dwy
1	1	8,000	5,600	2,400	1,680	
2 or more	1	9,600	6,720	2,400	1,680	
2 or more	2 or more	9,600 (13,470)	6,720	3,200 (1,950)	2,240	800
1	2 or more	8,000	5,600	3,200	2,240	

2. Interruption of Continuous Traffic

Satisfied _____ Not Satisfied X

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Vehicles per day on major street (total of both approaches)		Vehicles per day on higher-volume minor-street approach (one direction only)		
		Philadelphia Urban	Rural	Proforma Urban	Rural	Project Dwy
1	1	12,000	8,400	1,200	850	
2 or more	1	14,400	10,080	1,200	850	
2 or more	2 or more	14,400 (13,470)	10,080	1,600 (1,950)	1,120	800
1	2 or more	12,000	8,400	1,600	1,120	

3. Combination

Satisfied _____ Not Satisfied _____

No one warrant satisfied but following warrants fulfilled

80% or more ..... _____ (1) _____ (2)

Vehicles per day on major street (total of both approaches)	Vehicles per day on higher-volume minor-street approach (one direction only)
2 Warrants	2 Warrants

NOTE:

1. Heavier left turn movement from the major street may be included with minor street volume if a separate signal phase is to be provided for the left-turn movement.
2. To be used only for NEW INTERSECTIONS or other locations where actual traffic volumes cannot be counted.

1 - Based on expansion of PM peak hour volumes (see Exhibit 6), assuming 10% of the daily volume occurs during the PM peak hour.

Calculation of Gaps in Southbound Traffic Stream on Archibald at Project Driveway

EBR @ Phil/Archibald = 142 vph

For a 100 sec cycle there is 36 cycles/hour

∴ veh/cycle = 142/36 = 3.94

EBR Saturation Flow = 1700 vph

$= \frac{1700}{3600} = 0.47$ veh/sec or 2.12 sec/vehicle

Time to clear EBR = 3.94 veh/cycle × 2.12 sec/veh = 8.35 sec/cycle Add 2 sec. lost time Total Time = 10.35 say 11 sec.

Total Gap available for NBL at Project Driveway (based on Passer II run)

= NBL @ Phil. + E/W @ Phil. − EBR @ Phil.

= 10 + 20 − 11.0 = 19 sec

NBL @ Project Driveway = 100 vph

= 2.78 veh/cycle based on 100 sec cycle

peak volume per cycle = 1.5 × 2.78 = 4.17 veh/cycle

available gap per vehicle = $\frac{19 \text{ sec/cycle}}{4.17 \text{ veh/cycle}}$

= 4.56 sec/vehicle

4.56 sec/veh is adequate to clear vehicles

TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
PASSER2 MULTIPHASE ARTERIAL PROGRESSION - 145101 3.0 JULY 1986
PASSER II-84

ONTARIO ARCHIBALD AVE DISTRICT 12 07/02/90 RUN NO. 1

OPTIONS IN EFFECT ARE:
PROGRESSION MODE.
DIRECTIONAL ORIENTATION SPECIFIED
(NARROW FORMAT ONLY).
ARTERIAL ORIENTATION (A-DIRECTION) IS: SB.
NARROW (SCREEN) OUTPUT FORMAT.
GRAPHIC DISPLAY FILE OUTPUT TO UNIT 9.

NUMBER OF INTERSECTIONS	LOWER CYCLE LENGTH	UPPER CYCLE LENGTH	CYCLE INCREMENT
3	100	100	5

** INTERSECTION 1 PHILADELPHIA

DISTANCE 0 TO 1	SPEED	DISTANCE 1 TO 0	SPEED
0. FT	0. MPH	0. FT	0. MPH

A SIDE QUEUE CLEARANCE	B SIDE QUEUE CLEARANCE
0 SECS	0 SECS

ARTERIAL PERMISSIBLE PHASE SEQUENCE.

LEFT TURNS FIRST	WITH OVERLAP
THROUGH MOVEMENTS FIRST	WITH OVERLAP
LEADING GREEN	WITH OVERLAP
LAGGING GREEN	WITH OVERLAP

CROSS ST PHASE SEQUENCE IS LEFT TURNS FIRST WITH OVERLAP.

	MOVEMENTS (NEMA)							
	5	6	1	2	3	4	7	8
VOLUMES (VPH)	143	1329	18	3018	446	703	1012	361
SAT FLOW RATE (VPHG)	3400	5100	3400	5100	3400	3400	3400	3400
MINIMUM GREEN (SEC)	10	25	10	25	10	20	10	20

* INTERSECTION 2 WB SR-60 RAM

DISTANCE 1 TO 2	SPEED	DISTANCE 2 TO 1	SPEED
910. FT	40. MPH	910. FT	40. MPH

A SIDE QUEUE CLEARANCE 0 SECS

B SIDE QUEUE CLEARANCE 0 SECS

ARTERIAL PERMISSIBLE PHASE SEQUENCE.
THROUGH MOVEMENTS FIRST WITH OVERLAP

CROSS ST PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST WITH OVERLAP.

	MOVEMENTS (NEMA)							
	5	6	1	2	3	4	7	8
VOLUMES (VPH)	0	1620	367	3268	0	997	0	0
SAT FLOW RATE (VPHG)	0	5100	3400	5100	0	5100	0	0
MINIMUM GREEN (SEC)	0	10	10	10	0	30	0	0

**** INTERSECTION 3 EB SR-60 RAM

DISTANCE 2 TO 3	SPEED	DISTANCE 3 TO 2	SPEED
475. FT	40. MPH	475. FT	40. MPH

A SIDE QUEUE CLEARANCE 0 SECS

B SIDE QUEUE CLEARANCE 0 SECS

ARTERIAL PERMISSIBLE PHASE SEQUENCE.
THROUGH MOVEMENTS FIRST WITH OVERLAP

CROSS ST PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST WITH OVERLAP.

	MOVEMENTS (NEMA)							
	5	6	1	2	3	4	7	8
VOLUMES (VPH)	1303	1665	0	2303	0	0	0	956
SAT FLOW RATE (VPHG)	3400	5100	0	5100	0	0	0	5100
MINIMUM GREEN (SEC)	10	15	0	15	0	0	0	30

* INTERSECTION 1 PHILADELPHIA OFFSET= .0 SECONDS, .0 %

ARTERIAL PHASE SEQUENCE IS LEADING GREEN
CROSS STREET PHASE SEQUENCE IS LEFT TURNS FIRST

	ARTERIAL				CROSS STREET			
MOVEMENTS	2+5	2+6	1+6	TOTAL	3+7	4+7	4+8	TOTAL
GREEN TIME (SECS)	10.2	32.8	10.0	53.0	19.1	7.9	20.0	47.0
GREEN TIME (%)	10.2	32.8	10.0	53.0	19.1	7.9	20.0	47.0

MOVEMENT	V/C RATIO (%)	(LOS)	DELAY TOTAL (VEH-HR)	DELAY AVERAGE (SEC/VEH)	(LOS)	PROB. OF QUEUE CLEAR.(%)	STOPS (VEH/HR)	(%)	MIN DELAY CYCLE
NB THRU :	67	(B)	9.80	26.5	(C)	100	1010.	(76)	
LEFT :	9	(A)	.22	44.4	(D)	100	16.	(86)	
SB THRU :	152*	(F)	492.62	587.6	(F)	0	4076.	(135)	
LEFT :	68	(B)	2.12	53.4	(E)	84	128.	(89)	
EB THRU :	66	(B)	4.23	42.2	(D)	96	308.	(85)	
LEFT :	87	(E)	6.81	54.9	(E)	59	396.	(89)	
WB THRU :	87	(E)	8.86	45.4	(D)	69	611.	(87)	
LEFT :	129*	(F)	78.63	279.7	(F)	0	1006.	(99)	
NODE 1 :	152*(MAX)		603.29	308.9			7550.	(107)	120

**** INTERSECTION 2 WB SR-60 RAM OFFSET= 4.5 SECONDS, 4.5 %

ARTERIAL PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST
CROSS STREET PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST

	ARTERIAL				CROSS STREET			
MOVEMENTS	2+6	1+6	1+5	TOTAL	4+8	3+8	3+7	TOTAL
GREEN TIME (SECS)	57.4	12.6	.0	70.0	30.0	.0	.0	30.0
GREEN TIME (%)	57.4	12.6	.0	70.0	30.0	.0	.0	30.0

MOVEMENT	V/C RATIO (%)	(LOS)	DELAY TOTAL (VEH-HR)	DELAY AVERAGE (SEC/VEH)	(LOS)	PROB. OF QUEUE CLEAR.(%)	STOPS (VEH/HR)	(%)	MIN DELAY CYCLE
NB THRU :	48	(A)	.95	2.1	(A)	100	174.	(11)	
LEFT :	126*	(F)	27.21	266.9	(F)	0	343.	(93)	
SB THRU :	120*	(F)	147.31	162.3	(F)	0	3198.	(98)	
WB THRU :	75	(C)	10.05	36.3	(D)	96	830.	(83)	
NODE 2 :	126*(MAX)		185.51	106.8			4545.	(73)	120

TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PASSER2 MULTIPHASE ARTERIAL PROGRESSION - 145101 3.0 JULY 1986

PASSER II-84

* INTERSECTION 3 EB SR-60 RAM OFFSET= 12.9 SECONDS, 12.9 %

ARTERIAL PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST
CROSS STREET PHASE SEQUENCE IS THROUGH MOVEMENTS FIRST

	ARTERIAL				CROSS STREET			
MOVEMENTS	2+6	2+5	1+5	TOTAL	4+8	3+8	3+7	TOTAL
GREEN TIME (SECS)	32.6	37.4	.0	70.0	30.0	.0	.0	30.0
GREEN TIME (%)	32.6	37.4	.0	70.0	30.0	.0	.0	30.0

MOVEMENT	V/C RATIO (%) (LOS)	DELAY TOTAL (VEH-HR)	DELAY AVERAGE (SEC/VEH) (LOS)	PROB. OF QUEUE CLEAR.(%)	STOPS (VEH/HR) (%)	MIN DELAY CYCLE
NB THRU :	115* (F)	62.52	135.2 (F)	0	1600. (96)	
SB THRU :	69 (B)	1.81	2.8 (A)	100	285. (12)	
LEFT :	115* (F)	49.69	137.3 (F)	0	1274. (98)	
EB THRU :	72 (C)	9.42	35.5 (D)	98	788. (82)	
NODE 3 :	115*(MAX)	123.45	71.4		3947. (63)	120

*** PASSER II-84 BEST SOLUTION SUMMARY - TOTAL SYSTEM PERFORMANCE ***

CYCLE LENGTH : 100

BAND	A	B		
WIDTH (SECS)	32	16	EFFICIENCY	: .24
SPEED (MPH)	40	40	ATTAINABILITY	: .65

PERFORMANCE MEASURES	TOTAL VEHICLES (VEH/HR)	TOTAL DELAY (VEH-HR)	AVERAGE DELAY (SEC/VEH)	TOTAL STOPS (VEH/HR) (%)	FUEL CONSUMPTION (GAL/HR)	MAX MIN CYCLE (SEC)
TOTAL :	19509.	912.2	168.3	16041.7(82)	811.5	120

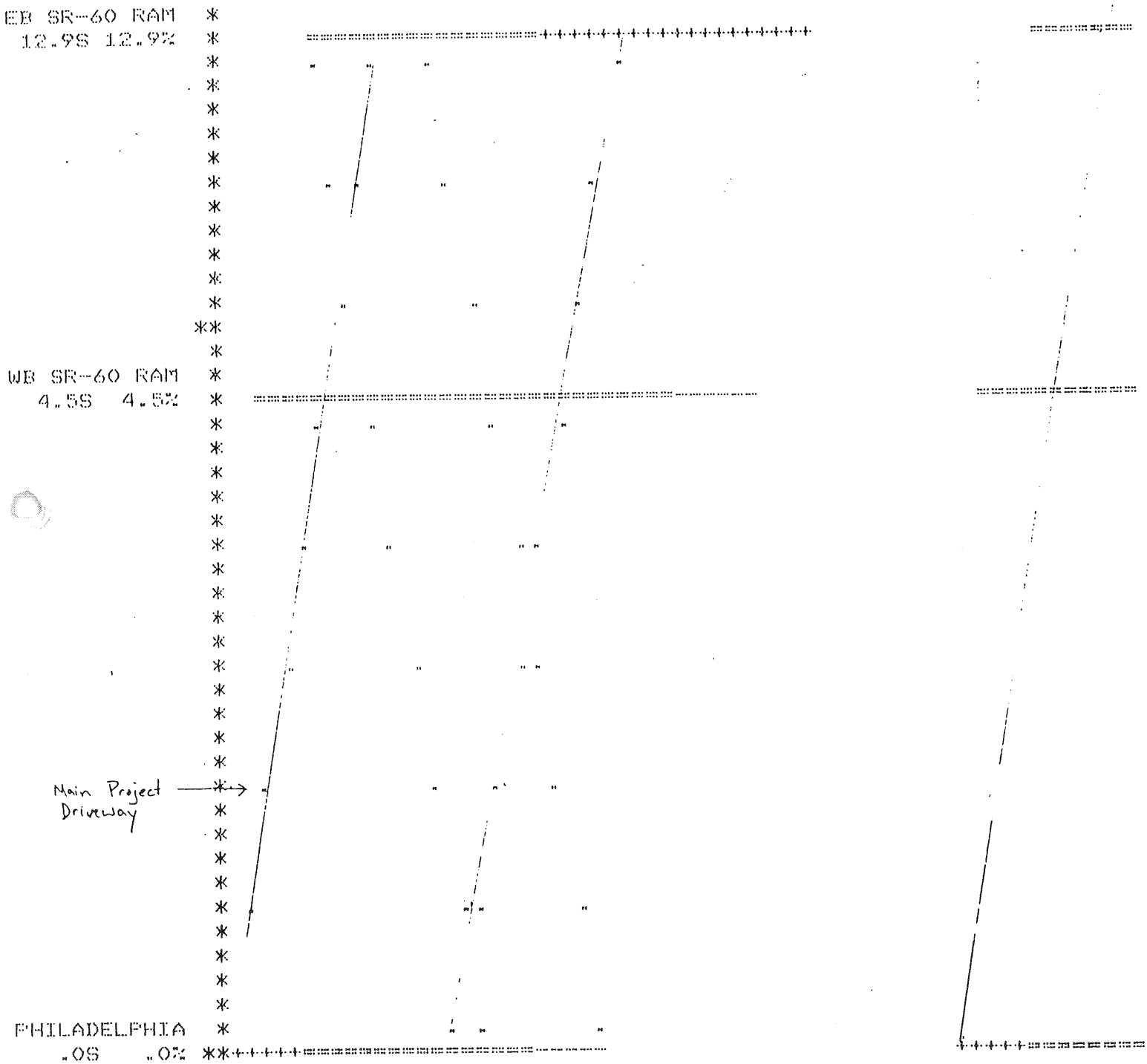
TEXAS DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

PASSER2 MULTIPHASE ARTERIAL PROGRESSION - 145101 3.0 JULY 1986

PASSER II-84

TI -SPACE DIAGRAM FOR: ARCHIBALD AVE

ONTARIO DISTRICT 12 RUN NUMBER 1 07/02/90 CYCLE LENGTH 100



"A" BAND
40 MPH
32 SECONDS

"B" BAND
40 MPH
16 SECONDS

KEY: *** BOTH LEFTS (1+5) +++ LEADING GREEN (2+5)
==== BOTH THRUS (2+6) ---- LAGGING GREEN (1+6)

SCALES: HORIZONTAL - 1 INCH = 20 SECONDS (1 INCH = 10 CHARACTERS)

APPENDIX C

Police Security Standards

I. SECURITY LIGHTING

A. All buildings are required to have minimal exterior lighting to eliminate any dark areas (to include any recessed areas). direct lighting shall be provided at all entrance ways.

B. The minimum maintained lighting level shall be one (1) to one and one half (1 1/2) foot candle power in all parking, loading, common and storage areas.

C. All areas are to be lighted from sunset to sunrise and will be controlled by photo sensored cells.

D. Lighting in exterior areas shall be in vandal-resistant fixtures.

E. The developer shall have submitted certified exterior site lighting plans showing luminaire throw patterns cut sheets of the luminaires. The lighting plans must be approved prior to building permits being issued.

F. Lighting around the development is to be consistent.

G. Interior night lighting shall be constructed and maintained on the ground floor level in those areas that are visible form the street.

II. SECURITY HARDWARE

A. One (1) inch single cylinder. If windows are within forty (40) inches of any locking device. tempered glass must be used.

B. Glass panel, aluminum frame swinging doors shall have astragal plate to protect the strike. Placement must conform with Fire Department standards.

C. Sliding glass doors will be of the inside sliding door type. Track mounted locking slidebolts and anti-lift devices will be installed on all sliding glass doors.

D. Large garage-type/loading doors are to have two slide bolts, one on each side of the doors.

E. All roof openings giving access to the buildings shall be secured with either iron bars, metal gates, stamped metal, or alarmed and meet with Police Department approval.

F. All skylights shall be constructed of a "burglar resistant" material, or be secured with either iron bars or an alarm system, and meet with Police Department approval.

III. SECURITY FENCING

A. No obstructing material will be used on any entrance gate.

B. Block or chain link fencing will be a minimum of six (6) feet tall around storage areas.

IV. NUMBERING

A. Street address numbering shall adhere to standards set forth in City of Ontario Ordinance 9-3.2746(3). Numbers and the background to which they are attached shall be of contrasting colors and shall be of a reflective material for nighttime visibility.

B. The developer shall install roof top numbers and street names on all roofs of a development. They shall be a minimum of three (3) feet in length and two (2) feet in width and of white color. Numbers shall be placed parallel to street address as assigned.

C. Buildings with rear access must have the numbers meeting the requirements of IV-A, above.

V. SECURITY SHRUBBERY

A. Security shrubbery shall be installed next to all fences and walls that adjoin all common/public access areas. Placement of such shrubbery will meet all requirements of the City of Ontario Development Advisory Board.

VI. ALARM SYSTEMS

A. A burglar alarm system is recommended for all businesses, and a robbery alarm should be considered for certain retail businesses.

B. If an alarm is installed, an alarm permit must be obtained from the Ontario Police Department. Subscribers should acquaint themselves with Ontario's False Alarm Ordinance, OMC 4-9.1990.

C. If an alarm is installed, a blue flashing light shall be installed on the roof top, screened from public view but visible from the air.

VII. MISCELLANEOUS

A. The developer shall provide a copy of these requirements to his or her on-site contractor.

B. The placement of outside public telephones shall be restricted to an area immediately adjacent to the front door of the development.