APPENDIX D
General Approach for the Updated Noise Assessment and Applicable Details from the 1991 Noise Assessment

Mississauga BRT – General Approach for the Update Noise Assessment

Road traffic (busway) sound levels will be predicted using the Ministry of the Environment (MOE) noise prediction model, ORNAMENT, which is based on the technique developed by the U.S. Federal Highway Administration (FHWA) and enhanced by the Ministry of Transportation and the Ministry of the Environment.

The STAMSON program Version 5.04 (2000) will be used for calculating all road and bus traffic sound levels based on analysis of multiple road sections/segments to further enhance its three-dimensional capabilities. STAMSON is the computerized version of the MOE's current noise prediction model, ORNAMENT.

The road traffic sound level calculations will be primarily based on the average daily traffic volumes (AADT), percentages of medium and heavy vehicles, posted speed limits, road to receptor distance, elevation differential between the road and the receptor, roadway gradient, pavement type and the type of ground cover between the road and the receptor in question.

Based on MOE guidelines for predicting road traffic noise, the equivalent daytime sound level in dBA, Leq corresponding to the average hourly volume of the 16 hours traffic (07:00-23:00) will be used for noise impact assessment , i.e. Leq_{16} in dBA. For information purposes, the equivalent nighttime sound level in dBA, Leq_8 corresponding to the average hourly volume of the 8 hours traffic (23:00-07:00) will be included in this study.

For BRT stations, stationary source assessment procedures will be employed as has been recommended by the MOE. The approach requires the assessment of hourly sound levels (i.e. Leq_{1h}).

Stationary sources sound levels assessed will be predicted using an ISO-based prediction model developed by SS Wilson Associates. The stationary sound level calculations will be based on reference sound emission levels of buses and cars, bus and car volumes, distance setbacks, acoustic shielding by barriers and other structures, ground and atmospheric attenuation, and grade elevations.

Noise measurements (both short term [over a period of 4 hours] attended and long term [over a period of 5 days] unattended) will be carried out to establish the sound emission levels of buses and cars and the prevailing ambient sound levels. The short term attended measurements will be used in the stationary source prediction model, while the long term unattended measurements will be used to verify the predicted ambient sound levels due to road traffic.

For the purpose of this study, the environmental noise assessment is based on the change in sound levels above the future ambient sound levels (2017).

S.S. WILSON AND ASSOCIATES
DIV. OF M.H.G. ENGINEERING INC.
Consulting Engineers

REPORT NO. W90-72

ENVIRONMENTAL NOISE STUDY
PROPOSED MISSISSAUGA BUSWAY SYSTEM
MISSISSAUGA, ONTARIO

SUBMITTED TO:

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FEBRAURY 1, 1991

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ENVIRONMENTAL NOISE STUDY
PROPOSED MISSISSAUGA BUSWAY SYSTEM
MISSISSAUGA, ONTARIO

INDEX PAGE

1.0 INTRODUCTION

1.1 The services of S.S. Wilson and Associates were retained by the Consulting Engineering firms M.M. Dillon, McCormick Rankin Ltd., and The IBI Group on behalf of the City of Mississauga to prepare an environmental noise impact study for the proposed Mississauga Busway System located in the City of Mississauga, Ontario.

1.2 The Proposed Busway System is composed of an exclusive 2-lane busway stretching from Ridgeway Drive eastward parallel to Highway 403 and Highway 403 Arterial Road, to Fieldgate Blvd., then heading north from Fieldgate Drive to Eglinton Avenue and then parallel to Eglinton Avenue to Renforth Drive.

To serve the busway traffic as well as local bus traffic on the existing arterial crossings, a total of 17 stations were proposed for the Busway system at the following locations:

1. Highway 403 at Ridgeway Blvd.
2. Highway 403 Interchange with Winston Churchill Blvd.
3. Highway 403 at Glen Erin Drive.
4. Highway 403 Interchange with Erin Mills Parkway.
5. Highway 403 at Mississauga Road.
6. Highway 403 at Creditview Road.
7. Highway 403 Interchange with Mavis Road.
8. Highway 403 at City Centre.
9. Highway 403 at Central Parkway.
10. Highway 403 Arterial at Cawthra Road.
11. Highway 403 Arterial at Tomken Blvd.
12. Highway 403 Arterial at Dixie Road.
13. Fieldgate Blvd.
14. Eglinton Avenue at Spectrum Drive.
15. Eglinton Avenue at Satellite Drive.
16. Eglinton Avenue at Orbitor drive.
17. Eglinton Avenue at Renforth drive.

The general location of the study area is shown in Figure 1 and the overall layout of the proposed Busway is illustrated in Figures 2 to 23.

Subsequentely, the proposed station at Highway 403 at Glen Erin Drive was cancelled.

Figures 4 to 6 show the section of the proposed Busway alignment where two different alignments are proposed. For that section of the Busway, the impact of both alignments will be addressed.

1.3 The scope of this study is to establish through measurements and prediction models the existing ambient/background sound levels and the projected sound levels at selected receptor locations along the proposed Busway or in the vicinity of the proposed stations as well as to recommend noise control measures where warranted.

2.0 CONCLUSIONS AND RECOMMENDATIONS

2.1 CONCLUSIONS

1. A study has been carried out to research all aspects related to the potential noise impact of the proposed Busway on the noise-sensitive developments adjacent to the proposed Busway alignments which also include the proposed stations. The study dealt with documentation of the existing ambient conditions, the applicable criteria, the effectiveness of the proposed noise control measures and the future sound environment.

2. Traffic on the existing Highway 403, Highway 403 Arterial, Eglinton Avenue, and all roads overpassing and intersecting the Busway are considered as the major sources of environmental ambient noise within the entire study area as vehicular traffic noise is the most dominant source. The predicted sound levels at most of the potential receivers prior to undertaking of the proposed Busway system do exceed the Provincial objective of Leq 55 dBA due to the close proximity of many dwellings and buildings to the existing network of roads and highways.

3. The predicted future sound levels at the building facades or yards of the nearest dwelling units along the area in question in case of a "Do-Nothing Option" will be in the range of Leq (day) 42 to 67 dBA. The established excess sound levels due to the Busway at the year 2021 over the future Do-Nothing option sound levels will be up to a maximum of 5 dB at some locations; i.e. within the government maximum allowable excess of 5 dB.

4. The Busway alignment has been selected in areas that are dominated by the noise from well established arterial roads and Highway 403; i.e. the proposed alignment is acoustically compatible with the existing land uses.

5. Most of the Busway lanes will be located within a cut or at relatively lower elevations which will result in lower sound levels compared to at-grade situations. The proposed cuts are considered effective sound barriers that are capable of providing noticeable to significant sound level reductions depending on the depth of cut and the location with respect to the receptor locations.

6. There are marginal differences in the sound levels generated by the various proposed alternative alignments. Therefore the noise concern may not be considered as one of the dominant

factors in selecting either of the alternatives.

2.2 RECOMMENDATIONS

1. The noise impact due to ultimate bus traffic on the proposed Busway system is considered minor with respect to all locations along the proposed alignment since the increase in sound levels due to bus traffic on the proposed Busway would be a maximum of 5 dBA. This increase is within the MOE/MTO acceptable Protocol criteria for new and expanded roadway projects. Accordingly additional noise control measures are NOT required.

2. In the case of the receptors located in the vicinity of the proposed stations, the overall combined noise impact is also considered minor with respect to all proposed stations, and additional noise control measures are also NOT warranted.

3. To meet the MOE requirements for stationary noise sources during the construction phase of the proposed undertaking, construction equipment used on the site should meet the sound emission level standards set by the MOE.

   The MOE assesses noise impact during the construction period against the sound level standards set out in Publications NPC-115 and NPC-118 (see Appendix D). These standards limit the allowable levels from the equipment at source rather than at the receiver. In order to meet the above requirements, the equipment will have to be certified by the manufacturer. If such certification is not available or if the equipment is not new, it will be required that the proponent certify that the actual equipment used based on "on-site" measurements, under typical operating conditions comply with the MOE requirements.

   Other relevant standards include the Federal Government Standards regulating the noise emissions from heavy and medium trucks.

4. To improve the acoustical performance of the proposed Busway cuts we recommend that the wall construction materials have reasonable sound absorptive qualities and/or by constructing the cut sidewalls using an outward slope or slant. These measures will improve both the noise perceived at the near-by receptors, the transit system riders.

3.0 ANALYSIS

3.1 DESCRIPTION OF THE SOURCES OF NOISE

The proposal calls for the establishment of a Busway System composed of an exclusive 2-lane busway stretching from Ridgeway Drive eastward parallel to Highway 403 and Highway 403 Arterial Road, to Fieldgate Blvd., then heading north from Fieldgate Drive to Eglinton Avenue and then parallel to Eglinton Avenue to Renforth Drive.

To serve the busway traffic as well as local bus traffic on the existing arterial crossings, a total of 17 stations were proposed for the Busway system.

The primary source of noise associated with the proposed system is bus noise operating on the transit route and within the stations. Other sources of noise of lesser magnitude include automobile traffic using the designated parking areas associated with some stations and possibly mechanical equipment associated with one of the stations. The noise emitted by buses is due to bus exhaust, engine and tire/ground interaction depending on the bus speed and the type of pavement.

Since noise prediction methodologies for buses moving on a roadway or within a station are different, the description of the specific bus activities and associated sound levels will be dealt with separately.

1. In-Between Stations Bus Movements

Buses are expected to operate between stations using a posted speed limit of 80 km/hr depending on the segment of the Busway except near the proposed stations where buses will be accelerating and decelerating as discussed below. Although individual buses are considered as point sources, the combined movements of such point sources on a linear path would qualify the entire system of point sources moving steadily as a line source.

The traffic noise prediction model used for the assessment of bus movements between the stations is "ORNAMENT" which was developed by the Ontario Ministry of the Environment. The technical details of the model could be found in the MOE Technical Document ORNAMENT, October 1989. The computerized version of the Model used for this project is STAMSON 3.0. It is important to note

that City buses are classified under the "Medium Trucks" category as outlined in the model. Appendix A contains summary of the procedures and adjustments used.

Since the majority of the proposed transitway will be carrying buses only, the percentage of Medium Trucks used in the prediction of such sections was set at 100% relative to the entire vehicular traffic movements on the exclusive busway.

According to the prediction model, the 2-way movements of; for example 50 buses per hour (i.e. 25 buses in either direction) are capable of producing an energy equivalent sound level (Leq) of 64 dBA at a typical receptor 15 metres away from the centreline of the Busway. It is important to realize that the peak sound levels due to bus pass-bys will still remain at 75 to 80 dBA due to each individual bus pass-by at 15m since the Leq represents the average energy exposure due to multiple bus movements over the period of interest (1 hour in this case). The following table provides a quick reference for illustration purposes only of the resulting Leq sound levels due to various bus movements:

One Way Bus Movements/Hr.	Total 2-Way/Hr.	Leq, dBA
25	50	64
50	100	67
75	150	69
100	200	70

(Based on 80 km/hr., 15m from busway centre line to receptor and normal ground conditions without any physical barriers).

For this analysis, no other sources of noise were considered along the Busway corridor since City buses are the predominant part of traffic allowed on the major part of this proposed corridor.

2. Bus Movements Within the Stations

The term station as used in this study refers to both bus stations and conventional road-side bus stops. Figure 29 illustrates typical details of a bus station and a bus stop.

The primary sources of noise within a bus station are mostly due to the variety of bus activities and movements within the designated areas of the station where buses accelerate, decelerate, idle or move at constant speeds. Such activities generate different peak sound levels and

the time or duration of each event may be different. Since the ORNAMENT model cannot deal with such complex evaluations, a different approach was followed whereby the sound emission levels of buses operating under different conditions were actually measured and the results were then used to recompose overall noise exposure levels at the specific points of reception.

Appendix B contains the details of the recent bus sound level measurements taken within the City of Mississauga Transit Yards in connection with this project. The results contained in Appendix B were used in the subsequent calculations of the bus station sound levels.

Sound levels due to bus activities within the bus stations and along the bus stops were calculated using computer programs developed by **S.S. Wilson and Associates** for multiple receptors or at grid points (contours) and for multiple noise sources. These programs take into account the following factors:

- Reference sound levels (emission levels from Appendix B) and reference distances for the various bus movements or activities; examples include idling, acceleration, deceleration, stop and go, movements near bus stop, stop signs, ... etc.

- Reference sound levels for vehicular traffic activities within the parking area based on data measured by **S.S. Wilson and Associates** in connection with other similar projects.

- Speeds of buses within the various segments of the stations or alternatively, the time spent by each bus in each identified time segment.

- Volume of buses (2 way movements).

- Divergence (distance) attenuation.

- Sound barrier attenuation where applicable.

- Ground and Atmospheric attenuation (as modified by source/receiver elevations and the intervening sound barrier).

- Source and receptor elevations.

Figure 29 illustrates the details of a selected station along with a description of the various noise activity areas or segments within or near the station. For example, the data received from the project traffic

consultants indicate that the buses are likely to spend 3 minutes each idling at each respective bay within the station as shown. The Figure also shows the various noise zones such as a stop sign noise zone, acceleration at low speeds, movements at a constant low speed, ... etc.

Since no detailed plans are available at this time to show the design of the specific station where a station building will be constructed, the noise from any potential mechanical equipment such as ventilation fans and air conditioning equipment was not considered at this point. It is worth noting that the noise from mechanical equipment are expected to be lower than the noise generated by the bus movements and also due to the high ambient/background sound levels. Shielding effects provided by station buildings were also not considered.

3.2 AMBIENT/BACKGROUND NOISE

In Section 2.0 it was indicated that noise assessment of the proposed undertaking also includes comparative evaluation of the source sound levels (due to bus activities) against the existing or established ambient/background sound levels due to vehicular traffic in the area. There are several sources of transportation noise in the area including Highway 403, the intersecting arterial roads and the associated ramps to Hwy. 403. The following is a list of the transportation sources of noise considered in this study:

- Highway 401 & Highway 427
- Highway 403
- Highway 403 Arterial Road extension.
- Eglinton Avenue
- Ridgeway Blvd.
- Winston Churchill Blvd.
- Glen Erin Blvd.
- Erin Mills Parkway.
- Mississauga Road.
- Creditview Road.
- Mavis Road.
- Hurontario Street (Highway 10)
- Central Parkway.
- Cawthra Road.
- Tomken Blvd.
- Dixie Road.
- Fieldgate Blvd.
- Spectrum Drive.
- Satellite Drive.
- Orbitor Drive.
- Explorer Drive.

- Renforth Drive.

It should be noted that there are other major sources of transportation noise affecting the area of concern which were not included in the estimation of the ambient noise. The sources include aircraft and railway noise which were specifically excluded from the analysis in order to comply with the MOE recommendation for the exclusion of sources of noise that are fairly intermittent in nature.

Traffic noise due to vehicular traffic movements on the above-noted roadways were calculated using the ORNAMENT model based on the roadway and traffic data supplied by the traffic consultants.

Since the proposed Busway system is planned to be fully operational by the year 2021 the ambient sound levels were calculated using the future ambient traffic data; i.e. the "Do-Nothing" alternative.

Appendix F contains the road and traffic data used for the ambient calculations.

It should be noted that for receptor locations in the vicinity of Central Parkway station, the current horizontal and vertical configurations of the traffic lanes of highway 403 were used in calculating the ambient sound levels due to vehicular traffic on the highway as it will be the worst case as opposed to future proposed configurations.

3.3 POINTS OF RECEPTION

Points of reception are considered any point on the premises of a person where sound originating from other than the premises are received.

If we examine the existing land uses near the proposed transit system it could be concluded that the predominant land use is residential followed by commercial and industrial. There are several vacant properties north of Highway 403, most of which are designated for residential land use and the remaining are residential subdivision already under construction.

For the purposes of this study, several representative locations were selected to represent the closest points of reception to both the Busway and the stations. Moveover, many of the selected receptors are located further away from the arterial roads in order to provide a more conservative approach in calculating the ambient sound levels, but still keeping the distance as close as possible to the proposed transit system. As an added measure of safety, the receptor

elevation was considered as a typical second storey level in a dwelling unit when calculating the stations sound levels since less ground attenuation would be included in the calculation of the sound propagation factors. A sound barrier in the form of an acoustical wall with an unspecified height is proposed by the consulting engineering firms McCormick Rankin Ltd., and The IBI Group. This wall was not taken into consideration during sound level calculations of both the ambient, station activities and Busway traffic.

Figures 2 to 23 illustrate the selected receptors along the various sections and alternatives of the proposed transit system.

The receptors shown in these figures represent a combination of residential dwellings and noise-sensitive commercial (office) buildings.

3.4 BRIEF DESCRIPTION OF THE TRANSIT CORRIDOR

Figures 2 to 23 also illustrate the proposed alignments of the transit system including the Busway lanes, crossings, stations and connections to the existing arterial network. The ultimate service extends from Ridgeway Drive to Renforth Drive primarily in the proximity of the Kings Highway 403 corridor and the Hydro transmission corridor in the City of Mississauga.

There are two basic alternatives for the Busway alignment designated as the "north" and "south" alignments as shown in the figures. The primary difference is the location of the Busway lanes and the resulting crossings of other roadways. Figures 4, 4.a , 5, 5.a , 6 and 6.a show, where applicable, the differences between the proposed alignments.

There are 17 station locations, of which 15 stations were considered in this study due to their potential noise impacts. The stations studies are:

1. Ridgeway Station
2. Winston Churchill Station
3. Glen Erin Station
4. Erin Mills Station
5. Mississauga Road Station
6. Creditview Station
7. Mavis Station
8. Central Parkway Station
9. Cawthra Station
10. Tomken Station
11. Dixie Station
12. Fieldgate Station
13. Spectrum/Satellite Station
14. Orbitor/Explorer Station
15. Renforth Station

The proposed stations at City Centre and Hurontario will not be addressed in this report as the layout and design of the stations as well as the surrounding land development are not complete at the time of the undertaking of this study.

The proposed speed limit on the transitway is 80 km/hr. with two primary lanes (one in each direction). Traffic data was obtained from the project traffic and engineering consultants; M.M. Dillon Ltd., McCormick Rankin Ltd., and The IBI Group.

Appendix F contains a summary of the traffic data used. It should be noted that the actual number of bus movements used for sound level calculations is assumed to be twice the number of bus movements in any one direction.

It is important to note that a significant proportion of the proposed Busway corridor is planned in a cut; i.e. below the existing grades as shown in Figures 2 to 23

The depressed Busway grade elevations are considered to be acoustically beneficial as the Busway edge closest to the receiver may act as an effective sound barrier depending on the Busway final grade elevations and the elevations at the points of reception. The acoustical benefits to be derived from the Busway depression/cut were included in the analysis of the noise impact.

Figure 28 illustrates a typical cross-section through the Busway showing the proposed cut.

3.5 GENERAL APPROACH

Ideally, stationary noise source assessment procedures recommended by the MOE call for hourly examination of the source sound levels against the ambient sound levels thereby establishing more-or-less 24 sets of hourly excess sound levels; if any at each receptor.

Although this procedure is considered favourable for sources of noise that are not directly related to the ambient in terms of their operation, hourly variations and daily pattern, the results of this study are based on examination of the average hourly bus movements during the daytime against the average ambient due to traffic represented by the 16 hour descriptor (Leq_{16}) and the 8 hour night-time descriptor (Leq_{8}).

This approach was selected for this project due to the following reasons:

(i) The daily variations and traffic patterns of the Busway are likely to be similar to that of the ambient traffic in that the bus A.M. and P.M. peak movements are likely to be higher than the average daily, but still follow to a large extent the traffic patterns on the roadways under consideration.

(ii) At this early stage of the planning process it is difficult to predict with a reasonable degree of accuracy the hourly variations in bus movements.

3.6 RESULTS

Sound levels were calculated at the selected receptors due to three different noise sources:

1. Bus traffic along the proposed Busway.
2. Activities within the proposed stations. This includes

local and Busway buses entering into, exiting from, manoeuvring and idling within the station boundaries as well as cars entering into, exiting from and idling within the Kiss & Ride and Park & Ride Facilities (where applicable).

3. Vehicular traffic on the existing Highway 403, Highway 403 Arterial and local roads. The sources constitute the sources of ambient sound levels.

Sample calculations are included in Appendix C and the full calculation sheets may be obtained separately by contacting S.S. Wilson & Associates.

The results are presented in the form of sound levels due to each of the above mentioned items as well as the combinations of all three. The excess over the ambient sound levels are calculated for the individual cases of bus traffic, station activities, and the overall combined sources. It has to be noted that a correction factor of up to 3 dBA was added to the sound levels due to bus traffic on the Busway to compensate for the effect of reflection as a result of the predominantly cut section of the Busway. The STAMSON 3.0 noise prediction model used in sound levels predictions does not have the capability to correctly simulate sound waves behaviour in this geometrical configuration. It can be further concluded that the cut section configuration of the proposed Busway proved to be favourable from an acoustical point of view, as it provided a minimum net reduction of sound levels of approximately 6 dBA.

Tables 3 to 19 summarize the results of the analysis. Figures shown are predicted sound levels in terms of Leq_{16} dBA.

A graphical presentation of the summary of the results is given in Figures 24 to 27.

The results at the worst case receptors in the vicinity of the proposed Busway stations are given in Tables 1 and 1.a.

From these tables it can be concluded that ambient sound levels at most of the selected receptors are considerably higher than the MOE Day-time Leq 55 dBA criteria.

In the case of the Busway traffic, the maximum calculated excess sound level over the ambient, as shown in Table 2, was 5 dBA, i.e. within the MOE/MTO maximum excess criteria.

In the case of the station activities, the maximum calculated excess sound level over the ambient, as shown in Tables 1 and 1.a, was less than 5 dBA, i.e. within the proposed criteria.

4.0 CRITERIA

4.1 SOUND LEVEL CRITERIA FOR BUS MOVEMENTS

At the present time, there are no provincial regulations or policies for the control of individual or cumulative bus sound levels operating on provincial or municipal roadways. For example, if a transit authority decides to increase the frequency of bus movements on an existing bus route or to add a new road-site bus stop no specific approval is required by any provincial jurisdiction.

The only applicable provincial legislation is the Highway Traffic Act which requires all vehicles to be equipped with exhaust muffling devices. On the other hand, the Federal Government has published noise emission standards for new buses not to exceed 83 dBA at 15m when tested at the manufacturers facilities.

It is worth noting that the Ontario Ministry of the Environment has previously endorsed environmental noise guidelines prepared by the Ontario Ministry of Transportation for the "GO-ALRT" system which included the establishment of new rail transit lines, stations and maintenance facilities in southern Ontario.

Other major busway transit systems established in Ontario included the Ottawa-Carleton Transportation (OC TRANSPO) system developed by the Regional Municipality of Ottawa-Carleton (RMOC). The RMOC-OC TRANSPO system included the assessment of environmental noise based on informal guidelines used by the RMOC and the project consultants in consultation only with the MOE.

In the absence of specific provincial policies and guidelines on the development of exclusive bus transit systems noise impact, a written submission was made to the MOE based on the discussions with MOE staff. Appendix E contains a copy of the letter prepared by this firm to the MOE which contains a brief description of the suggested methodology and the sound level criteria specific to this project.

The following summarizes the tentative criteria verbally endorsed by the MOE for the proposed Mississauga Busway:

(a) Bus Movements Between Stations

The Busway impact should be characterized by developing the 2 descriptors Leq 16 hour (daytime) and the Leq 8

hours (night-time), i.e. 07:00-23:00 and 23:00-07:00 Leq values. This approach seems reasonable since the AM and PM peak bus activities will occur at the same time as that due to the ambient/background vehicular traffic on other roads. Similarly low ambient on Sundays will correspond with low Sunday bus service anyway, therefore, no additional calculations will be needed for the weekend case.

The calculated Busway Leq 16 and Leq 8 should then be compared against the MOE general objective of; the higher of both: Leq 55 dBA or the ambient/background due to vehicular traffic elsewhere; i.e. use the same principles included in the MOE/MTO Protocol for Highway Noise Assessments. A maximum excess of 5 dB to be applied (to be consistent with the MOE/MTO Protocol) for this transit system which may be equated to a new roadway.

(b) Station Noise

All sources within a station (with the exception of a simple road side bus stop) should be treated as a Stationary Source that is subject to the MOE's Publications NPC-105 and NPC-106 (i.e. the higher of either the ambient or the NPC-106-2 Table).

The following exceptions or variations are recommended for this specific project:

(i) The assessment to be performed in terms of the Leq 16 and Leq 8 in order to be consistent with the busway impact between stations. The general activities in a bus station are expected to follow the ambient activities, therefore 16 hour and 8 hour averages may be used.

(ii) The excess that may be allowed by the MOE for the busway may also be allowed for the stations as well as for the combined effect of stations plus the busway. Therefore, if the 5 dB MOE/MTO Protocol excess or any other excess is allowed, the proposed stations and the combined effect of stations and busway may also be allowed the same excess.

4.2 SOUND LEVEL CRITERIA FOR CONSTRUCTION EQUIPMENT

Sound levels generated by construction equipment are assessed against the Ontario Ministry of the Environment Publication NPC-115 "Construction Equipment" and Publication NPC-118, "Motorized Conveyances". These publications do not set overall or combined sound level limits due construction sites but set limits for noise generated by the individual pieces of

equipment used on construction sites. M.O.E. approval will be based on whether or not the equipment used on site meets their requirements. (Copies of M.O.E. publications NPC-115 and NPC-118 are included as Appendix D.

For example, the M.O.E. specifies that the maximum sound emission level from excavation equipment loaders and dozers not exceed 85 dBA at 7m for equipment having 75 kw and larger power rating if manufactured after January 1, 1981.

With respect to truck noise, the governing criteria are contained in the Federal Government safety test standards for manufacturing of new trucks included in their publication titled "SECTION 1106-Noise Emission Tests For Motor Vehicles, and the relevant Consolidated Regulations of Canada, 1978 amended by SOP-179-115, September 1, 1979: Section 1106". Typical trucks maximum sound emission level is 83 dBA for a vehicle gross weight of over 4500 kg.

TABLES

TABLE 1
PREDICTED SOUND LEVELS AT THE BUSWAY STATIONS[1]
WORST CASE RECEPTORS

Location/Station	Predicted Sound Levels (dBA)				Excess Over future Ambient Sound Levels (dB)	Mitigation[5]
	Future Ambient[2] (Do-Nothing)	Station Activities[3]	Busway Traffic	Total Combined Sound Levels[4]		
<u>West of City Centre</u>						
Ridgeway	59	51	43	60	+1	Not Required
Winston Churchill	60	54	53	62	+2	Not Required
Glen Erin*	62	57	52	64	+2	Not Required
Erin Mills*	61	58	58	64	+3	Not Required
Mississauga Road	57	47	48	58	+1	Not Required
Erindale/Creditview	65	60	51	66	+1	Not Required
Mavis	62	53	53	63	+1	Not Required
<u>East of City Centre</u>						
Central Parkway	63	56	60	65	+2	Not Required
Cawthra	53	45	45	54	+1	Not Required
Tomken	56	51	51	58	+2	Not Required
Dixie	56	52	49	58	+2	Not Required
Fieldgate**	45	46	46	50	+5	Not Required
Spectrum/Satellite	64	61	53	66	+2	Not Required
Orbitor/Explorer	64	61	53	66	+2	Not Required
Renforth	63	54	N/A	64	+1	Not Required

(1) Sound levels predicted at Receptor Locations in the vicinity of the stations.
(2) Future ambient sound levels are due to vehicular traffic on Highway no. 403 and local roads.
(3) Station activities include :
  (a) Local and Busway buses entering into, exiting from, manoeuvring and idling within the station boundaries as well as Cars entering into, exiting from and idling within the Kiss & Ride and Park & Ride Facilities (where applicable).
(4) Total Combined Sound Levels refers to future ambient sound levels combined with both station activities sound levels and Busway traffic sound levels.
(5) Pending MOE Approval of 5 dBA excess.

*North alignment. **Worst case location (E1, E2, E3 & E4 busway option)

TABLE 1.a
PREDICTED SOUND LEVELS AT KEY STATIONS[1]
SOUTH ALIGNMENT

Location/Station	Predicted Sound Levels (dBA)				Excess Over future Ambient Sound Levels (dBA)	Mitigation[5]
	Future Ambient[2] (Do-Nothing)	Station Activities[3]	Busway Traffic	Total Combined Sound Levels[4]		
Glen Erin	62	57	47	63	+1	Not Required
Erin Mills Parkway	61	52	55	62	+1	Not Required

Notes :
(1) Sound levels predicted at Receptor Locations in the vicinity of the stations that are likely to have the highest impact.
(2) Future ambient sound levels are due to vehicular traffic on Highway no. 403 and local roads.
(3) Station activities include :
  (a) Local and Busway buses entering into, existing from, manoeuvring and idling within the station boundaries.
  (b) Cars entering into, exiting from and idling within the Kiss & Ride and Park & Ride Facilities (where applicable).
(4) Total Combined Sound Levels refer to future ambient sound levels combined with both station activities sound levels and Busway traffic sound levels.
(5) Pending MOE Approval of 5 dBA excess.

TABLE 2
PREDICTED SOUND LEVELS DUE TO BUSWAY TRAFFIC[1]
WORST CASE RECEPTORS

Link From To	Receptor	Predicted Sound Levels (dBA)			Excess Over future Ambient Sound Levels (dB)	Mitigation
		Future Ambient[2] (Do-Nothing)	Busway Traffic	Total Combined Sound Levels[3]		
Ridgeway Winston Churchill	A2	60	62	64	+4	Not Required
Winston Churchill Glen Erin	A5	62	54	63	+1	Not Required
Glen Erin Erin Mills	A11	57	54	59	+2	Not Required
Erin Mills Mississauga Road	A15	57	61	62	+5	Not Required
Erin Mills Mississauga Road (South Alignment)	A17	61	56	62	+1	Not Required
Mississauga Road Erindale/Creditview	A24	63	52	63	0	Not Required
Erindale/Creditview Mavis	A30	67	64	69	+2	Not Required
Mavis** Confedration	B3	62	55	63	+1	Not Required
Hurontario Central Parkway	B6	67	62	68	+1	Not Required

Link From To	Receptor	Predicted Sound Levels (dBA)			Excess Over future Ambient Sound Levels (dB)	Mitigation
		Future Ambient[2] (Do-Nothing)	Busway Traffic	Total Combined Sound Levels[3]		
Central Parkway Cawthra	B11	62	56	63	+1	Not Required
Cawthra Tomken	B14	58	45	58	0	Not Required
Tomken Dixie	C3	48	52	53	+5	Not Required
Dixie Fieldgate	C7	49	49	52	+3	Not Required
Fieldgate Spectrum/Satellite++	Typical Receptor	61	53	62	+1	Not Required
Spectrum/Satellite Orbitor/Renforth++	Typical Receptor	61	53	62	+1	Not Required

(1) Sound levels predicted at receivers Locations in the vicinity of the proposed busway with no impact from stations activities.
(2) Future ambient sound levels are due to vehicular traffic on Highway no. 403 or its arterial.
(3) Total Combined Sound Levels refers to future ambient sound levels combined with and Busway traffic sound levels.

** East of City Centre.
++ Along Eglinton Avenue.

TABLE 3

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS WEST OF RIDGEWAY ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A1	80 m WEST OF RIDGEWAY	59	53	40	60	+1	0	+1	MARGINAL

TABLE 4

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN RIDGEWAY ROAD AND WINSTON CHURCHILL BLVD.

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A2	NORTH OF HIGHWAY 403	60	62	N/A	64	+4	0	+4	LOW
A3	UNITY DRIVE	56	38	N/A	56	0	0	0	N/A
A4	NORTH OF STATION	60	43	54	61	0	+1	+1	MARGINAL

TABLE 5

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS WINSTON CHURCHILL BLVD. AND GLEN ERIN DRIVE

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A5	AMBERCROFT TRAIL	62	54	N/A	63	0	0	+1	MARGINAL
A6	REMEA Ct.	61	40	N/A	61	0	0	0	N/A
A6b	THOM GDS.	60	42	44	60	0	0	0	N/A
A7	ROMFIELD CR.	62	52	57	64	0	+1	+2	MARGINAL

TABLE 6

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN GLEN ERIN DRIVE AND ERIN MILLS PARKWAY

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A8	TREETOP Ct.	61	46	N/A	61	0	0	0	N/A
A9	MARSHDALE Ct.	62	60	51	63	+1	0	+1	MARGINAL
A10	RADISSON Cr.	59	58	58	62	+3	+3	+3	MARGINAL
A11	FOLKWAY Dr.	57	54	N/A	58	+2	0	+1	MARGINAL
A12	RADISSON Cr.	61	58	58	63	+2	+2	+2	MARGINAL

TABLE 7

Leq (16 Hr.) SOUND LEVELS IN dBA AT
RECEPTORS BETWEEN ERIN MILLS PARKWAY AND MISSISSAUGA ROAD
NORTH ALIGNMENT

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A13	HAYDOCK PARK Dr.	61	53	N/A	61	0	0	0	N/A
A14	HAYDOCK PARK Dr.	61	62	N/A	65	+4	0	+4	LOW
A15	SLEDGFIELD RD.	57	61	N/A	62	+5	0	+5	LOW
A16	FOLKWAY Dr.	58	50	N/A	59	+1	0	+1	MARGINAL
A17	ALDERMEAD RD.	61	56	N/A	62	+1	0	+1	MARGINAL
A18	POWDER HORN CT.	67	55	N/A	67	0	0	0	N/A
A19	TYPICAL HOUSE LOCATION	57	48	47	58	0	0	+1	MARGINAL
A20	TYPICAL HOUSE LOCATION	58	48	46	59	0	0	+1	MARGINAL

TABLE 7.a

Leq (16 Hr.) SOUND LEVELS IN dBA AT
RECEPTORS BETWEEN ERIN MILLS PARKWAY AND MISSISSAUGA ROAD
SOUTH ALIGNMENNT

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A13	HAYDOCK PARK Dr.	61	53	N/A	62	+1	0	+1	MARGINAL
A14	HAYDOCK PARK Dr.	61	52	N/A	62	+1	0	+1	MARGINAL
A15	SLEDGFIELD RD.	57	52	N/A	58	+1	0	+1	MARGINAL
A16	FOLKWAY Dr.	58	51	N/A	59	+1	0	+1	MARGINAL
a17	ALDERMEAD RD.	61	56	N/A	62	+1	0	+1	MARGINAL
A18	POWDER HORN CT.	67	55	N/A	67	0	0	0	N/A
A19	TYPICAL HOUSE LOCATION	57	48	47	58	0	0	+1	MARGINAL
A20	TYPICAL HOUSE LOCATION	58	48	46	59	0	0	+1	MARGINAL

TABLE 8

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN MISSISSAUGA ROAD AND CREDIT VIEW ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A22	BRIDEWELL CT.	62	48	N/A	62	0	0	0	N/A
A23	TYPICAL HOUSE LOCATION	65	54	N/A	65	0	0	0	N/A
A24	TYPICAL HOUSE LOCATION	63	52	N/A	63	0	0	0	N/A
A25	ROSEBUSH RD.	65	53	60	66	0	+1	+1	MARGINAL
A26	MELIA DR.	62	51	49	62	0	0	0	N/A

TABLE 9

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN CREDIT VIEW ROAD AND MAVIS ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
A27	ROSE HAVEN RD.	65	52	N/A	65	0	0	0	N/A
A28	WHITE SPRUCE COURT	65	48	N/A	65	0	0	0	N/A
A29	ROSE HAVEN RD.	60	53	N/A	61	0	0	+1	MARGINAL
A30	TYPICAL HOUSE LOCATION	67	64	N/A	69	+2	0	+2	MARGINAL
A31	BEACON LANE	64	42	N/A	64	0	0	0	N/A

TABLE 10

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS WEST OF MAVIS ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
B1	TYPICAL HOUSE LOCATION	62	53	53	63	+1	+1	+1	MARGINAL
B2	WAKEFIELD CR.	62	52	N/A	62	0	0	0	N/A

TABLE 11

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN MAVIS ROAD AND CONFEDRATION PARKWAY

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
B3	FARWELL CR.	62	55	N/A	63	+1	0	+1	MARGINAL
B4	GREENPARK CR.	63	50	N/A	63	0	0	0	N/A
B5	MAYFLOWER DR.	61	48	N/A	61	0	0	0	N/A

TABLE 12

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN HURONTARIO STREET AND CENTRAL PARKWAY

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
B6	CHALFIELD LANE	67	62	N/A	68	+1	0	+1	MARGINAL
B7	LAURENTIAN AVE.	64	49	N/A	64	0	0	0	N/A
B8	ALTA CR.	60	60	56	64	+3	0	+4	LOW

TABLE 13

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN CENTRAL PARKWAY AND CAWTHRA ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
B9	TYPICAL APARTMENT LOCATION	67	60	56	68	+1	0	+1	MARGINAL
B10	FULL MOON Cr.	62	47	N/A	62	0	0	0	N/A
B11	TYPICAL TOWNHOUSE LOCATION	62	56	N/A	63	+1	0	+1	MARGINAL
B12	WILCOX RD.	64	44	N/A	64	0	0	0	N/A

TABLE 14

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN CAWTHRA ROAD AND TOMKEN ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
B13	FOREST FIRE LANE	61	46	49	61	0	0	0	N/A
B14	SHELBY Cr.	58	45	N/A	58	0	0	0	N/A

TABLE 15

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN TOMKEN ROAD AND DIXIE ROAD

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
C1	HIGHGATE PLACE	48	48	N/A	51	+3	0	+3	MARGINAL
C2	HIGHGATE PLACE	49	50	N/A	53	+4	0	+4	LOW
C3	FEWSTER DRIVE	48	52	N/A	53	+5	0	+5	LOW
C4	UNDERWOOD DRIVE	57	50	52	59	+1	0	+2	MARGINAL
C5	FEWSTER DRIVE	56	51	N/A	57	+1	0	+1	MARGINAL

TABLE 16

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS BETWEEN DIXIE ROAD AND FIELDGATE DRIVE

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
C6	LEE DRIVE.	50	46	N/A	51	+1	0	+1	MARGINAL
C7	HIGHGATE PLACE	49	49	N/A	52	+3	0	+3	MARGINAL
C8	FEWSTER DRIVE	47	45	N/A	49	+2	0	+2	MARGINAL
C9	UNDERWOOD DRIVE	62	43	N/A	62	0	0	0	N/A

TABLE 17

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS EAST OF FIELDGATE DRIVE

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
C10	AUDOBON BLVD.	54	48	46	55	+1	0	+1	MARGINAL
C11	AUDOBON BLVD.	49	50	44	53	+4	0	+4	LOW
C12	AUDOBON BLVD.	42	46	N/A	47	+5	0	+5	LOW

TABLE 18

Leq (16 Hr.) SOUND LEVELS IN dBA AT

TYPICAL RECEPTORS LOCATED ALONG THE PROPOSED BUSWAY BETWEEN EAST OF FIELDGATE DRIVE AND EGLINTON AVENUE.

RECEPTOR		AMBIENT	BUSWAY dBA	STATION
NAME	GRADE			
C13	AT GRADE	N/A	64	N/A
	BELOW GRADE 2m		60	
	BELOW GRADE 4m		60	
	BELOW GRADE 6m		57	
	BELOW GRADE 8m		55	
C14	AT GRADE	N/A	60	N/A
	BELOW GRADE 2m		57	
	BELOW GRADE 4m		57	
	BELOW GRADE 6m		56	
	BELOW GRADE 8m		54	
C15	AT GRADE	N/A	55	
	BELOW GRADE 2m		53	
	BELOW GRADE 4m		53	
	BELOW GRADE 6m		53	
	BELOW GRADE 8m		53	
C16	AT GRADE	N/A	50	N/A
	BELOW GRADE 2m		49	
	BELOW GRADE 4m		49	
	BELOW GRADE 6m		49	
	BELOW GRADE 8m		50	

TABLE 19

Leq (16 Hr.) SOUND LEVELS IN dBA AT

RECEPTORS EAST OF RENFORTH DRIVE

RECEPTOR		AMBIENT	BUSWAY	STATION	COMBINED	EXCESS OVER AMBIENT DUE TO:			IMPACT
NAME	LOCATION					BUSWAY	STATION	TOTAL	
C17	SEE FIGURE 23	63	N/A	54	64	N/A	+1	+1	MARGINAL

FIGURES

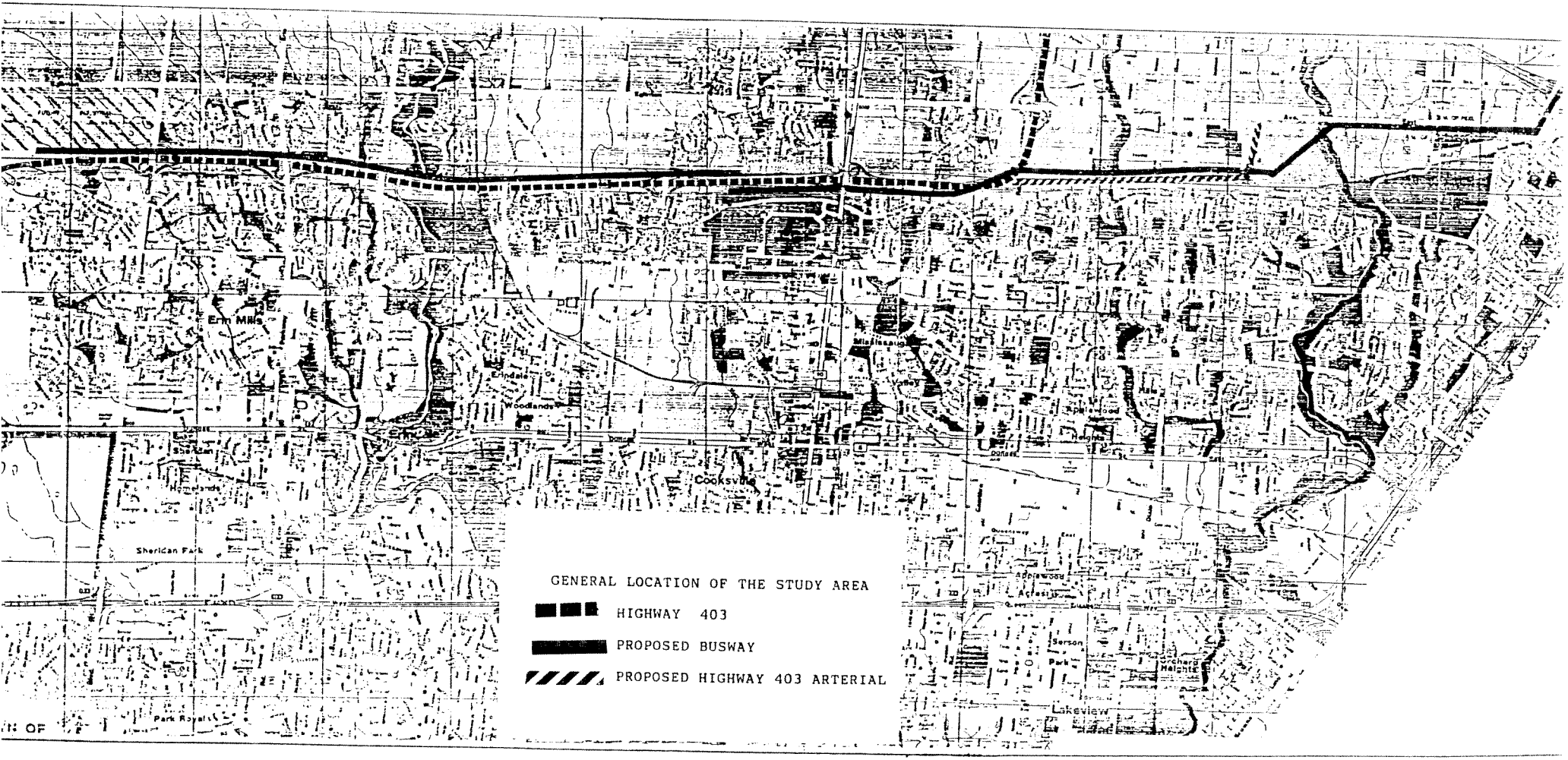

Erin Mills
Sheridan Park
Cooksville
Lakeview
GENERAL LOCATION OF THE STUDY AREA
HIGHWAY 403
PROPOSED BUSWAY
PROPOSED HIGHWAY 403 ARTERIAL

Figure 1

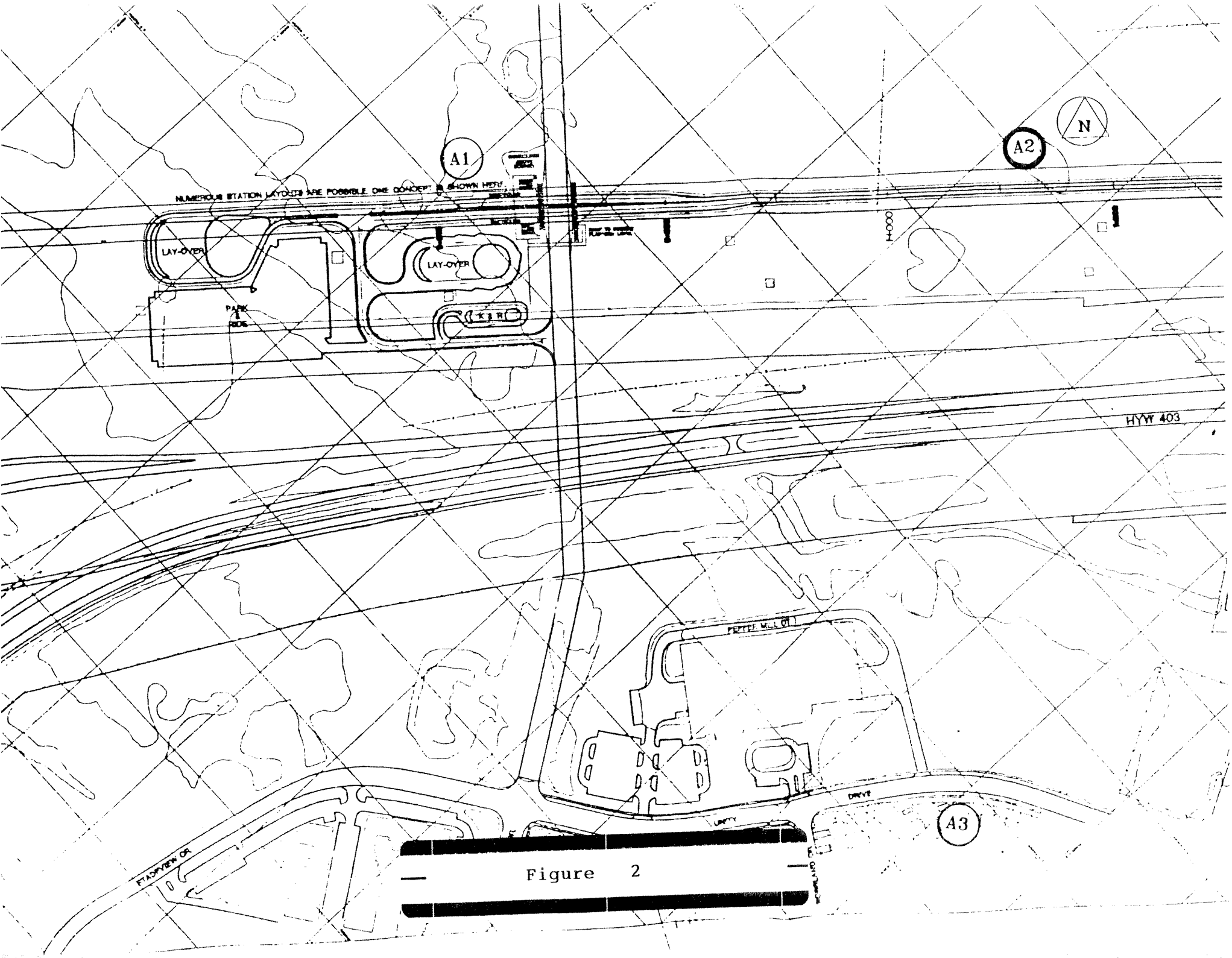


Figure 2

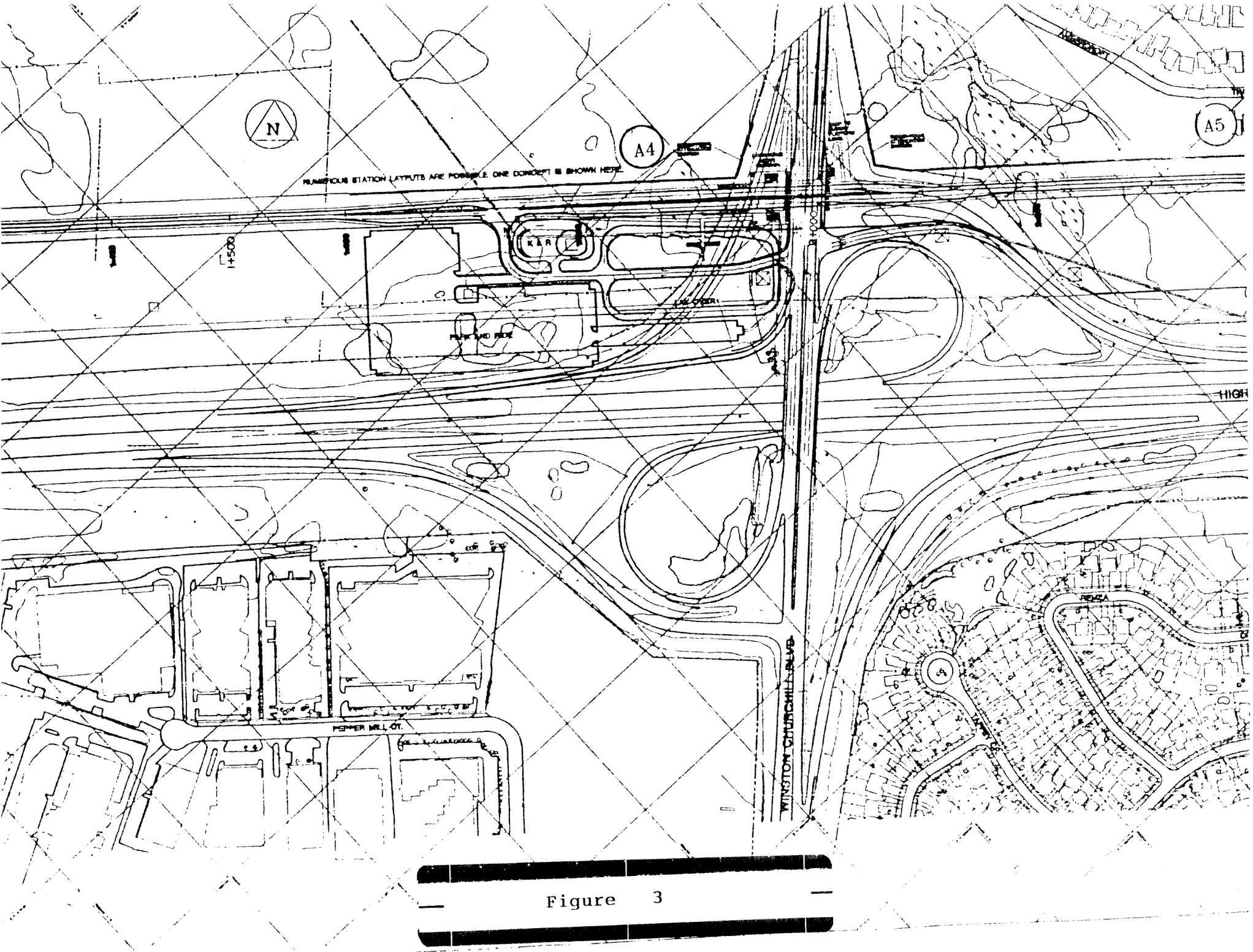

N
A4
A5
NUMEROUS STATION LAYOUTS ARE POSSIBLE. ONE CONCEPT IS SHOWN HERE.
1+500
K & R
PARK AND RIDE
WINSTON CHURCHILL BLVD.
FISHER MILL CT.
HIGH
RENISA

Figure 3

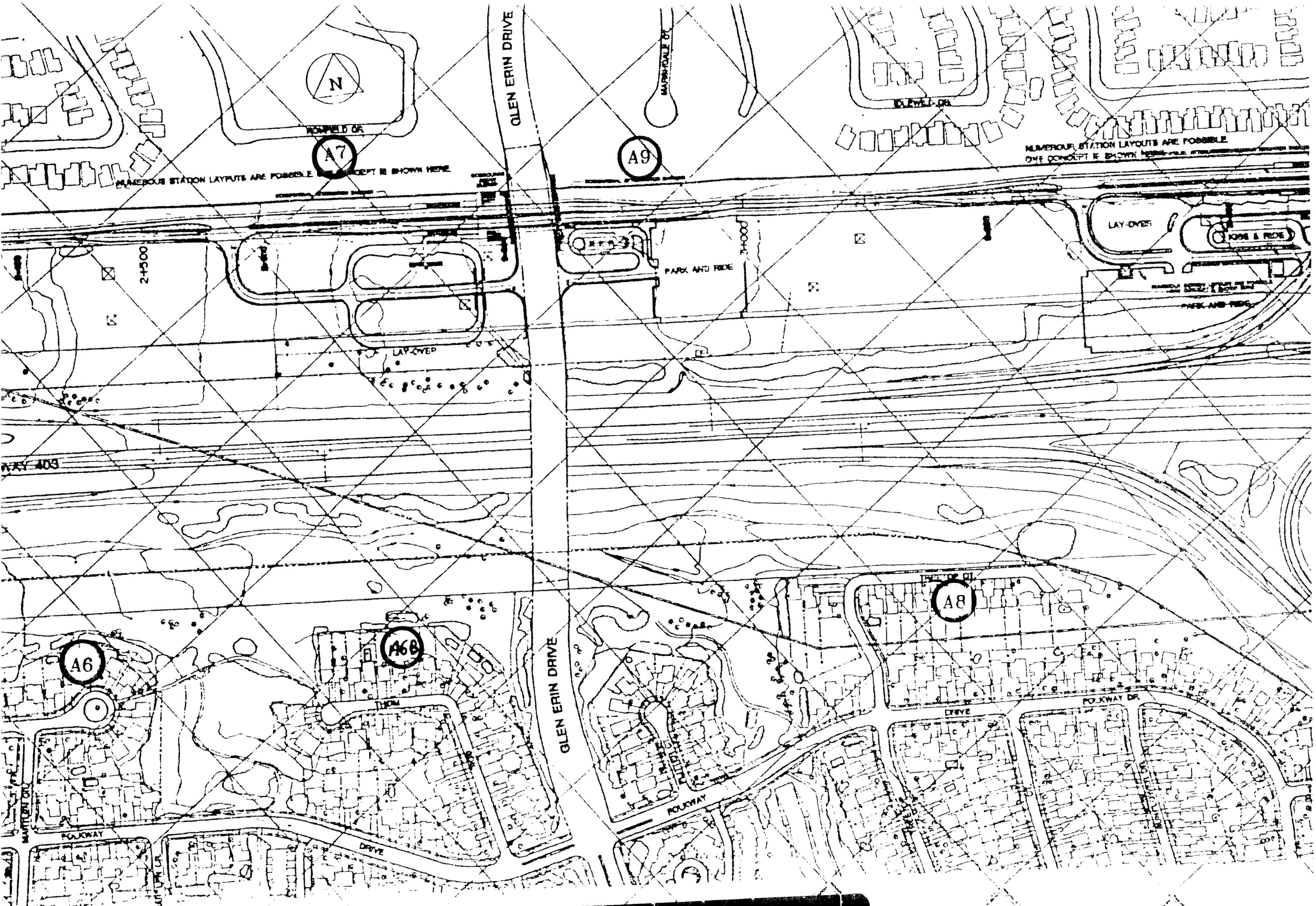
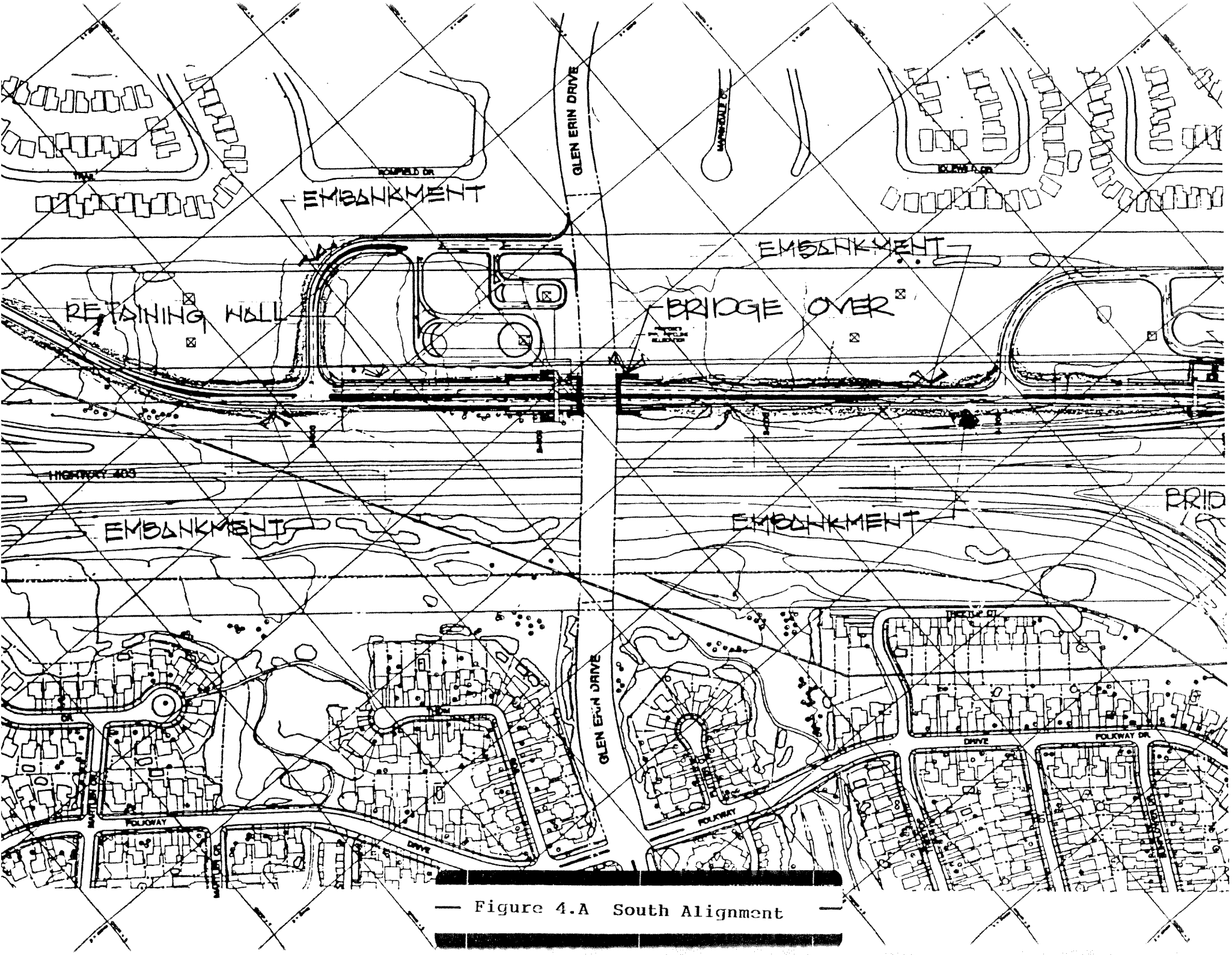

N
ROMFIELD DR.
A7
A9
A8
A6
A6B
GLEN ERIN DRIVE
NUMEROUS STATION LAYOUTS ARE POSSIBLE
LAY-OVER
PARK AND RIDE
2+500
3+000
POLKWAY
DRIVE
POLKWAY DR.

Figure 4



— Figure 4.A South Alignment —

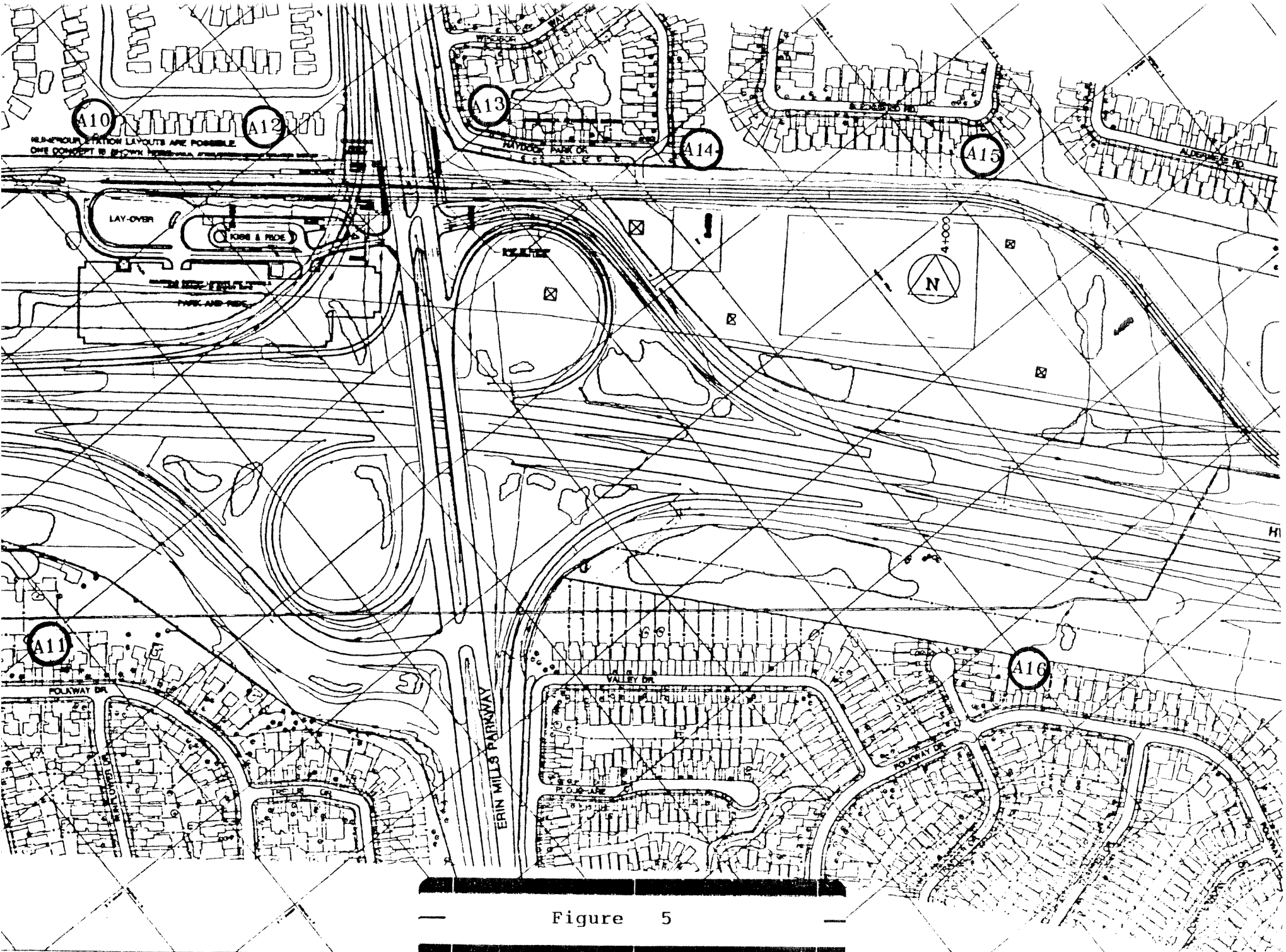

A10
A12
A13
A14
A15
A16
A11
LAY-OVER
KISS & RIDE
PARK AND RIDE
N
ERIN MILLS PARKWAY
VALLEY DR
POLKWAY DR

Figure 5

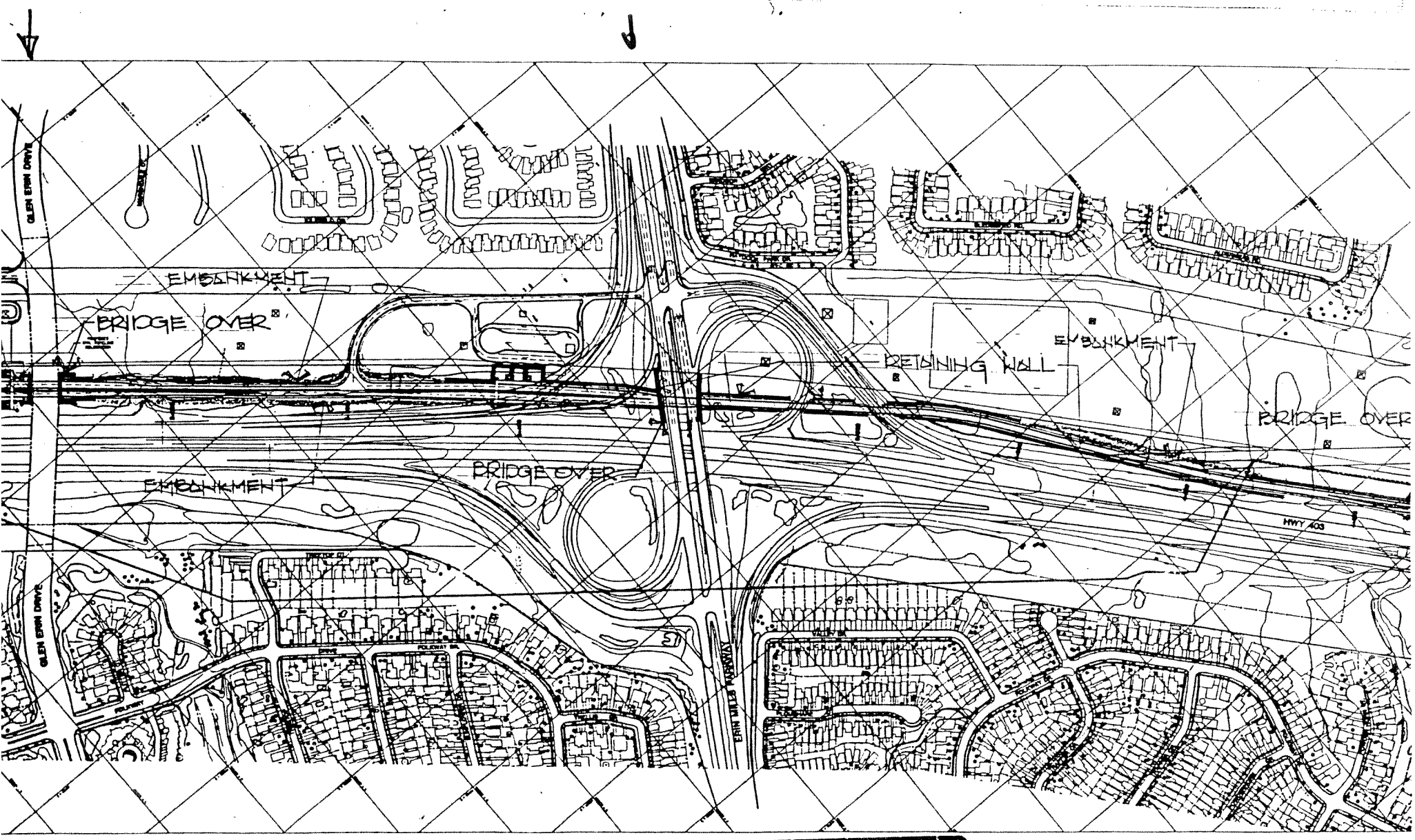


Figure 5.A South Alignment

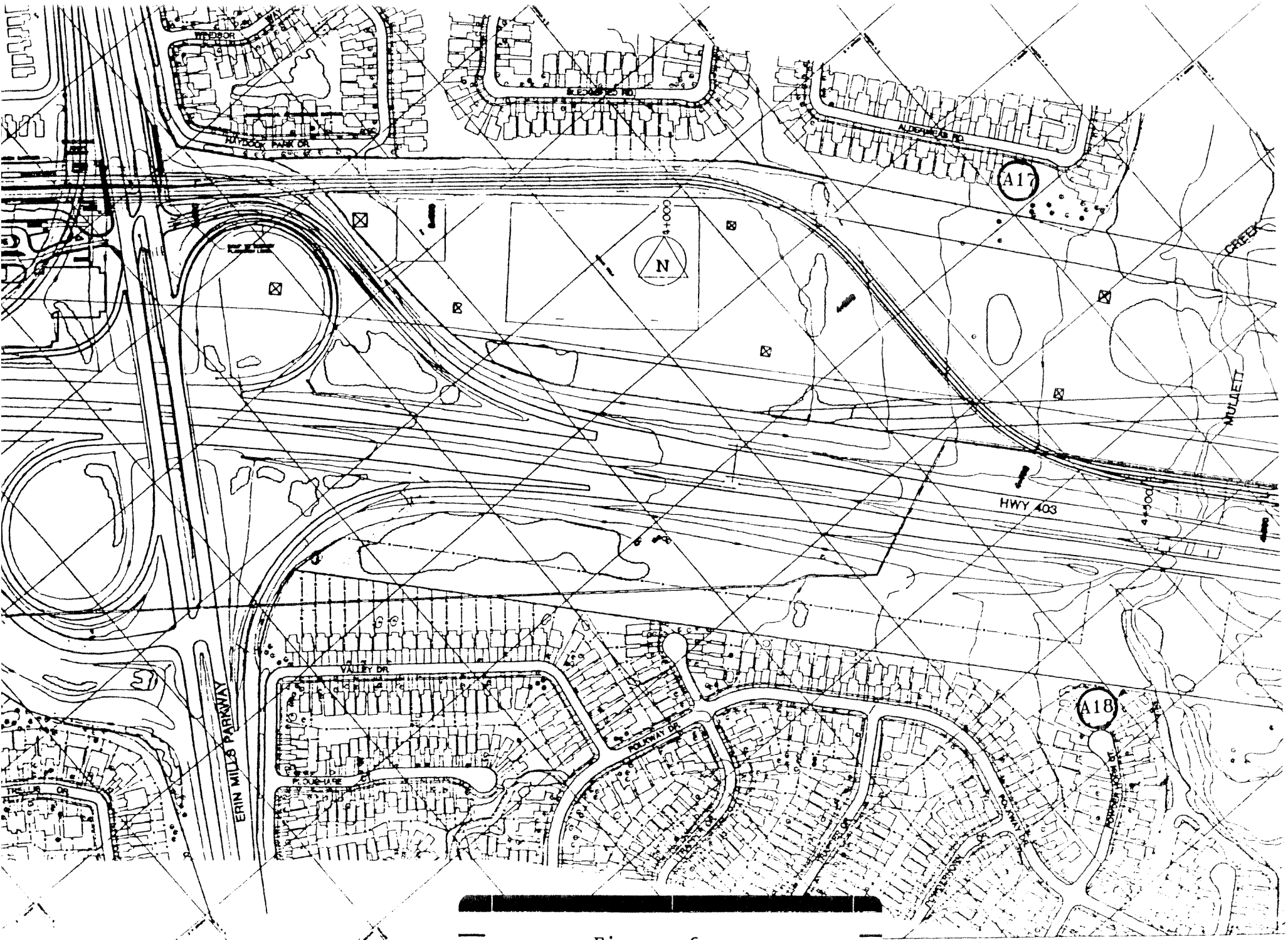

A17
A18
HWY 403
ERIN MILLS PARKWAY
VALLEY DR
POLWAY DR
MULLETT
CREEK
N

Figure 6

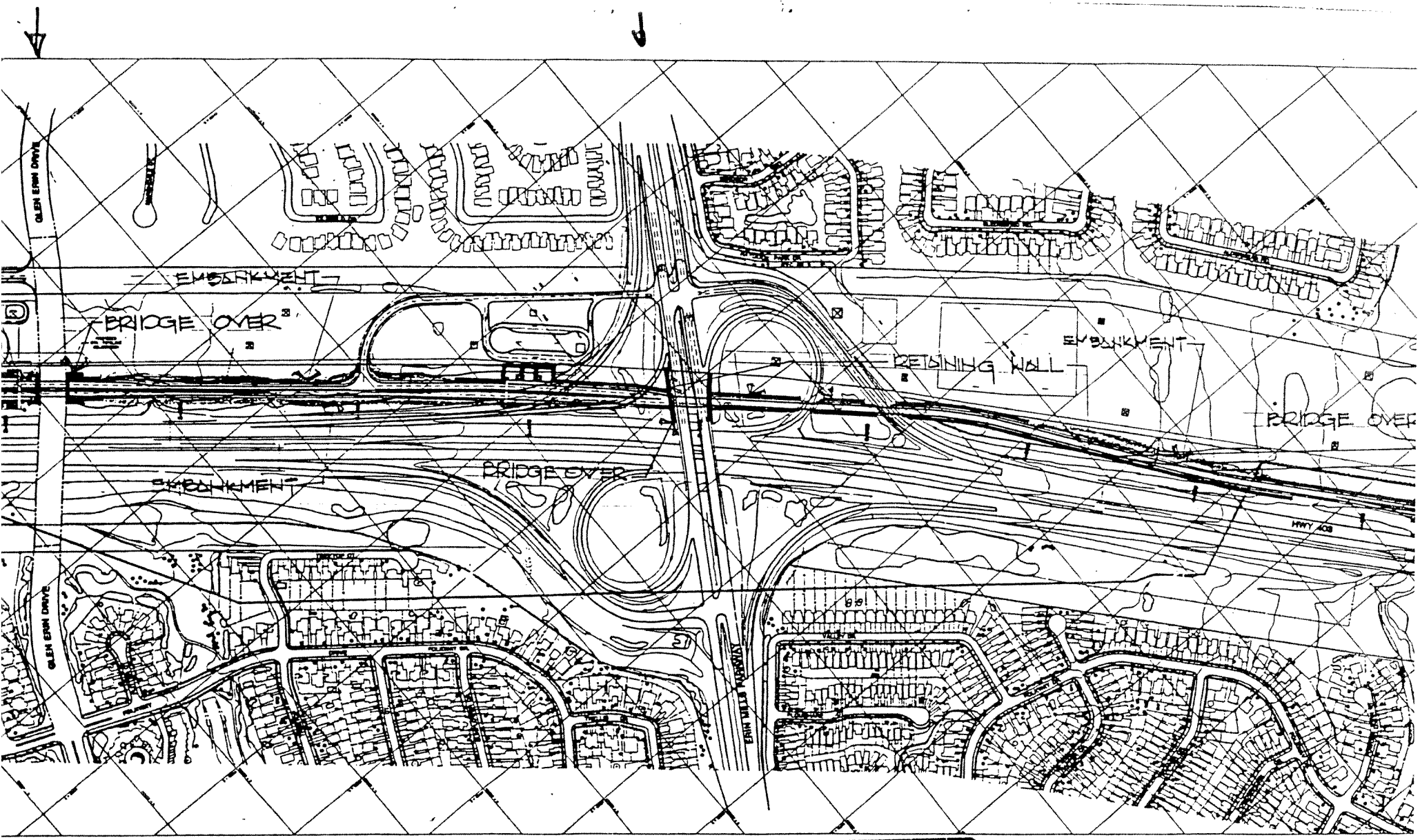


FIGURE 6.A South Alignment

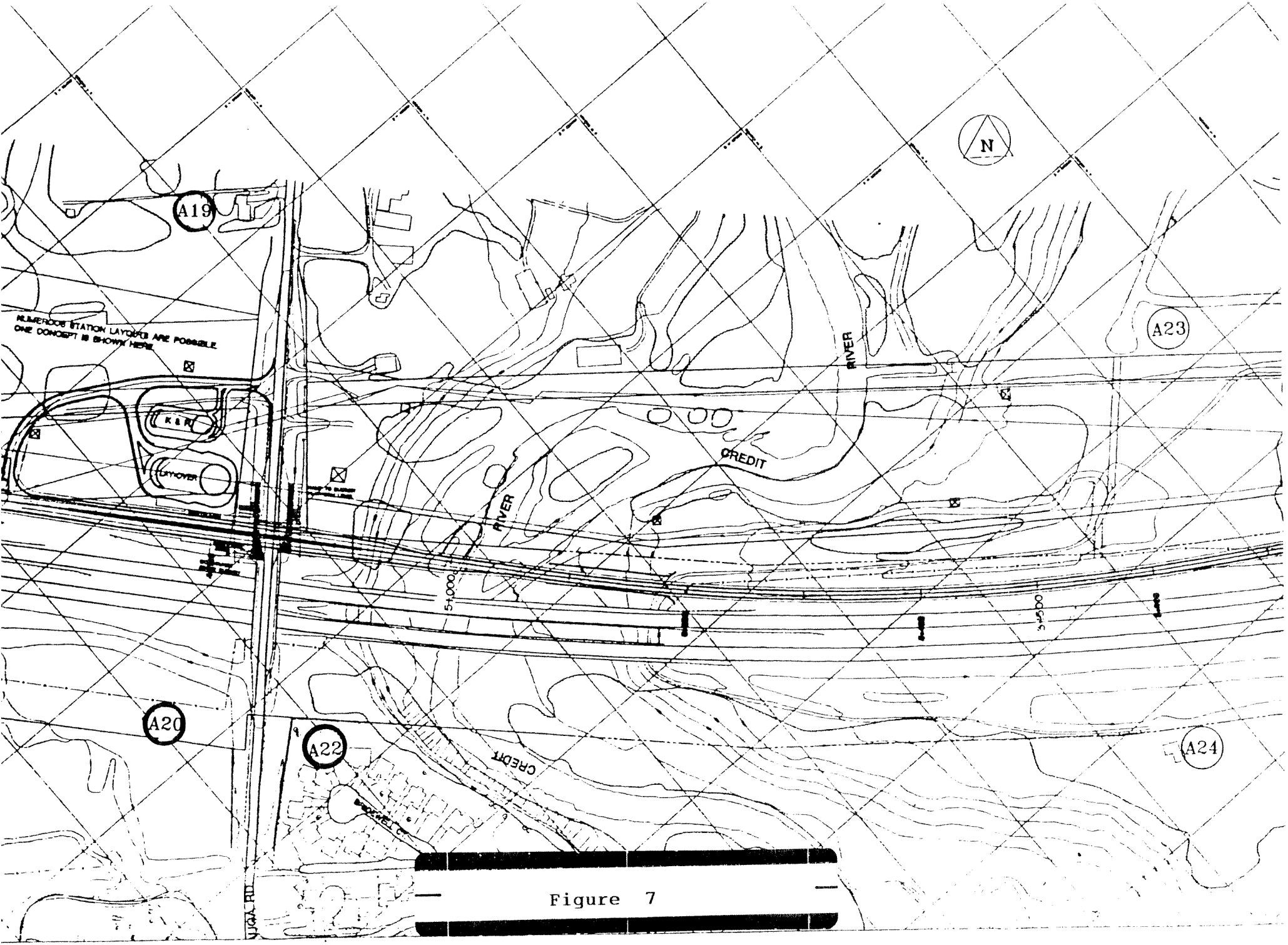

N
A19
A20
A22
A23
A24
RUMNEYDOOS STATION LAYOVER ARE POSSIBLE
ONE CONCEPT IS SHOWN HERE
R & R
LAY-OVER
CREDIT
RIVER
CREDIT
RIVER
5+000
3+500
BROWNELL CR.
UCA RD.

Figure 7

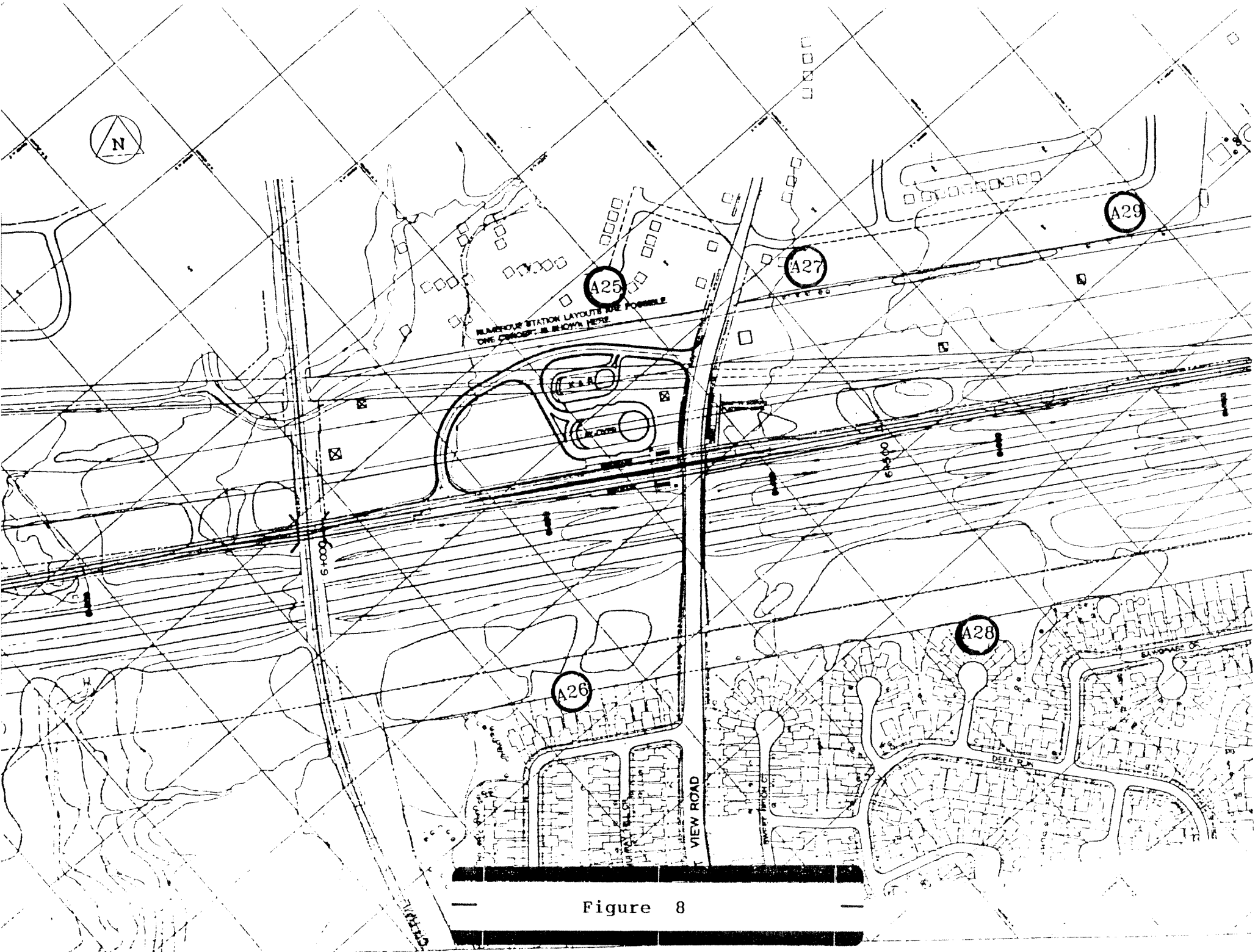


Figure 8

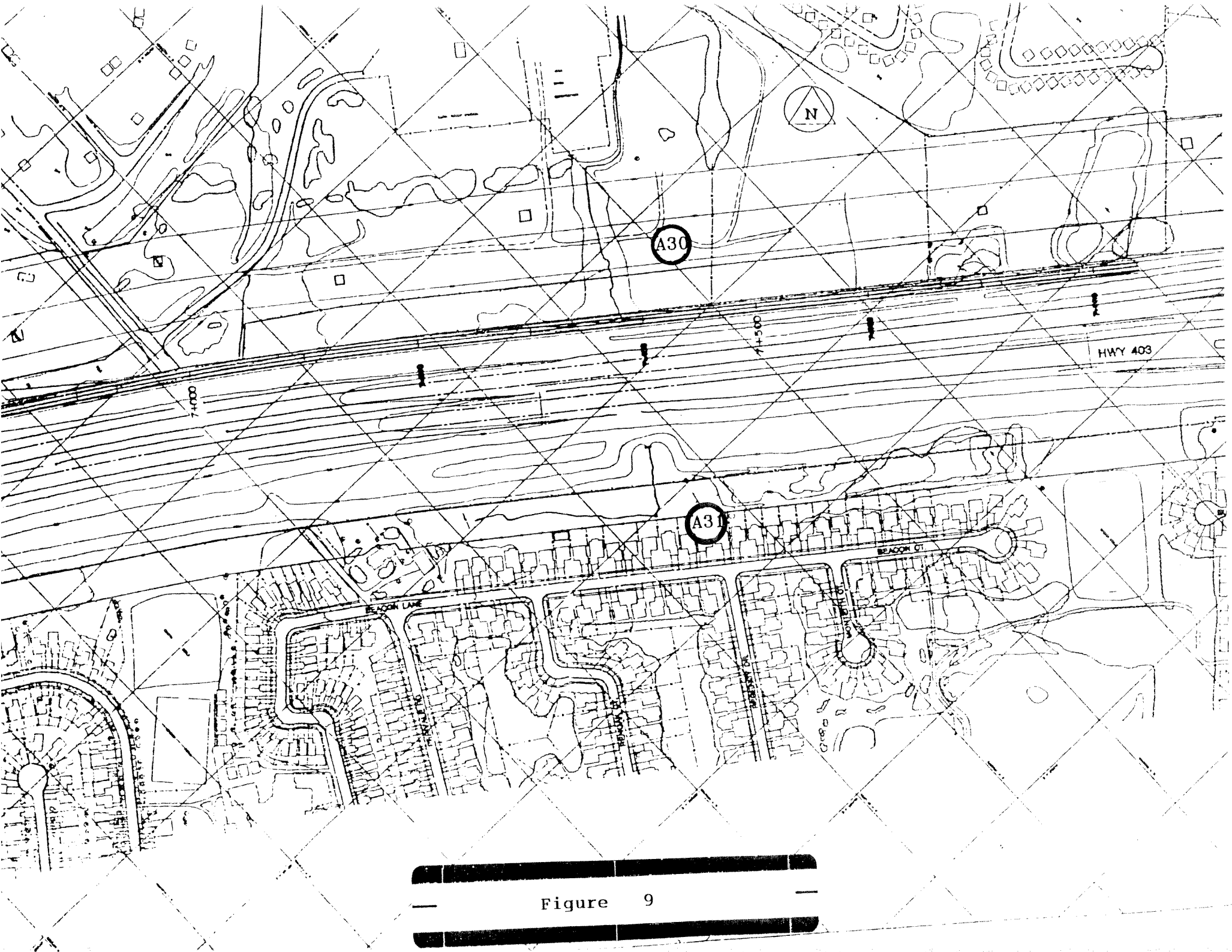


Figure 9

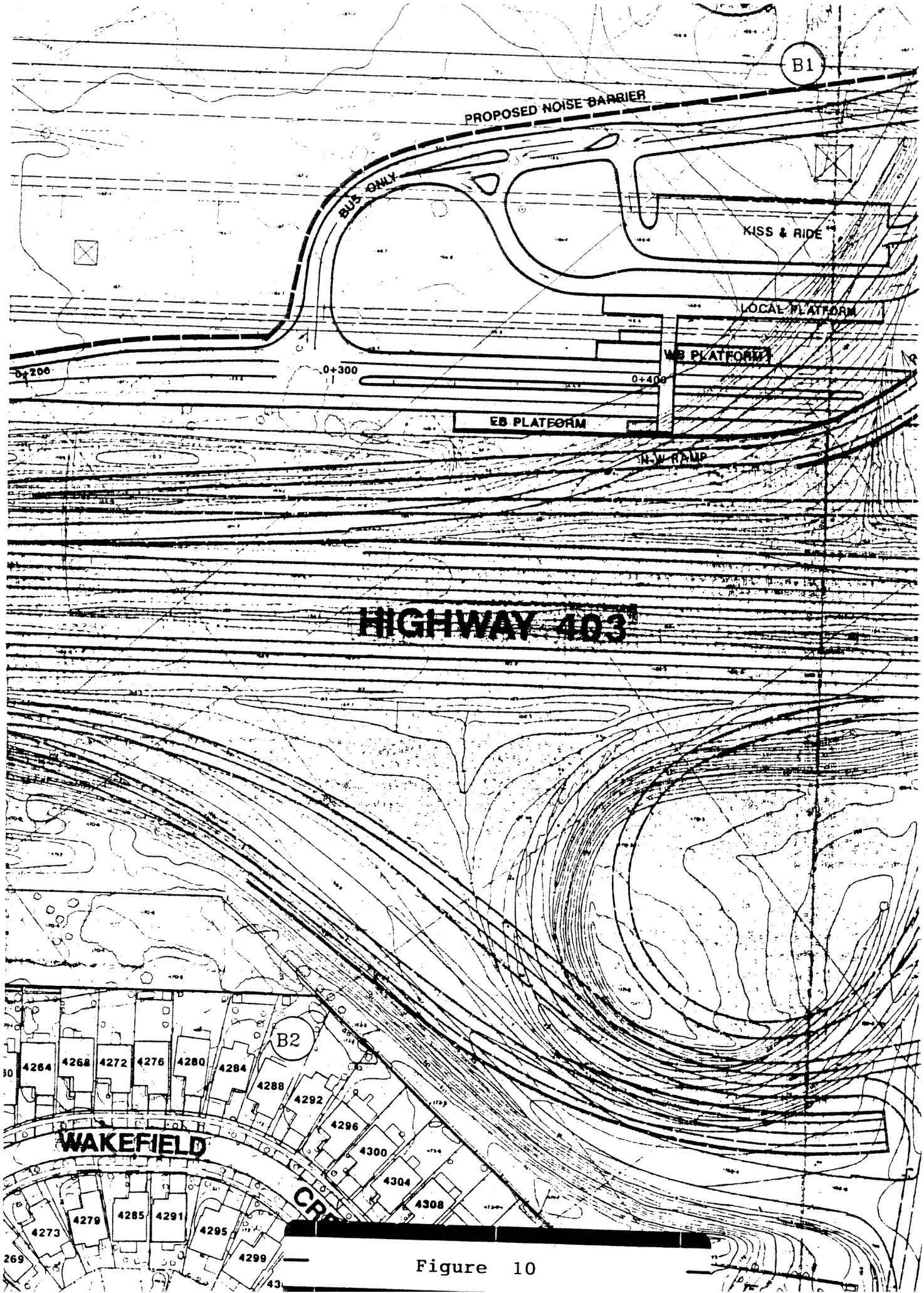

B1
PROPOSED NOISE BARRIER
BUS ONLY
KISS & RIDE
LOCAL PLATFORM
WB PLATFORM
0+200
0+300
0+400
EB PLATFORM
N-W RAMP
HIGHWAY 403
B2
4264
4268
4272
4276
4280
4284
4288
4292
4296
4300
4304
4308
WAKEFIELD
CR
4273
4279
4285
4291
4295
4299

Figure 10

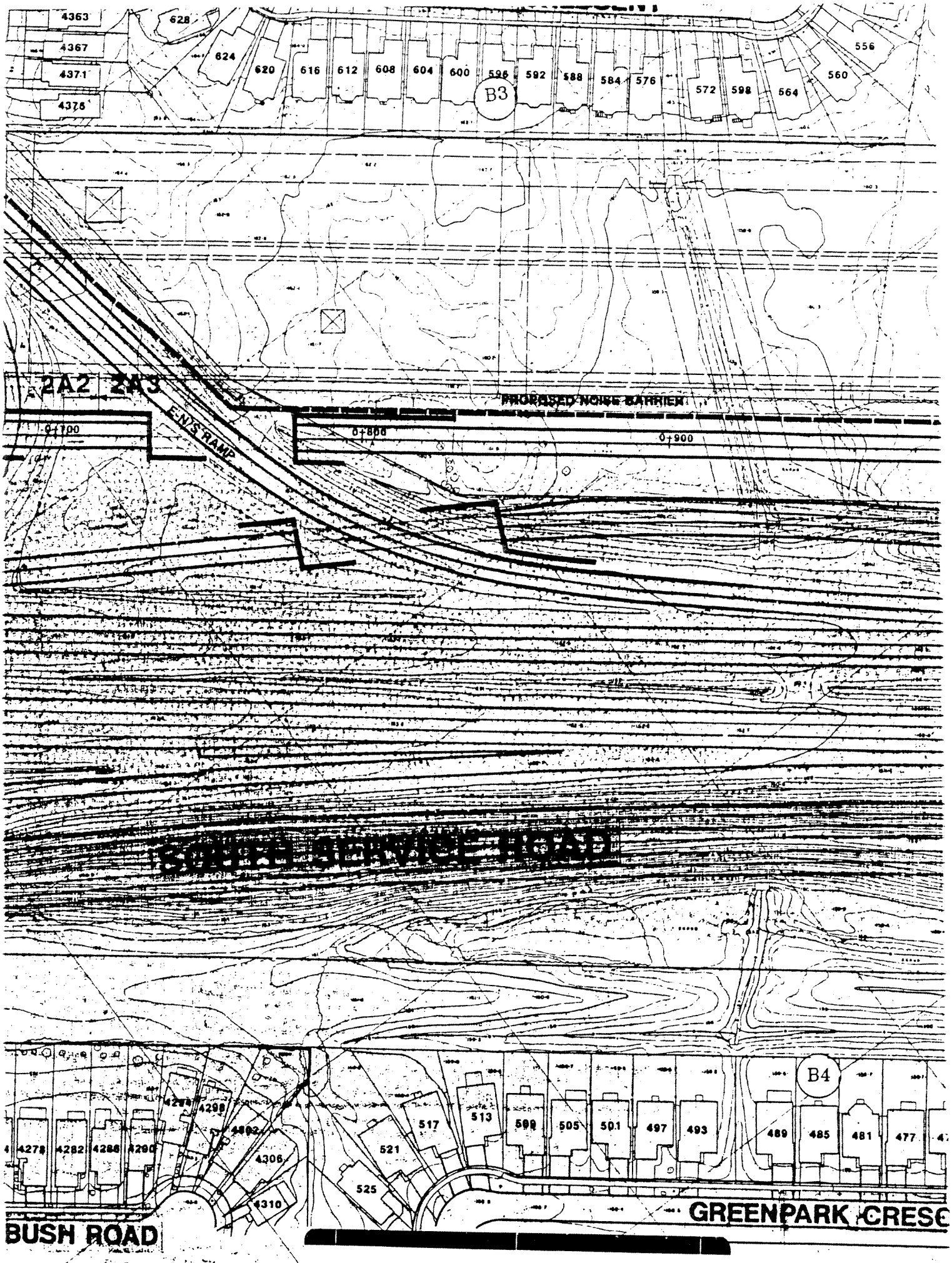

4363
4367
4371
4375
628
624
620
616
612
608
604
600
596
592
588
584
576
572
598
564
560
556
B3
2A2
2A3
PROPOSED NOISE BARRIER
E-N'S RAMP
0+700
0+800
0+900
SOUTH SERVICE ROAD
B4
4278
4282
4286
4290
4294
4298
4302
4306
4310
517
513
509
505
501
497
493
489
485
481
477
521
525
BUSH ROAD
GREENPARK CRESC

Figure 11

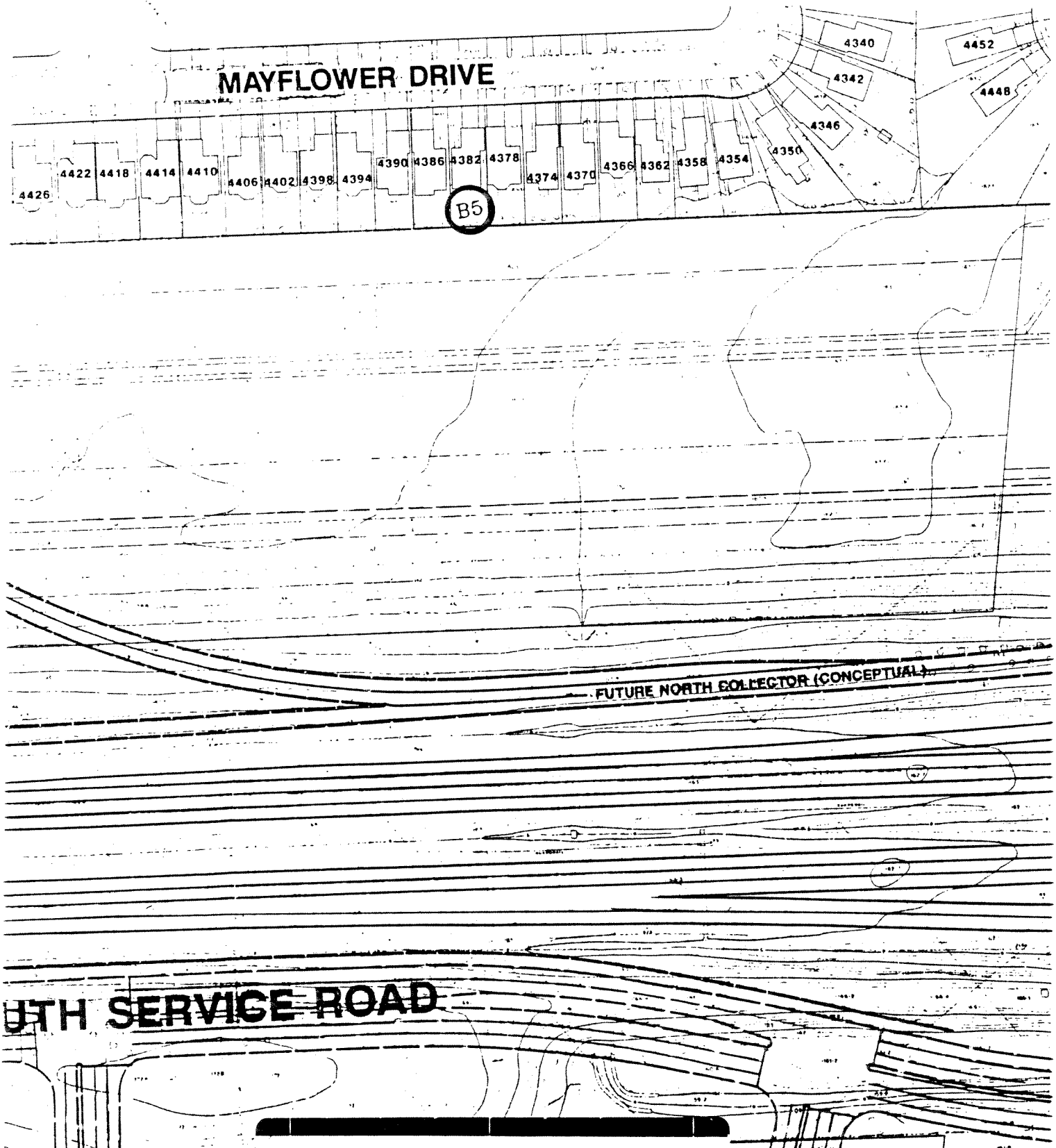

MAYFLOWER DRIVE
4340
4452
4342
4448
4346
4350
4422
4418
4414
4410
4406
4402
4398
4394
4390
4386
4382
4378
4374
4370
4366
4362
4358
4354
4426
B5
FUTURE NORTH COLLECTOR (CONCEPTUAL)
UTH SERVICE ROAD

Figure 12

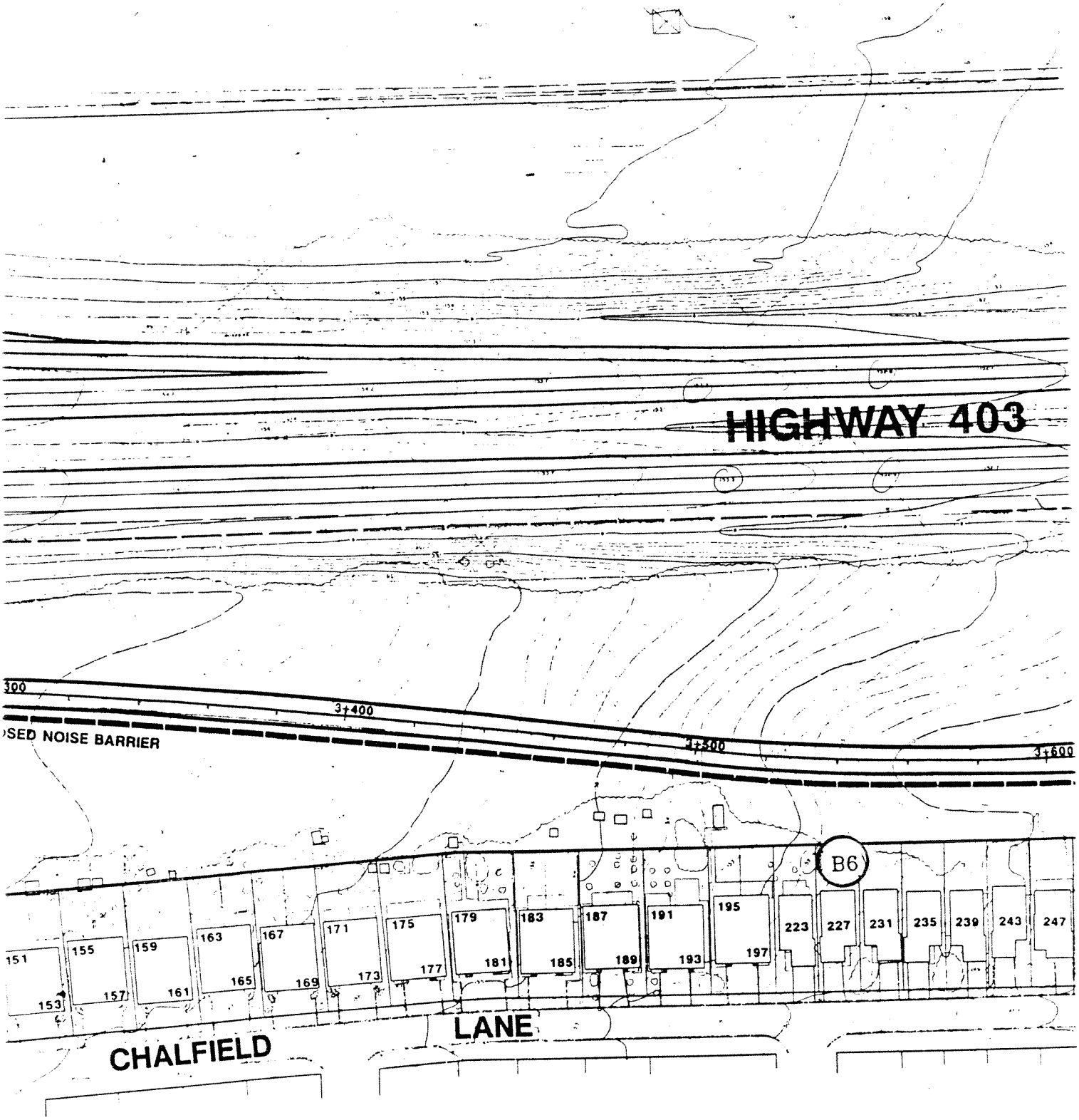

HIGHWAY 403
3+400
3+500
3+600
SED NOISE BARRIER
B6
151
153
155
157
159
161
163
165
167
169
171
173
175
177
179
181
183
185
187
189
191
193
195
197
223
227
231
235
239
243
247
CHALFIELD
LANE

Figure 13

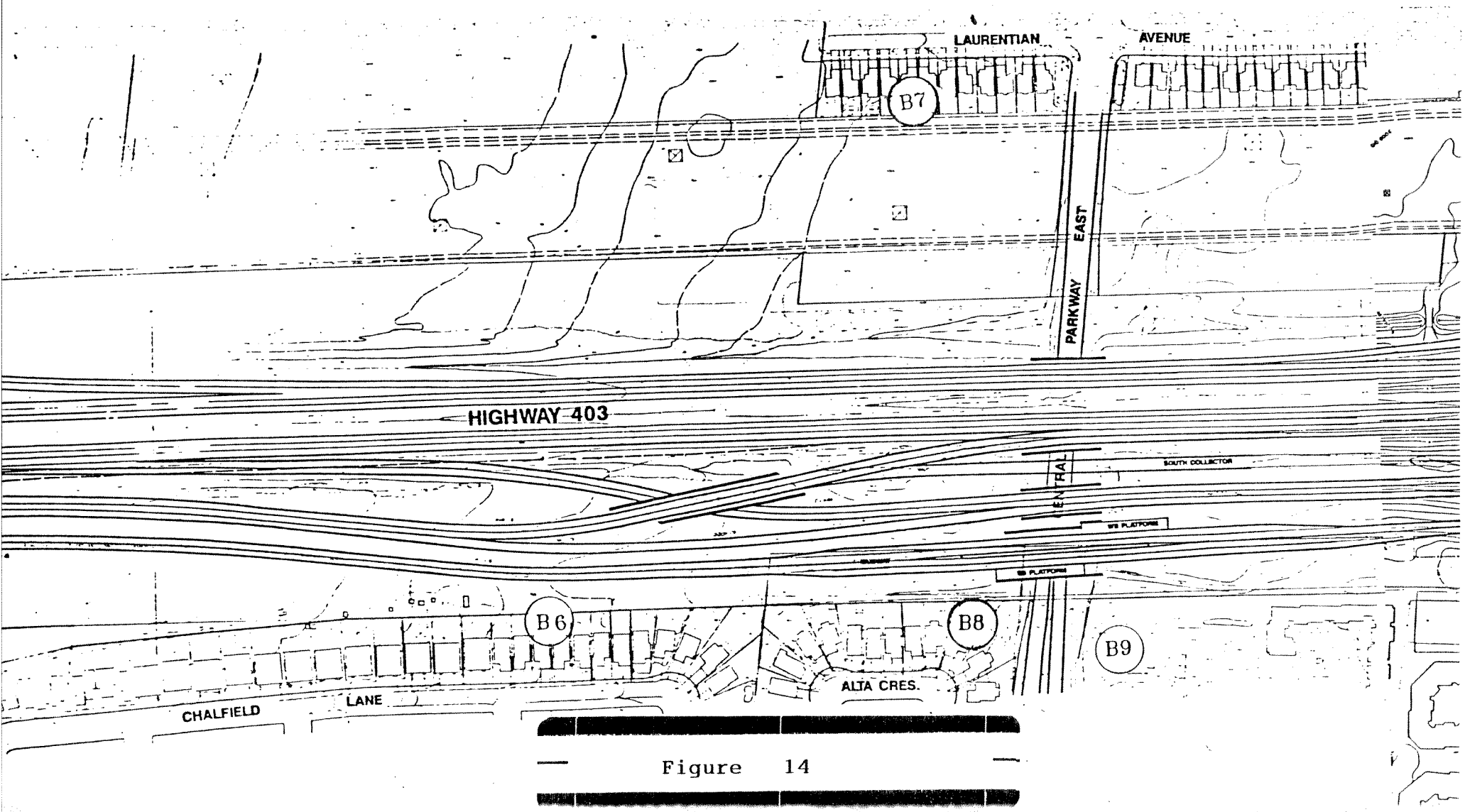

LAURENTIAN
AVENUE
B7
PARKWAY EAST
HIGHWAY 403
SOUTH COLLECTOR
B6
B8
B9
ALTA CRES.
CHALFIELD
LANE

Figure 14


AVENUE
ABERFOYLE COURT
FULL MOON CIRCLE
B10
NORTH
426
432
436
434
438
442
446
450
454
458
462
466
470
474
4385
4393
4397
4401
4405
4409
4413
4417
4421
4425
4429
4433
4437
4441
4445
4449
4453
4457
4461
4465
4469
4473
4481
4485

Figure 15

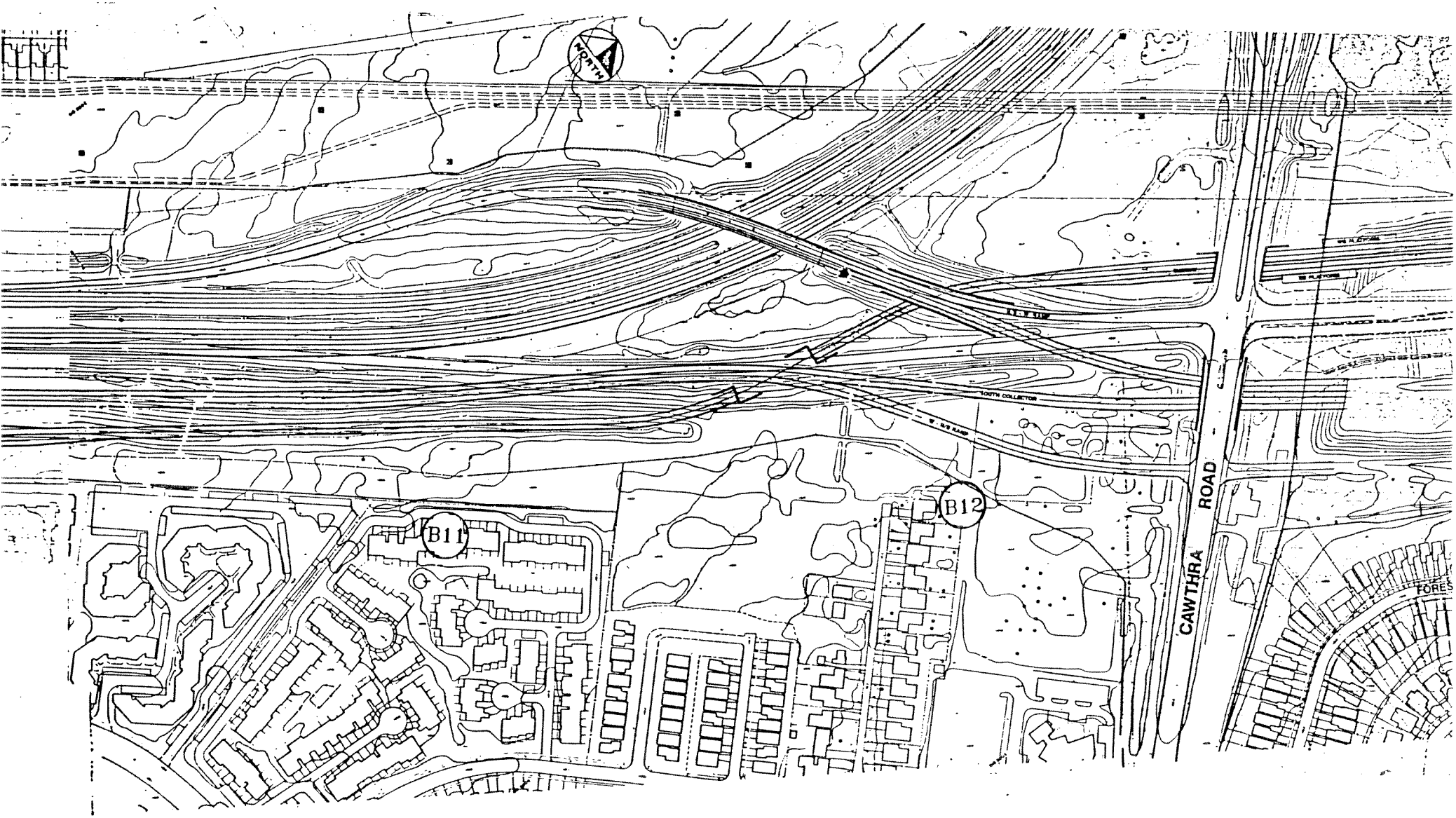


Figure 16

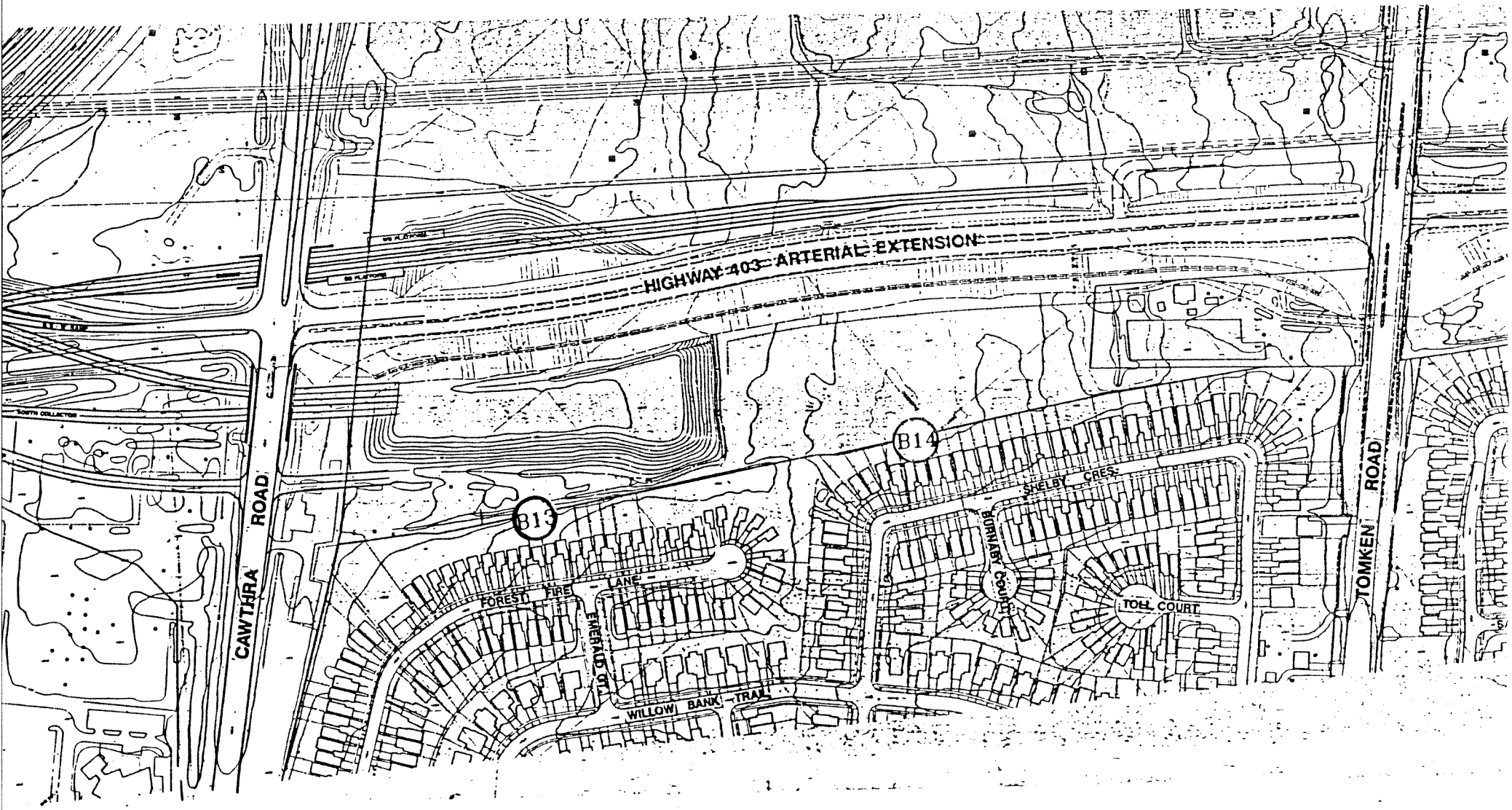

HIGHWAY 403 ARTERIAL EXTENSION
CAWTHRA ROAD
TOMKEN ROAD
B13
B14
FOREST FIRE LANE
EMERALD CT.
WILLOW BANK TRAIL
BURNABY COURT
SHELBY CRES.
TOLL COURT

Figure 17

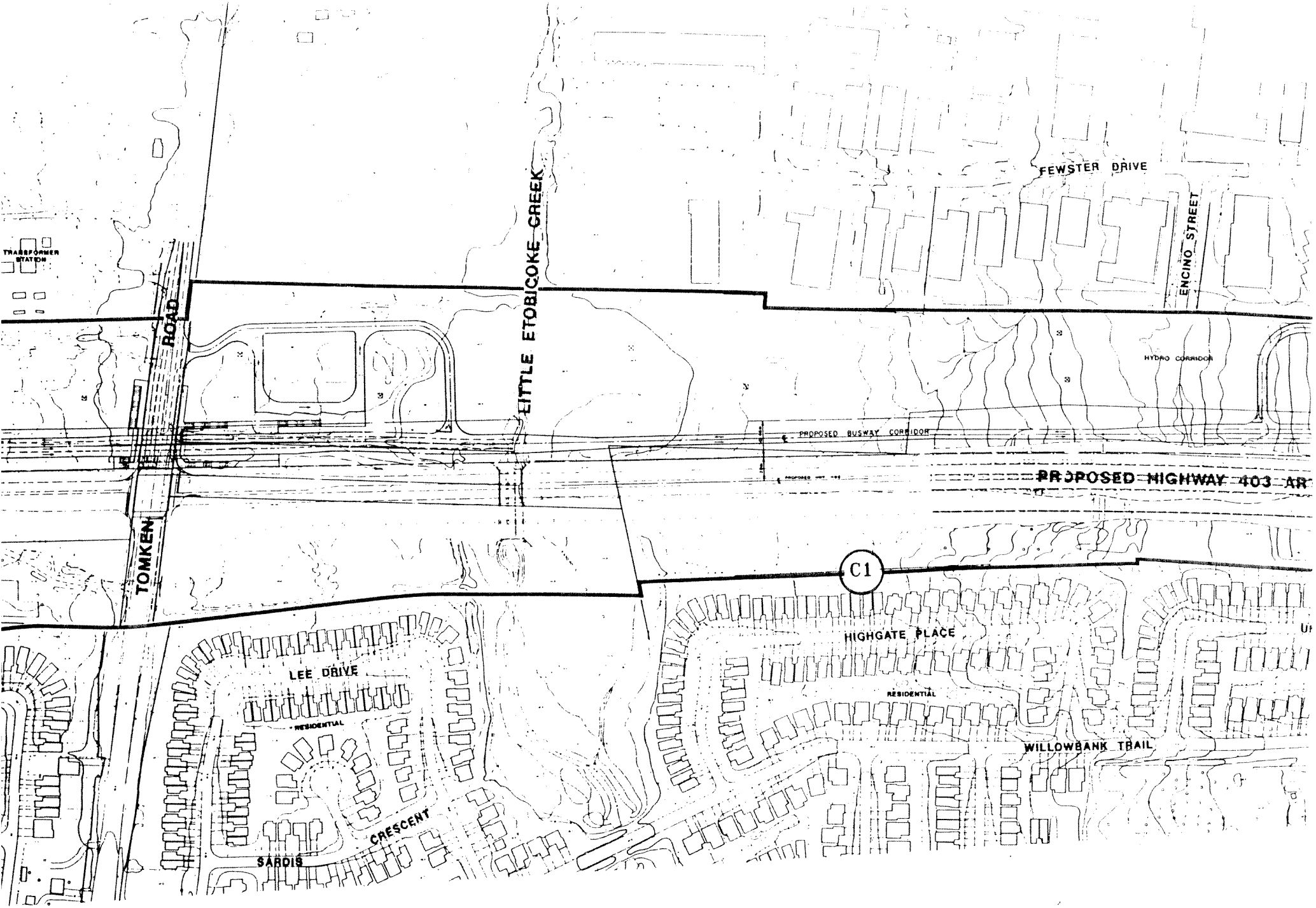

TRANSFORMER STATION
TOMKEN ROAD
LITTLE ETOBICOKE CREEK
FEWSTER DRIVE
ENCINO STREET
HYDRO CORRIDOR
PROPOSED BUSWAY CORRIDOR
PROPOSED HIGHWAY 403 AR
C1
HIGHGATE PLACE
RESIDENTIAL
WILLOWBANK TRAIL
LEE DRIVE
RESIDENTIAL
SARDIS
CRESCENT

Figure 18

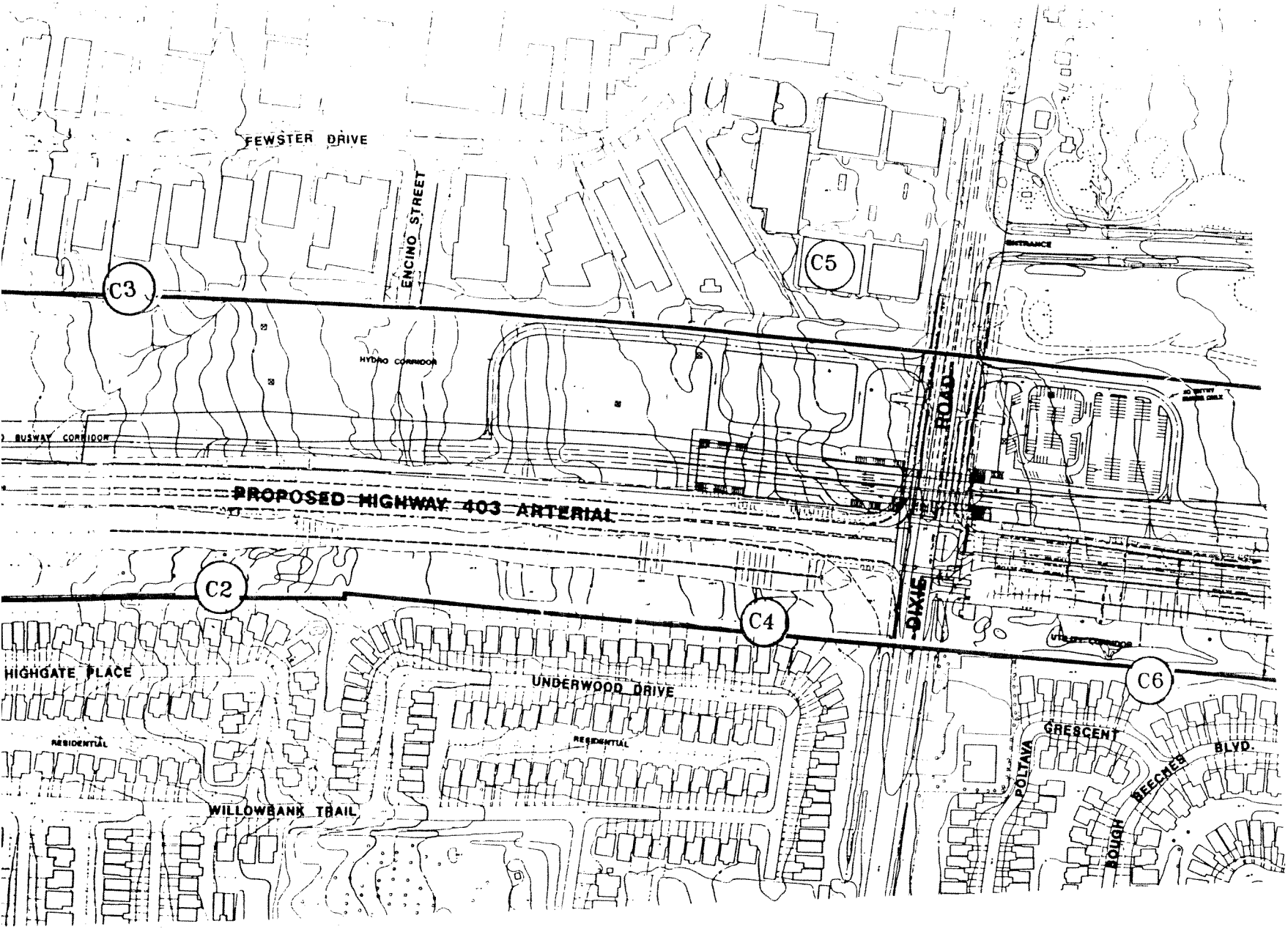

FEWSTER DRIVE
ENCINO STREET
C3
C5
HYDRO CORRIDOR
BUSWAY CORRIDOR
PROPOSED HIGHWAY 403 ARTERIAL
DIXIE ROAD
C2
C4
C6
HIGHGATE PLACE
UNDERWOOD DRIVE
RESIDENTIAL
RESIDENTIAL
WILLOWBANK TRAIL
CRESCENT
BLVD.
POLTAVA
BEECHES
BOUGH

Figure 19

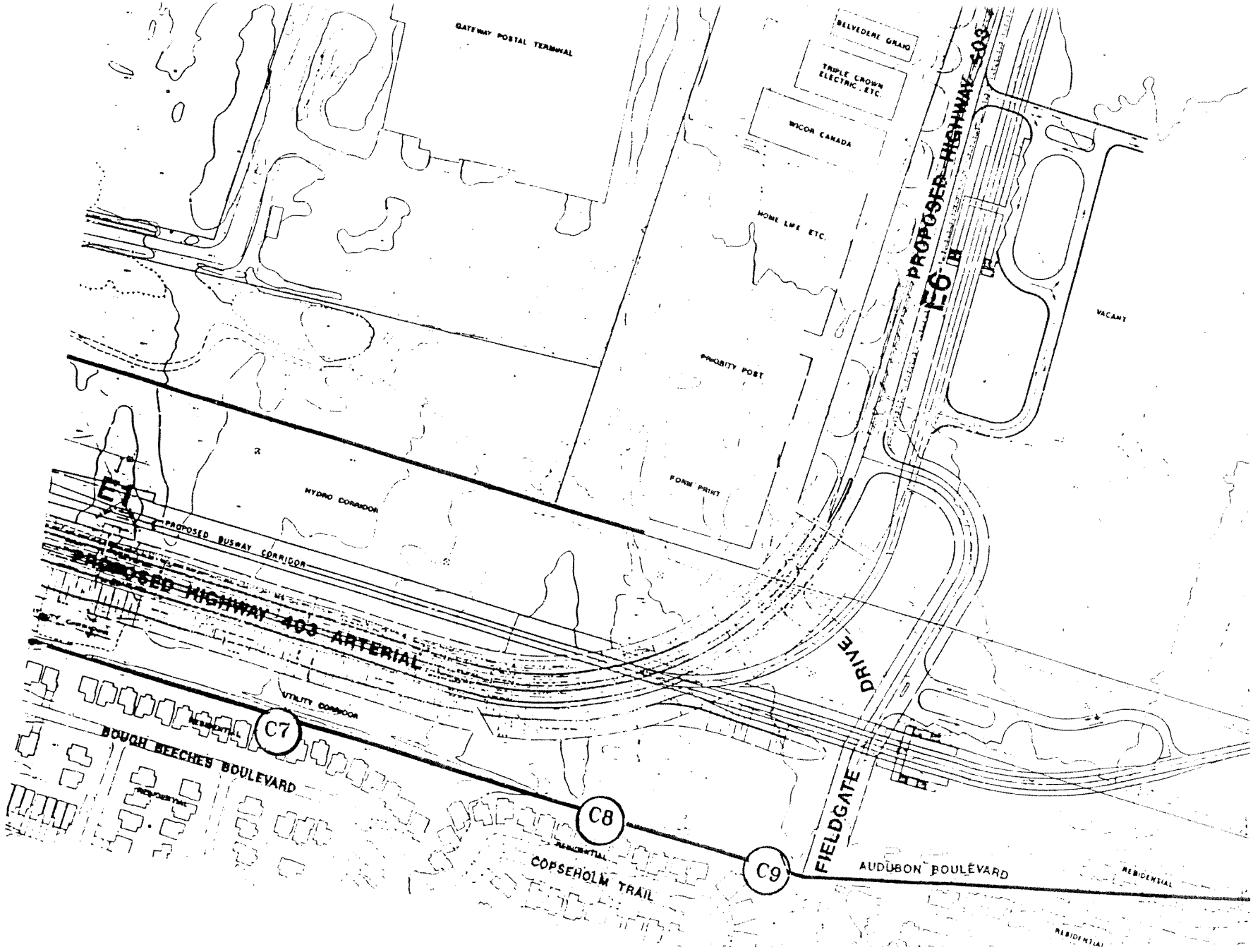

GATEWAY POSTAL TERMINAL
BELVEDERE GRAND
TRIPLE CROWN ELECTRIC, ETC.
WICOR CANADA
HOME LIFE ETC.
PROBITY POST
FORM PRINT
PROPOSED HIGHWAY 403
E6
VACANT
E1
HYDRO CORRIDOR
PROPOSED BUSWAY CORRIDOR
PROPOSED HIGHWAY 403 ARTERIAL
UTILITY CORRIDOR
C7
BOUGH BEECHES BOULEVARD
C8
COPSEHOLM TRAIL
C9
FIELDGATE DRIVE
AUDUBON BOULEVARD
RESIDENTIAL

Figure 20

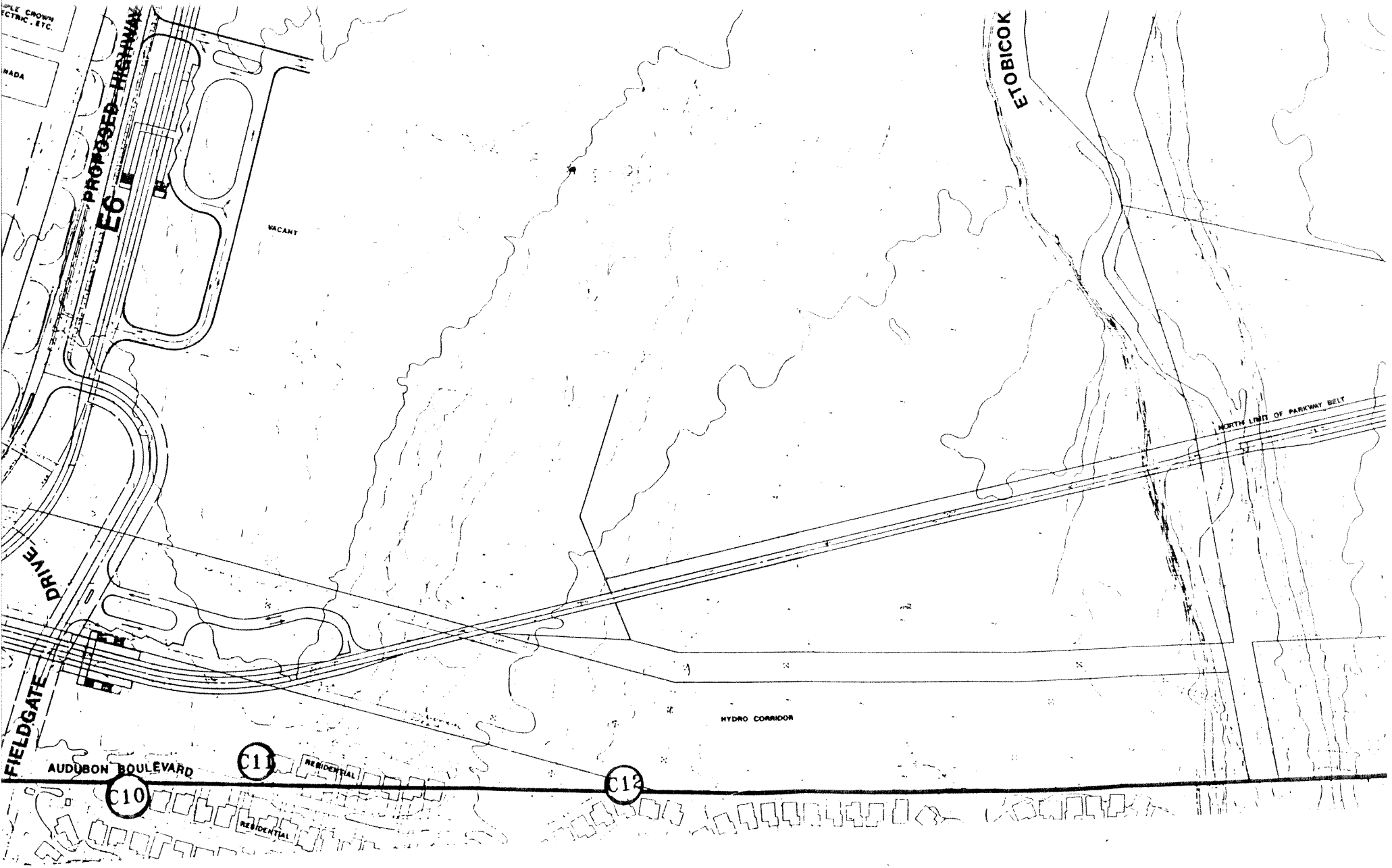

PROPOSED HIGHWAY
E6
VACANT
ETOBICOK
NORTH LIMIT OF PARKWAY BELT
FIELDGATE DRIVE
HYDRO CORRIDOR
AUDUBON BOULEVARD
C10
C11
C12
RESIDENTIAL
RESIDENTIAL

Figure 21

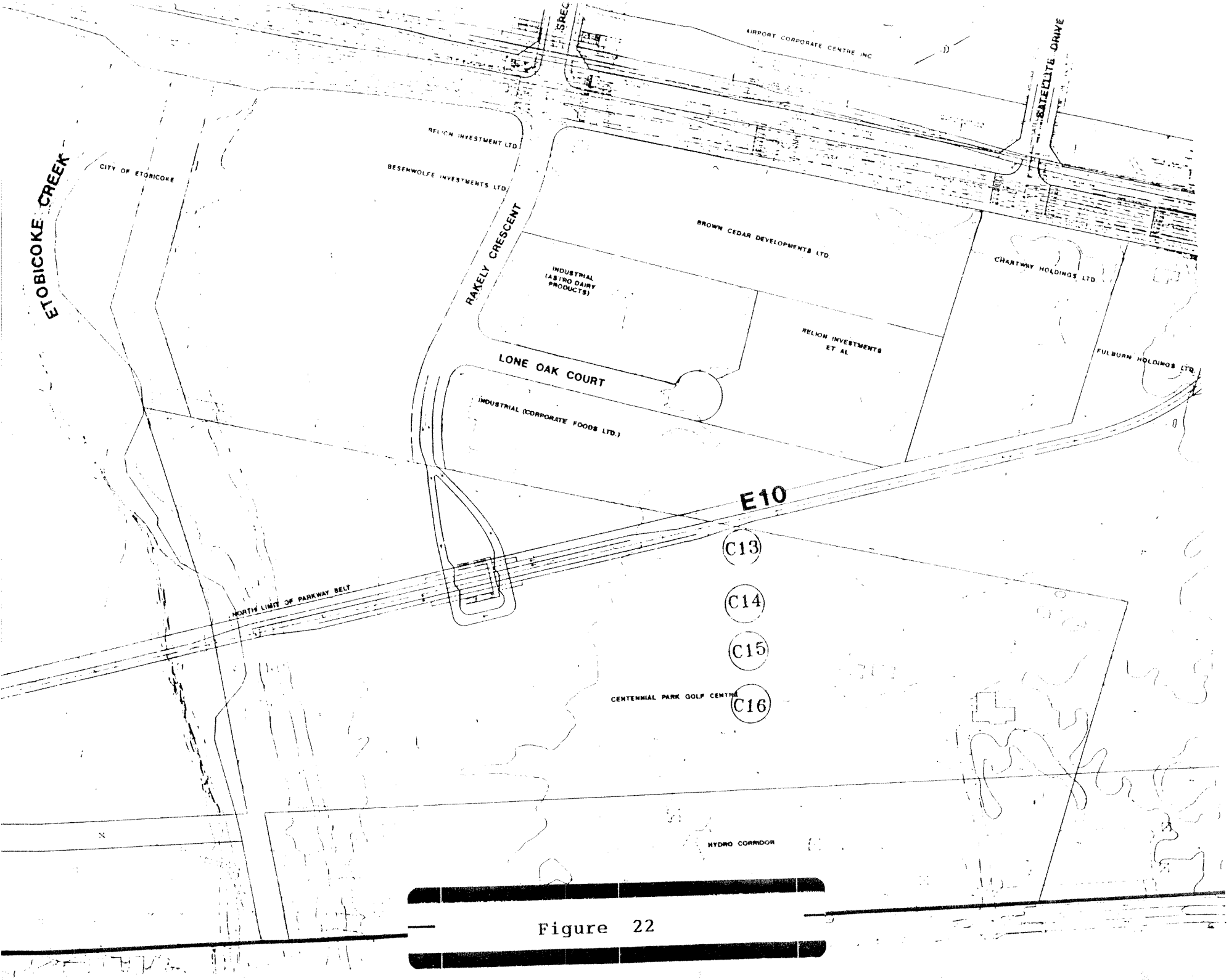

ETOBICOKE CREEK
CITY OF ETOBICOKE
RELION INVESTMENT LTD.
BESENWOLFE INVESTMENTS LTD.
RAKELY CRESCENT
AIRPORT CORPORATE CENTRE INC.
SATELLITE DRIVE
BROWN CEDAR DEVELOPMENTS LTD.
INDUSTRIAL (ASTRO DAIRY PRODUCTS)
CHARTWAY HOLDINGS LTD.
RELION INVESTMENTS ET AL
FULBURN HOLDINGS LTD.
LONE OAK COURT
INDUSTRIAL (CORPORATE FOODS LTD.)
E10
C13
C14
C15
C16
NORTH LIMIT OF PARKWAY BELT
CENTENNIAL PARK GOLF CENTRE
HYDRO CORRIDOR

Figure 22

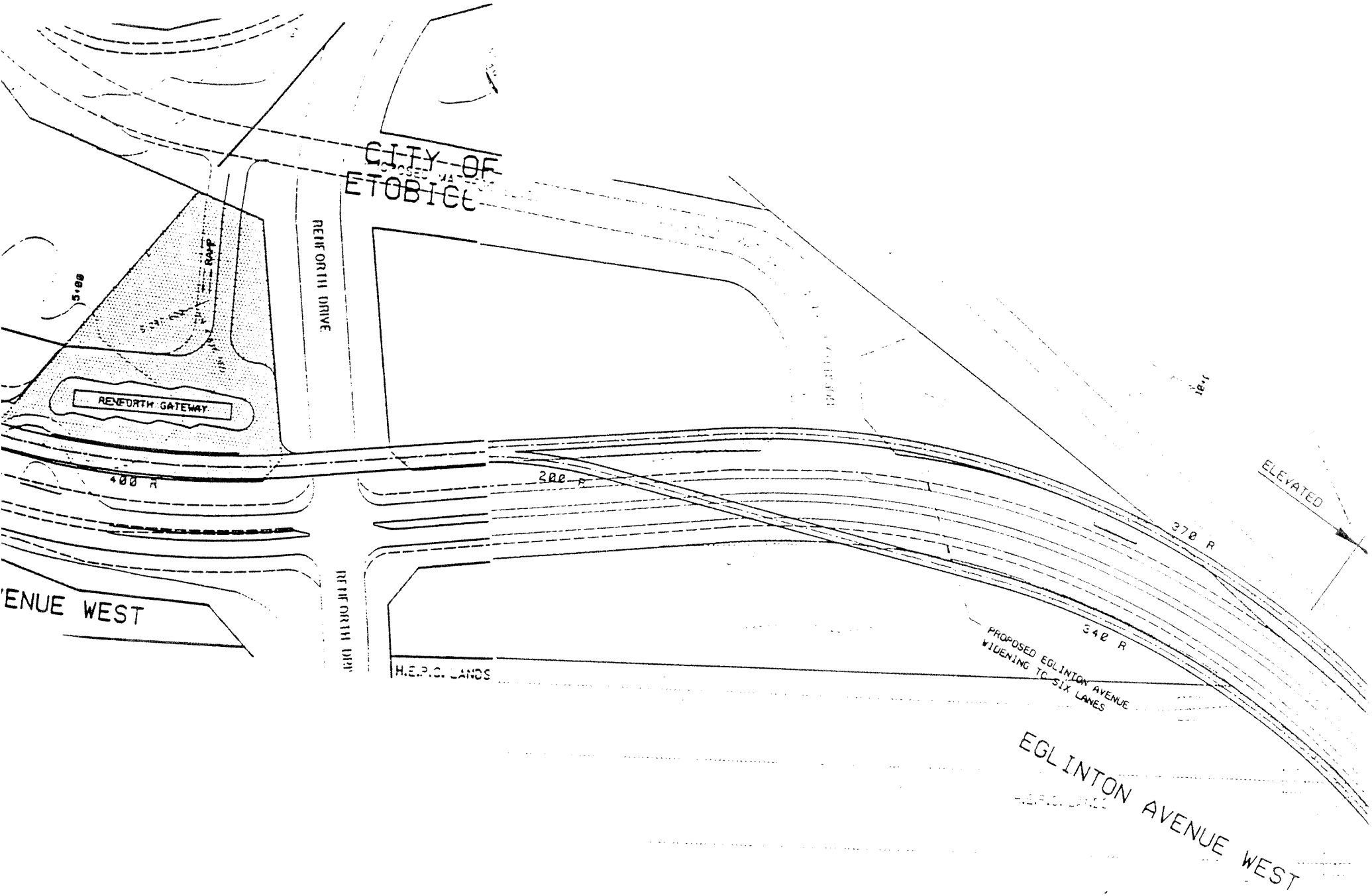

CITY OF ETOBICOKE
RENFORTH DRIVE
RENFORTH GATEWAY
400 R
300 R
370 R
340 R
ELEVATED
PROPOSED EGLINTON AVENUE WIDENING TO SIX LANES
H.E.P.C. LANDS
EGLINTON AVENUE WEST

Figure NO.23

MISSISSAUGA BUSWAY SYSTEM
NOISE LEVELS ALONG BUSWAY

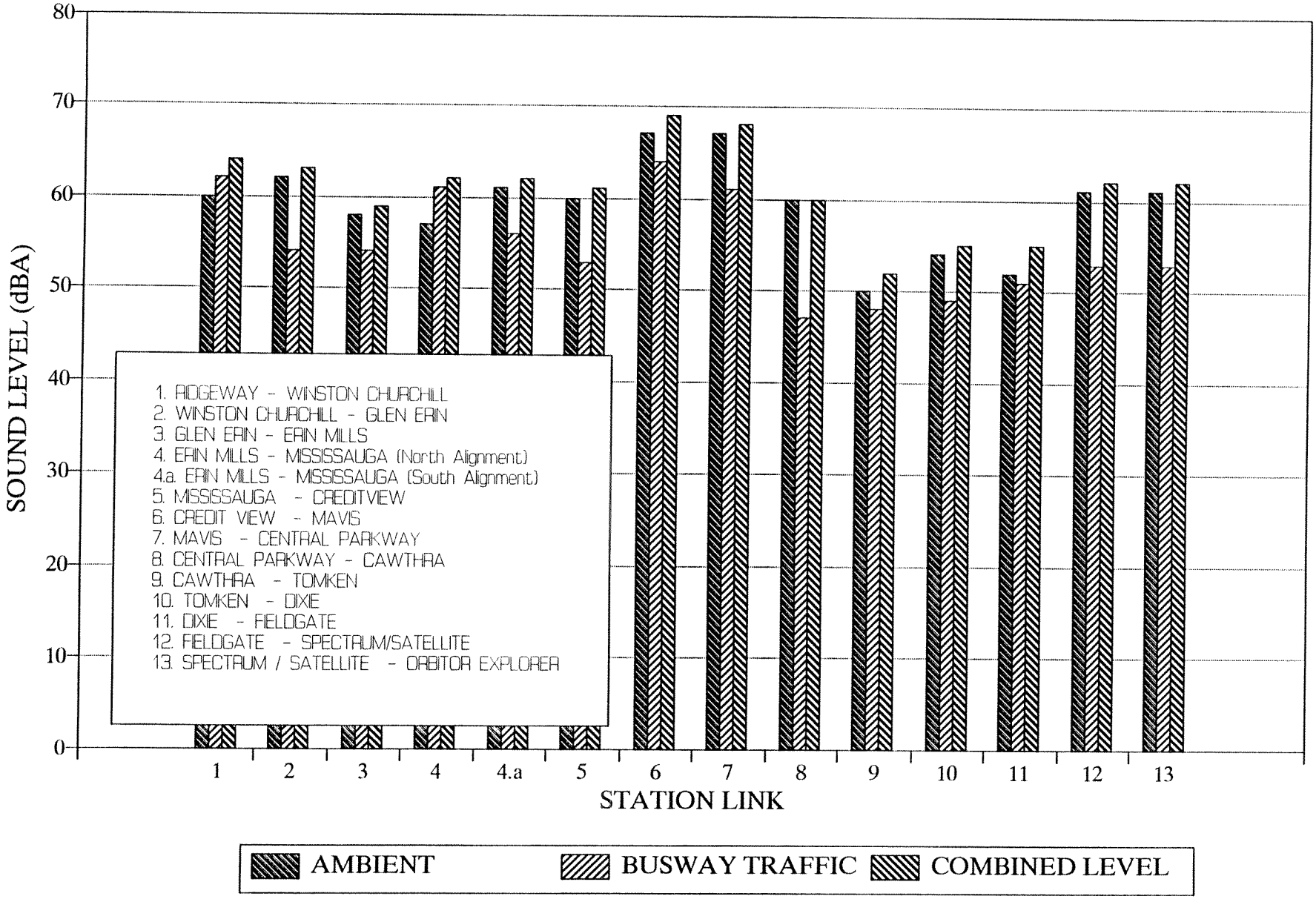


FIGURE 24

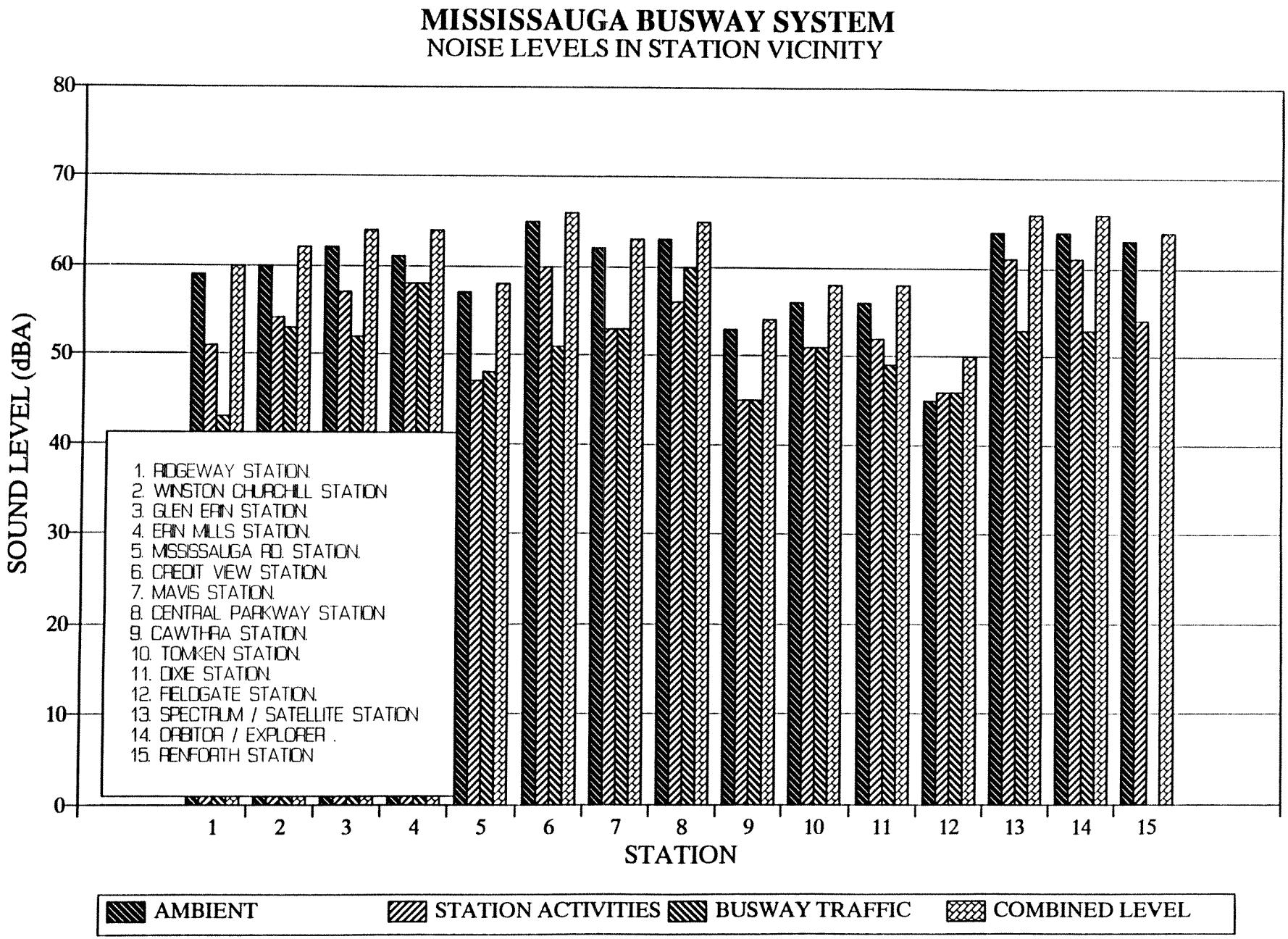

MISSISSAUGA BUSWAY SYSTEM
NOISE LEVELS IN STATION VICINITY
SOUND LEVEL (dBA)
80
70
60
50
40
30
20
10
0
1. RIDGEWAY STATION.
2. WINSTON CHURCHILL STATION
3. GLEN ERIN STATION.
4. ERIN MILLS STATION.
5. MISSISSAUGA RD. STATION.
6. CREDIT VIEW STATION.
7. MAVIS STATION.
8. CENTRAL PARKWAY STATION
9. CAWTHRA STATION.
10. TOMKEN STATION.
11. DIXIE STATION.
12. FIELDGATE STATION.
13. SPECTRUM / SATELLITE STATION
14. ORBITOR / EXPLORER .
15. RENFORTH STATION
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
STATION
AMBIENT
STATION ACTIVITIES
BUSWAY TRAFFIC
COMBINED LEVEL

FIGURE 25

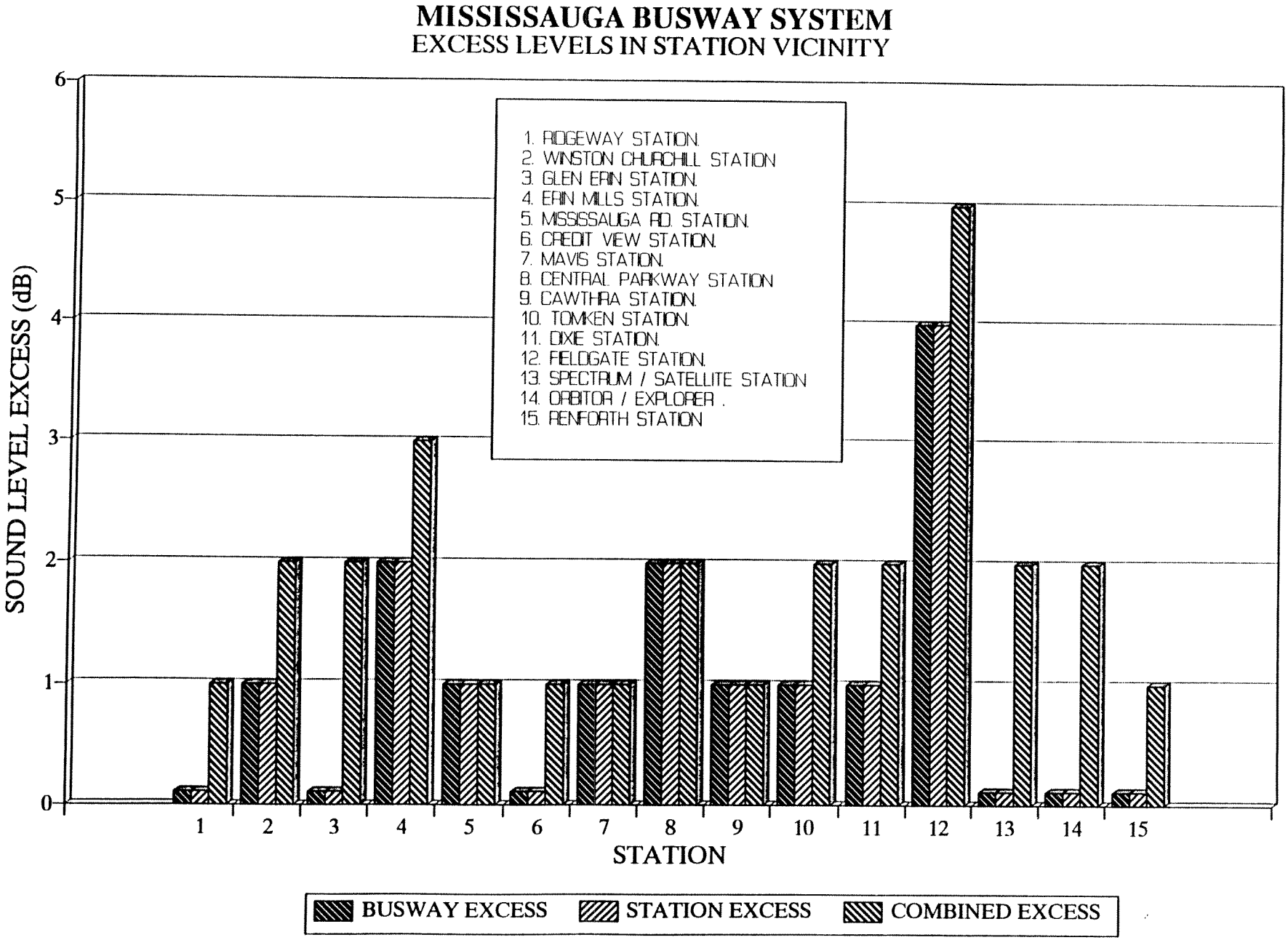

MISSISSAUGA BUSWAY SYSTEM
EXCESS LEVELS IN STATION VICINITY
SOUND LEVEL EXCESS (dB)
0
1
2
3
4
5
6
1. RIDGEWAY STATION.
2. WINSTON CHURCHILL STATION
3. GLEN ERIN STATION.
4. ERIN MILLS STATION.
5. MISSISSAUGA RD. STATION.
6. CREDIT VIEW STATION.
7. MAVIS STATION.
8. CENTRAL PARKWAY STATION
9. CAWTHRA STATION.
10. TOMKEN STATION.
11. DIXIE STATION.
12. FIELDGATE STATION.
13. SPECTRUM / SATELLITE STATION
14. ORBITOR / EXPLORER .
15. RENFORTH STATION
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
STATION
BUSWAY EXCESS
STATION EXCESS
COMBINED EXCESS

FIGURE 26

MISSISSAUGA BUSWAY SYSTEM
EXCESS IN NOISE LEVELS ALONG BUSWAY

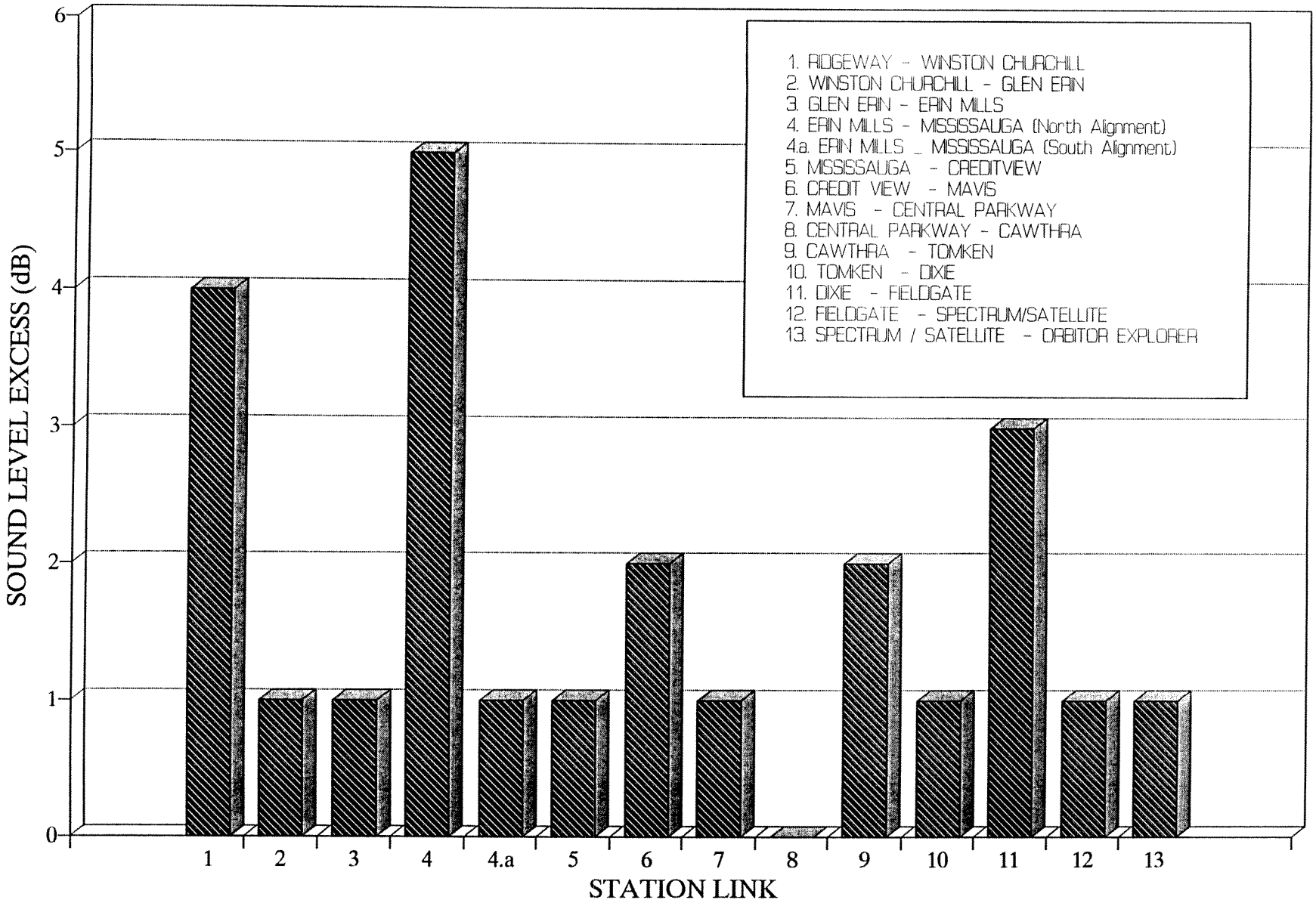


FIGURE 27

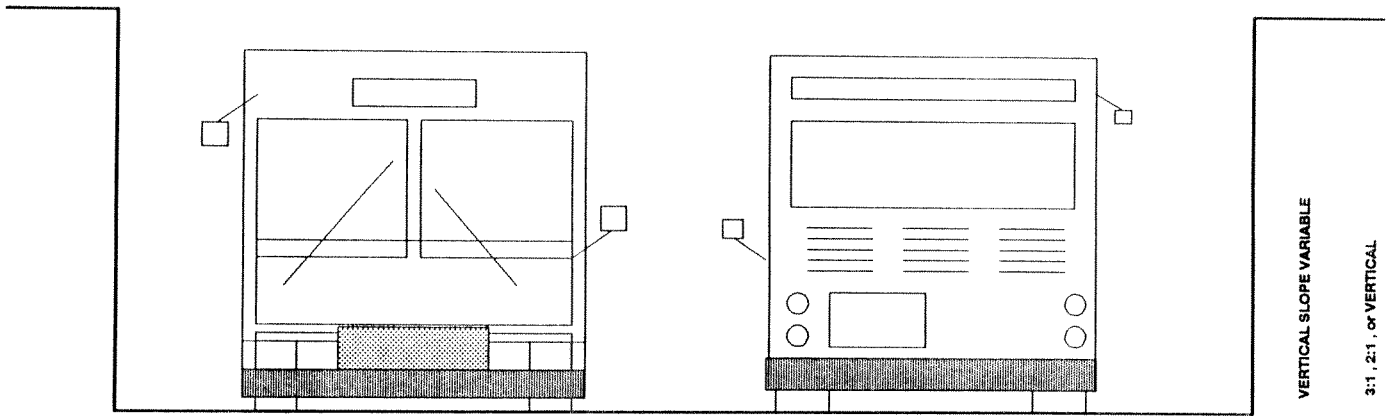
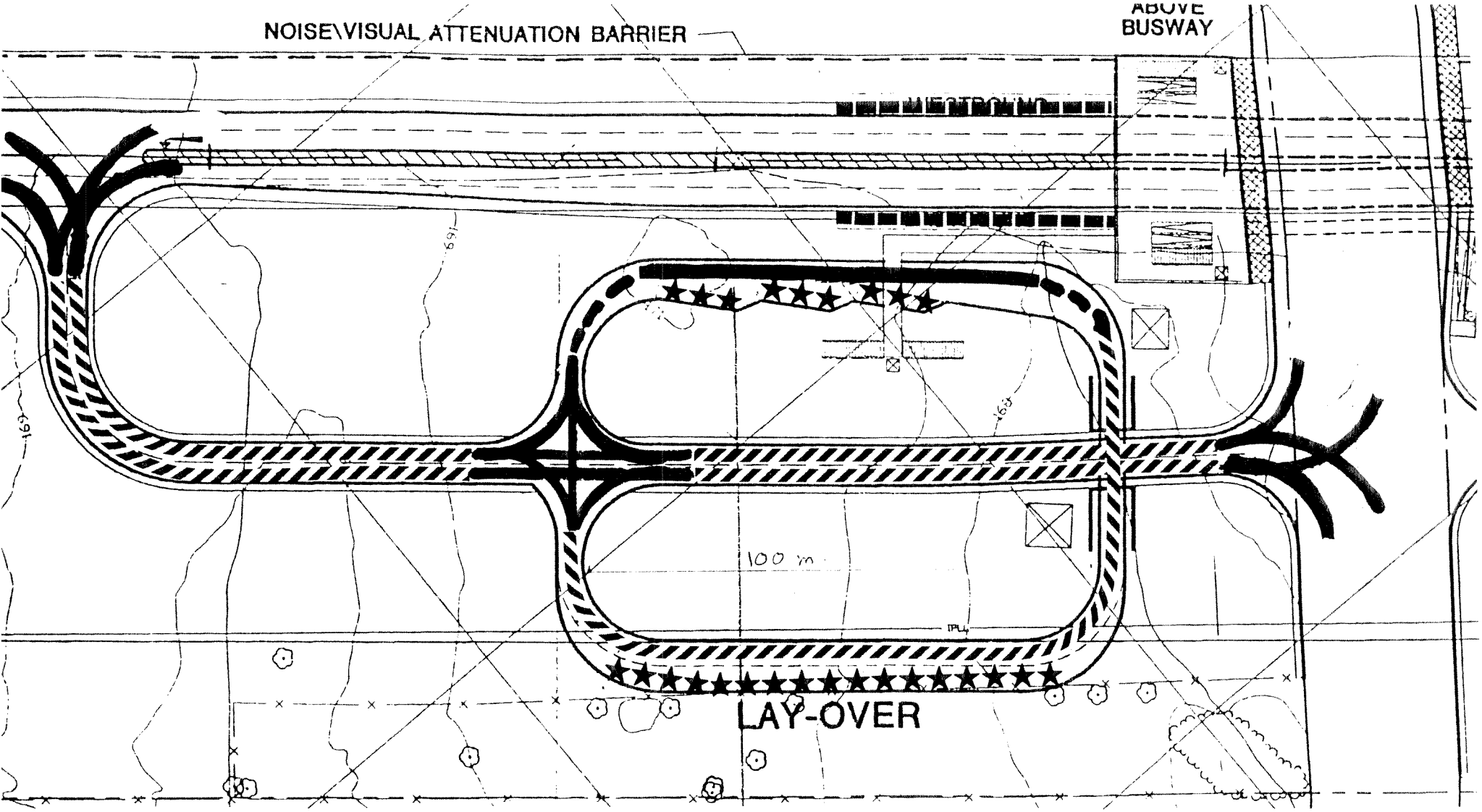


FIGURE 28

TYPICAL BUSWAY CUT SECTION



LEGEND

STOP AND GO AT BUS STO

LIGHT ACCELER'N AT 20 KM/HR.

STOP AND GO AT A STOP SIGN

LIGHT ACCELERATION AT 20 KM/HR.

BUS IDLING PASSENGERS AND LAYOVER

FIGURE 29

STATIONS NOISE LEVELS CONTOURS

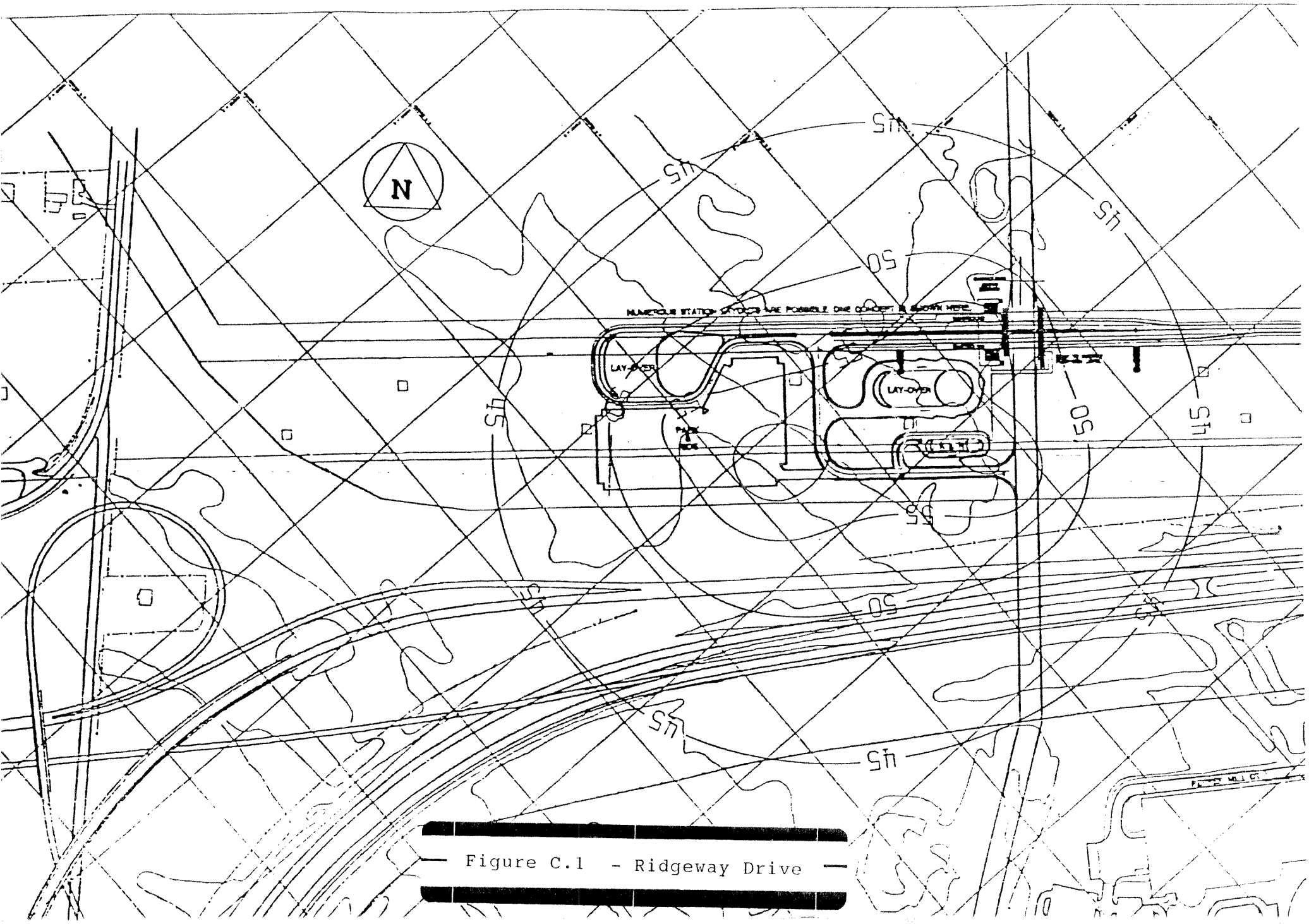


Figure C.1 - Ridgeway Drive

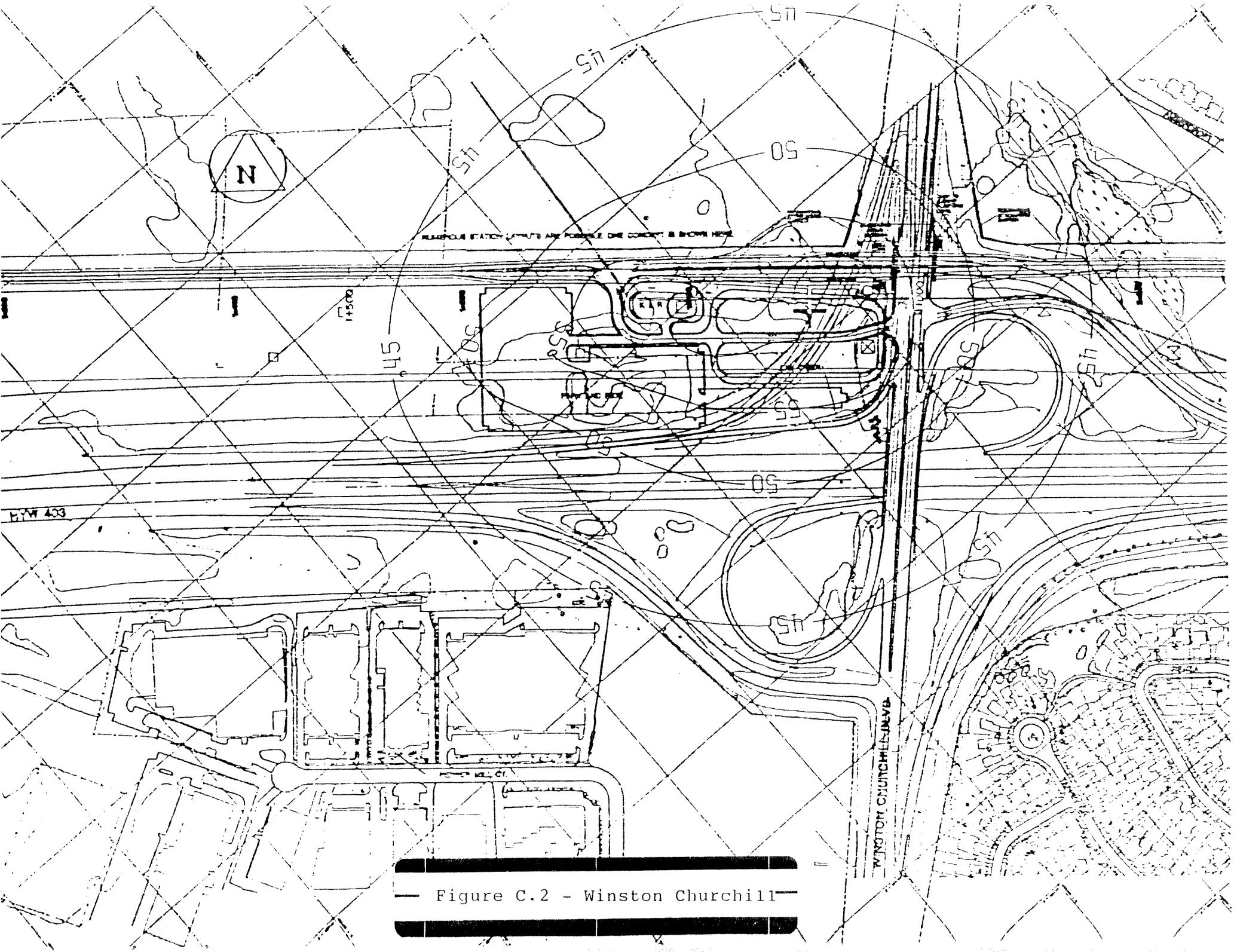


Figure C.2 - Winston Churchill

RIVE

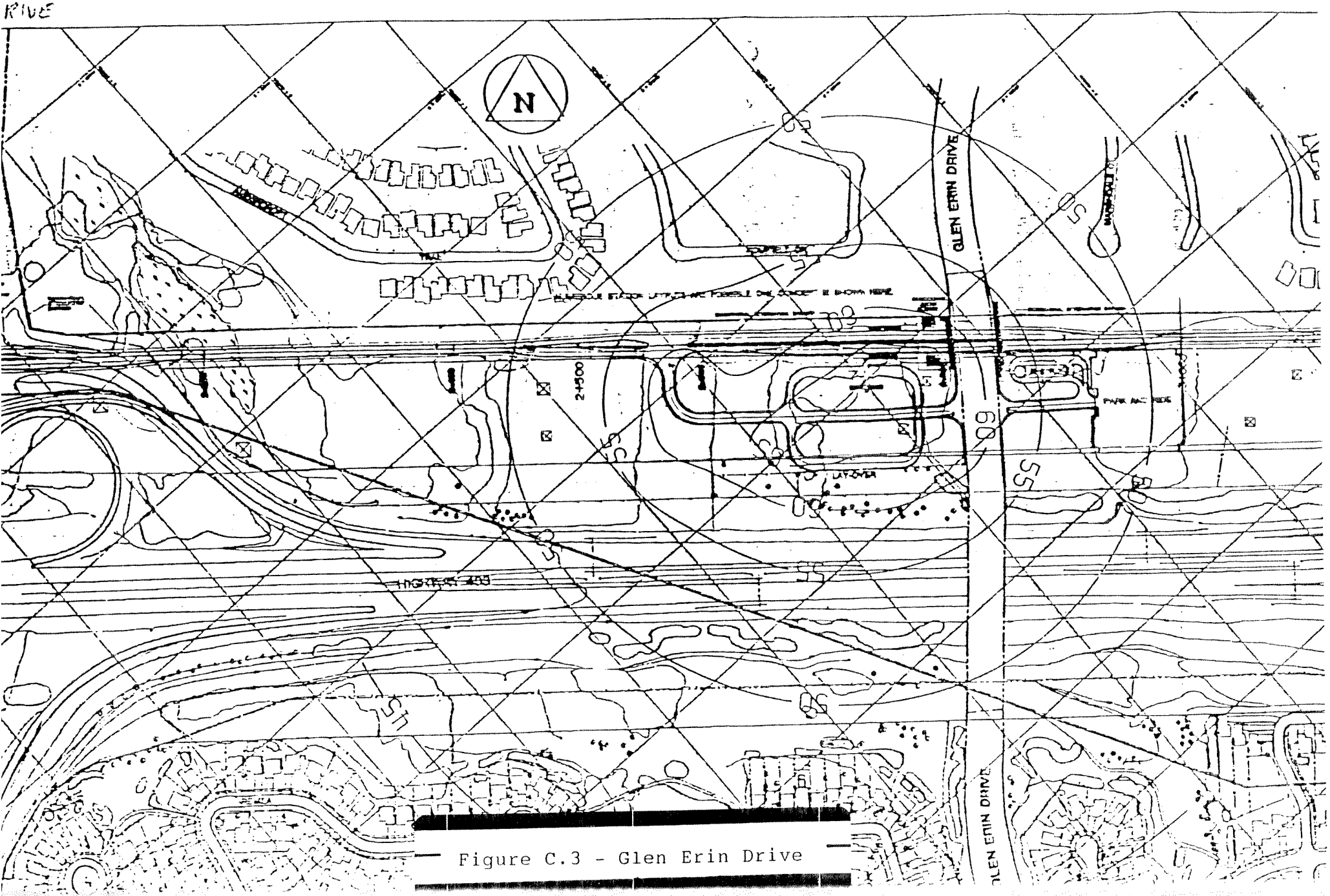


Figure C.3 - Glen Erin Drive

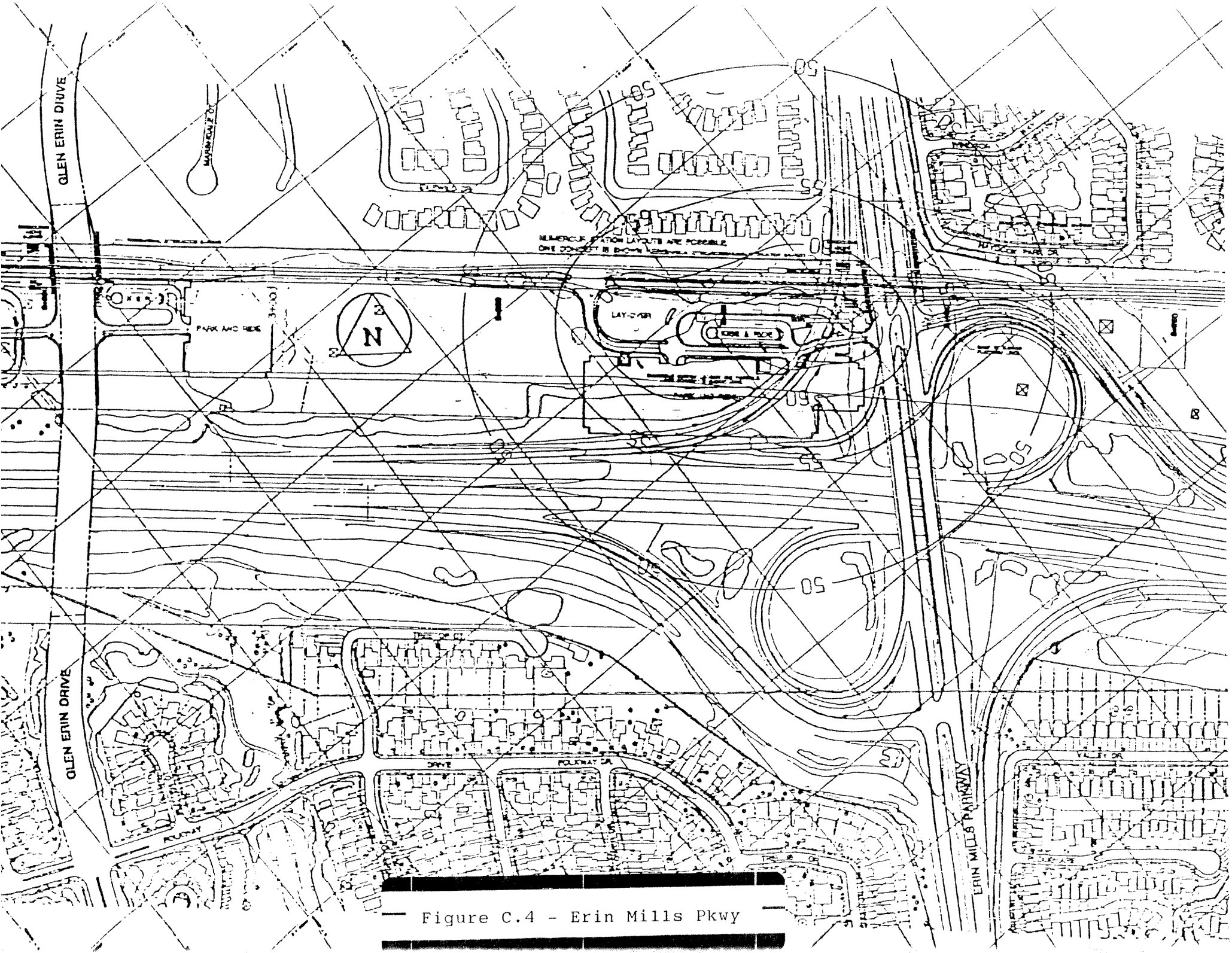


Figure C.4 - Erin Mills Pkwy

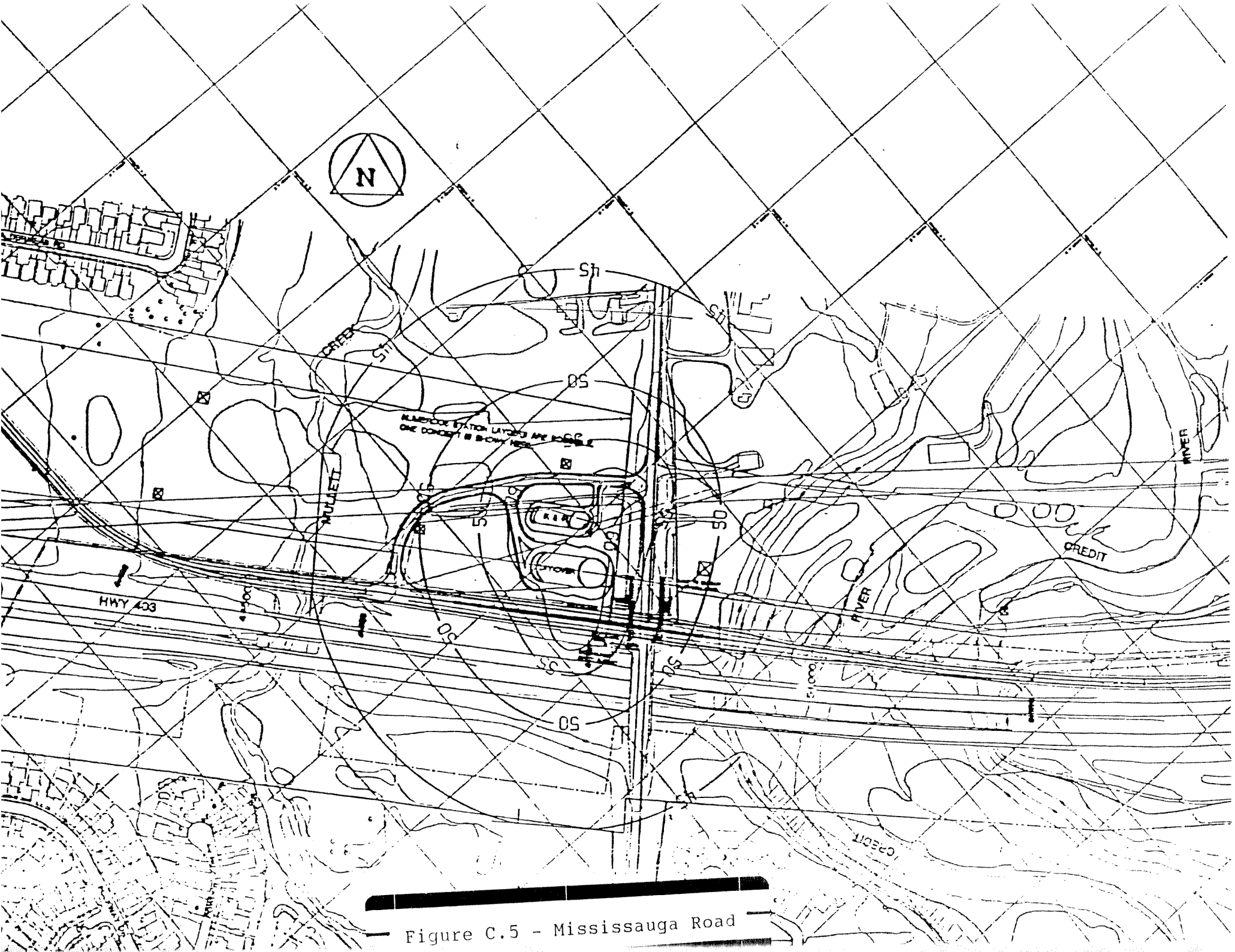


Figure C.5 - Mississauga Road

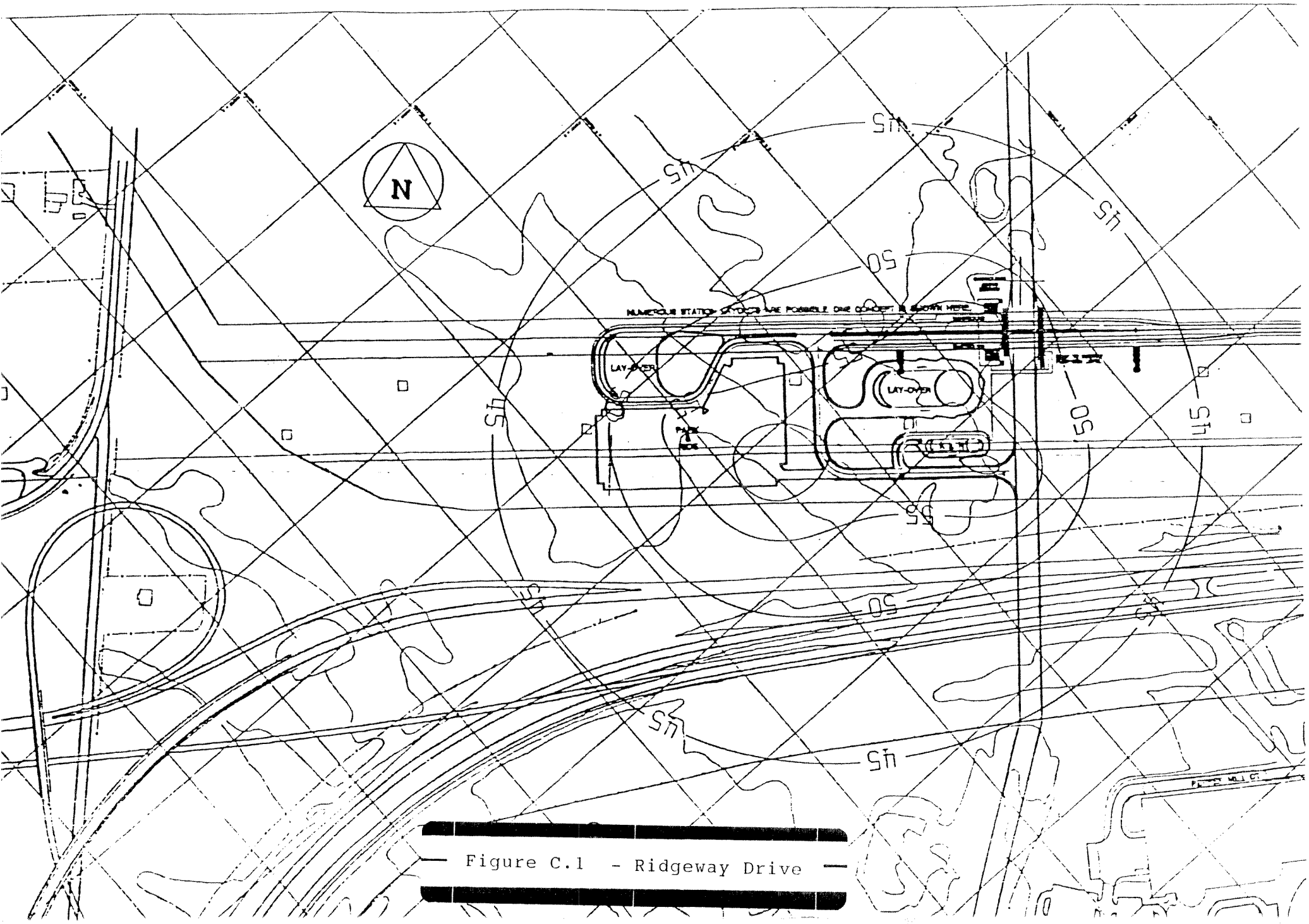


Figure C.1 - Ridgeway Drive

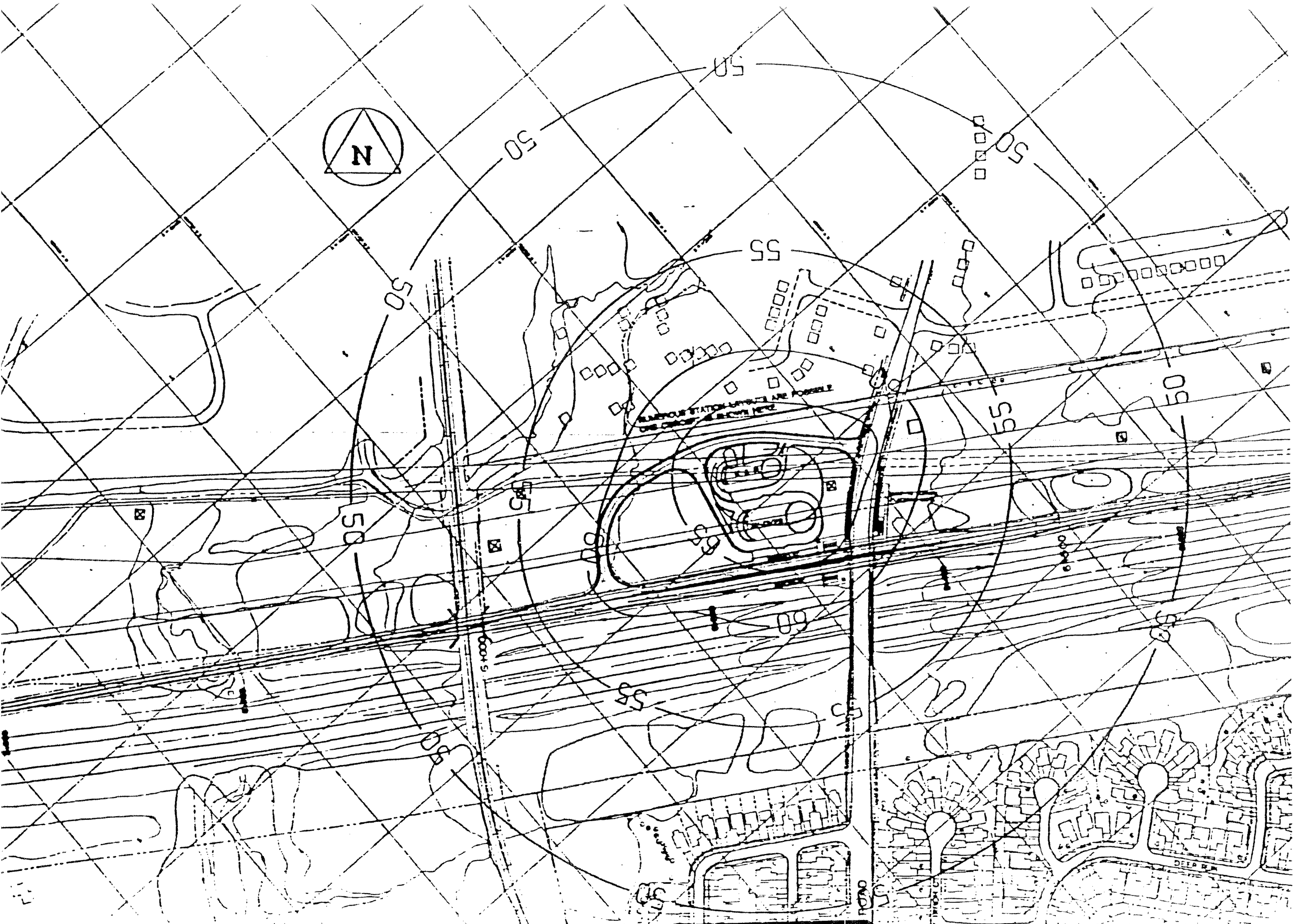


Figure C.6 - Creditview Road

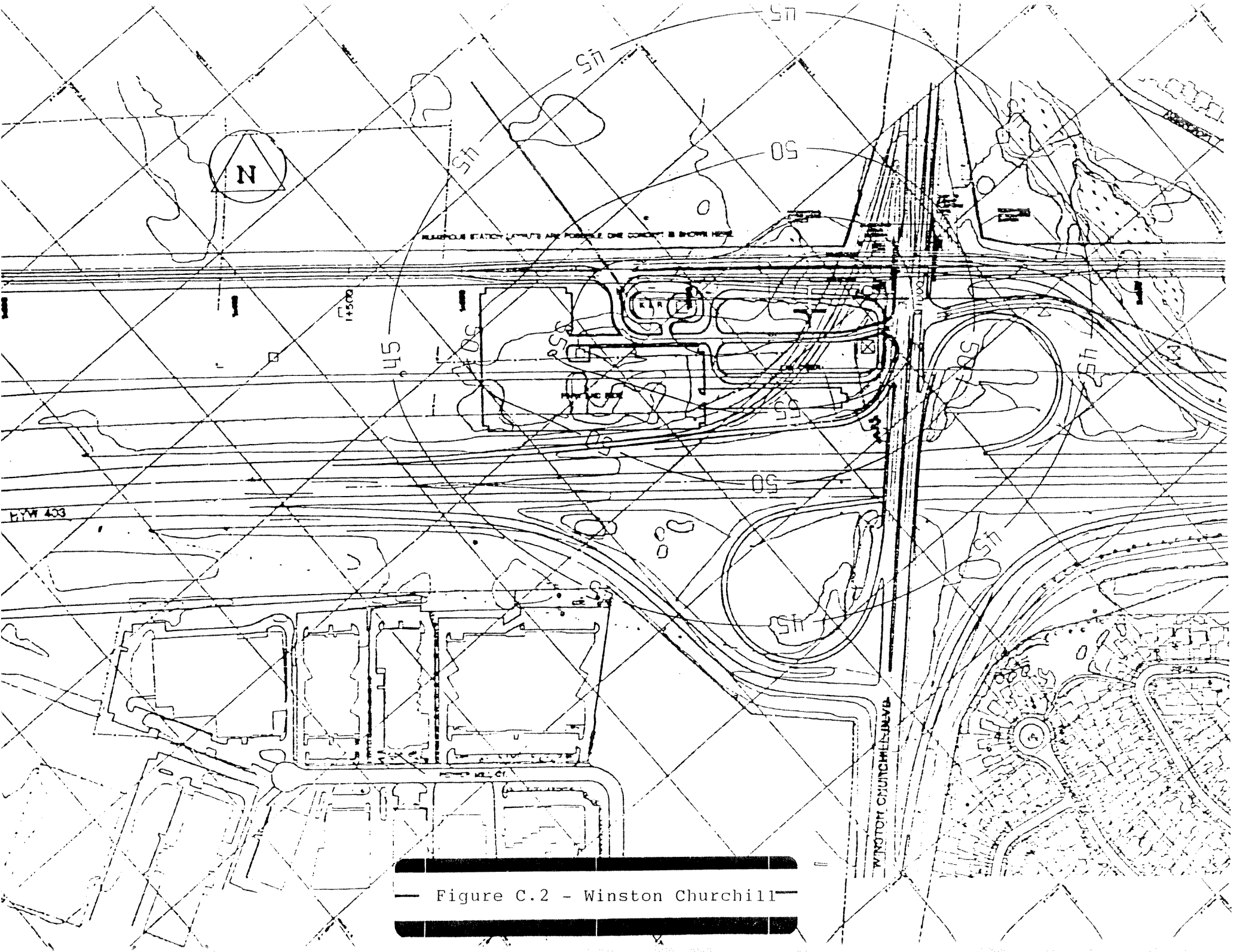


Figure C.2 - Winston Churchill

RIVE

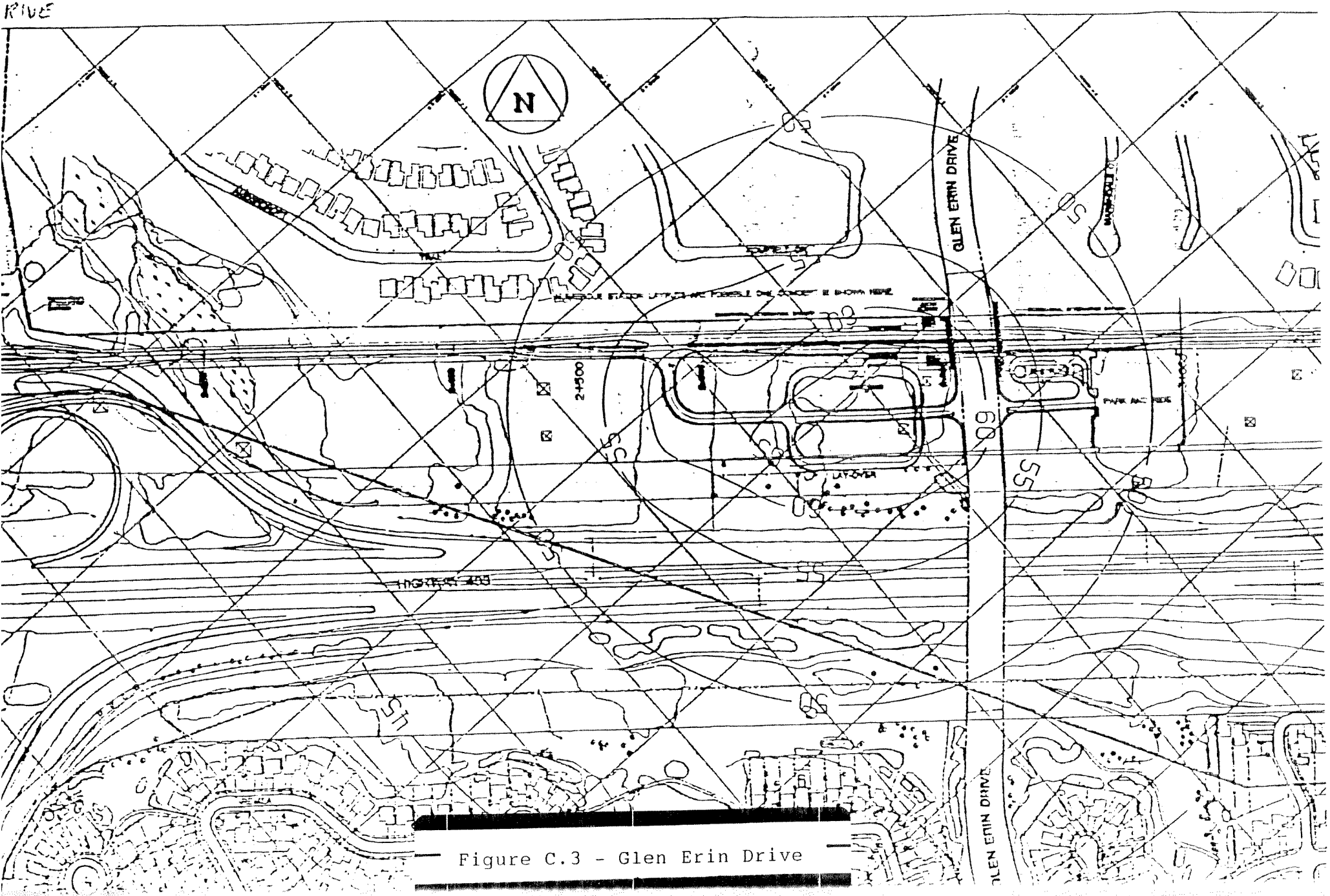


Figure C.3 - Glen Erin Drive

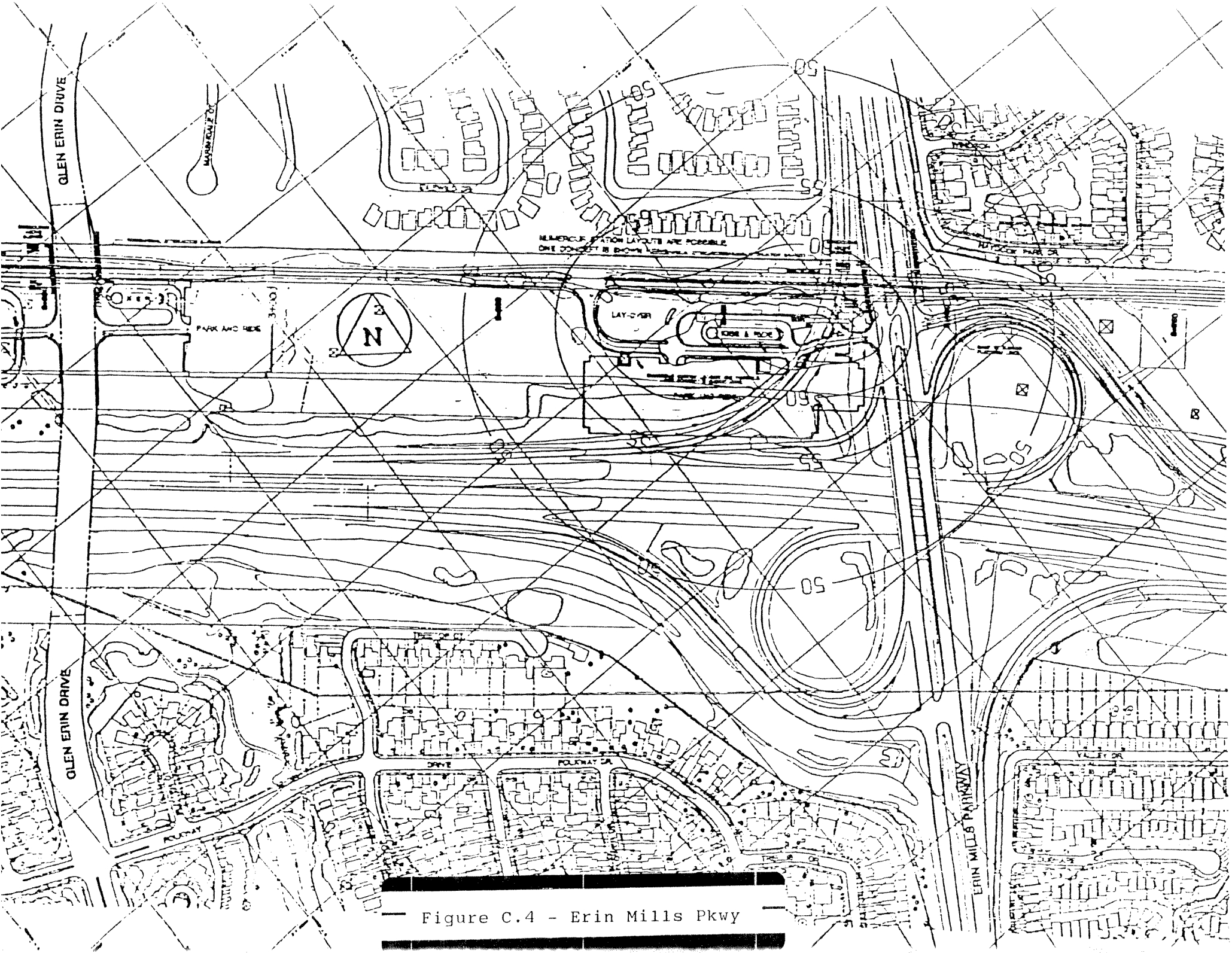


Figure C.4 - Erin Mills Pkwy

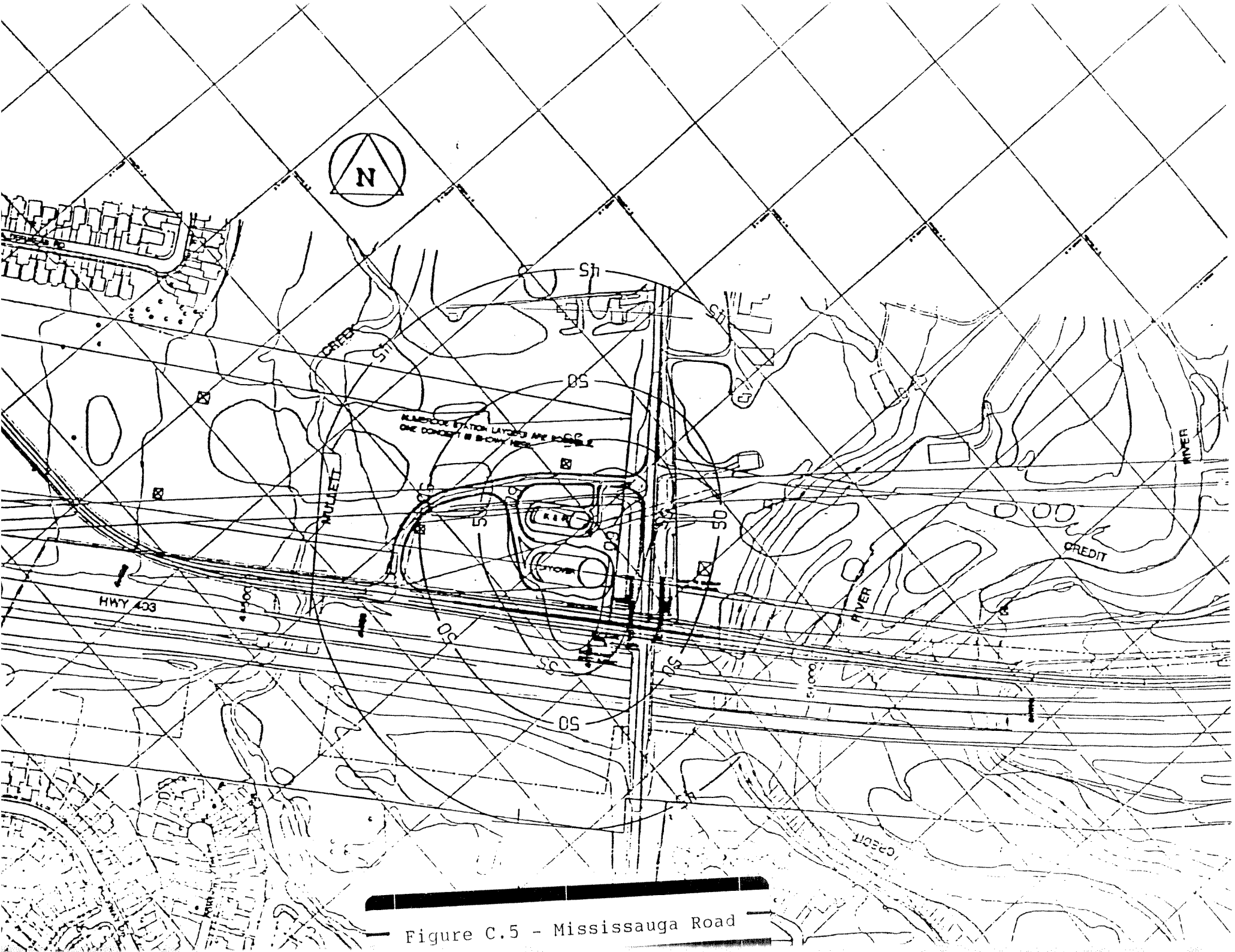


Figure C.5 - Mississauga Road

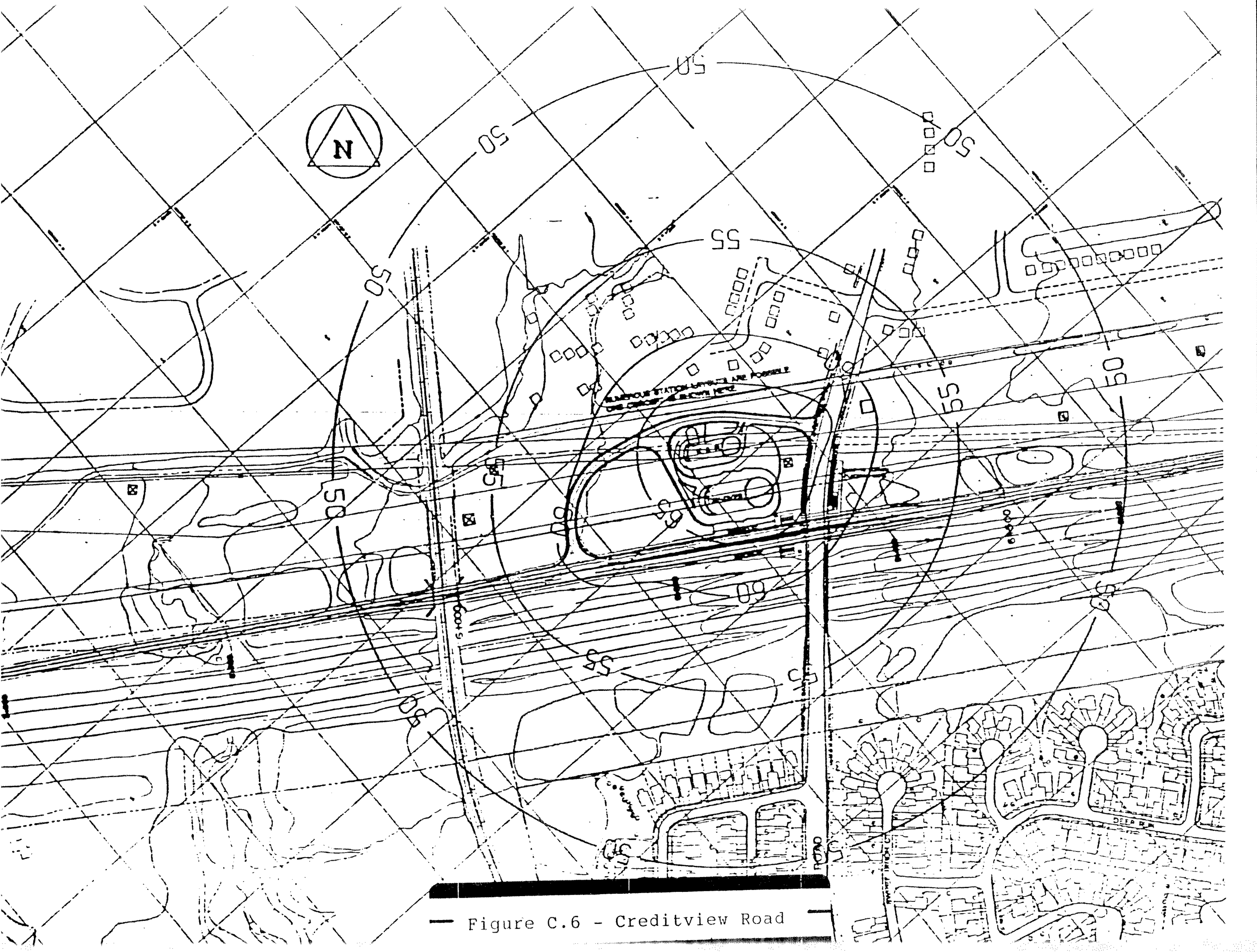


Figure C.6 - Creditview Road

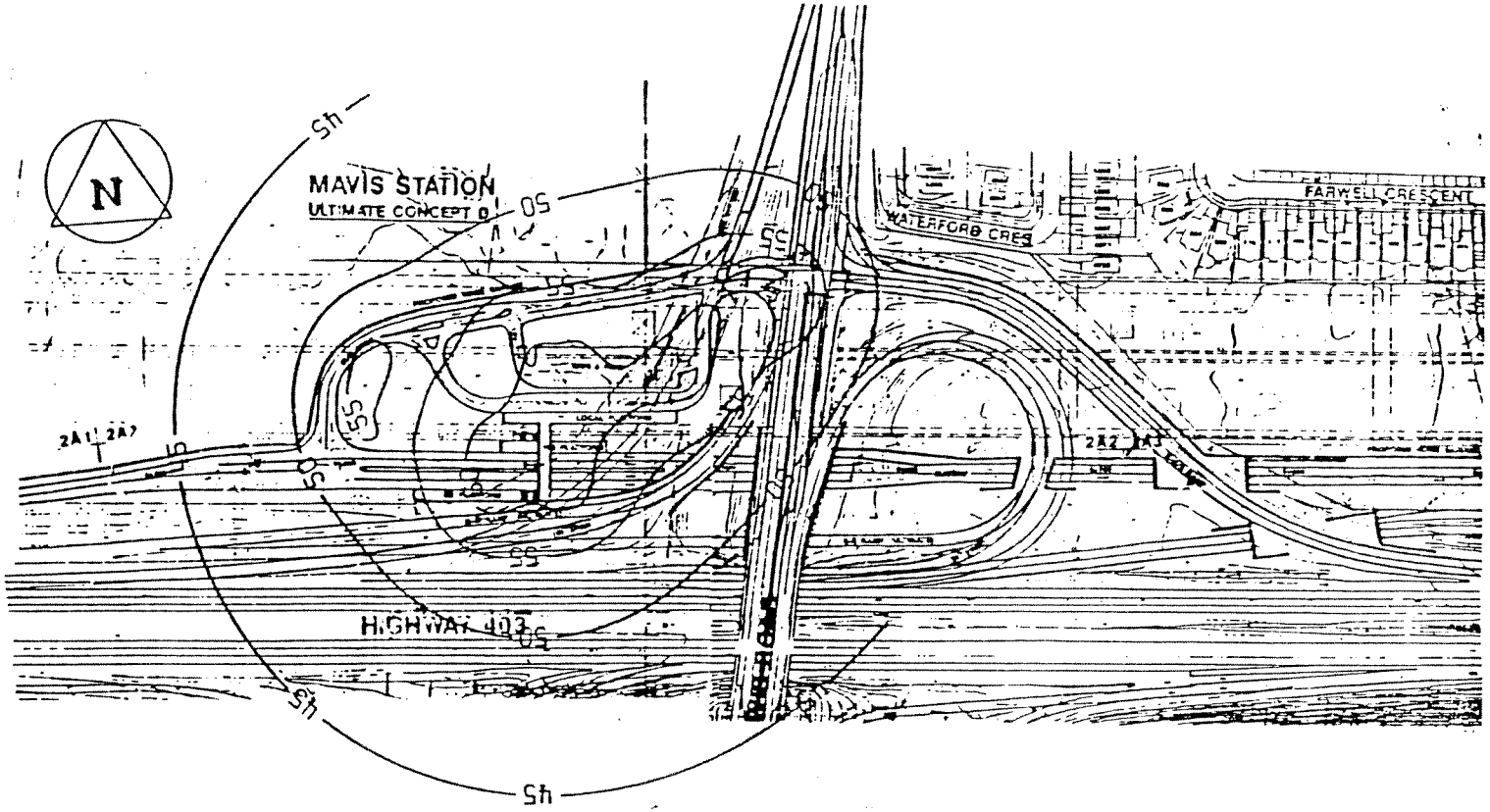


Figure C.7 - Mavis Road

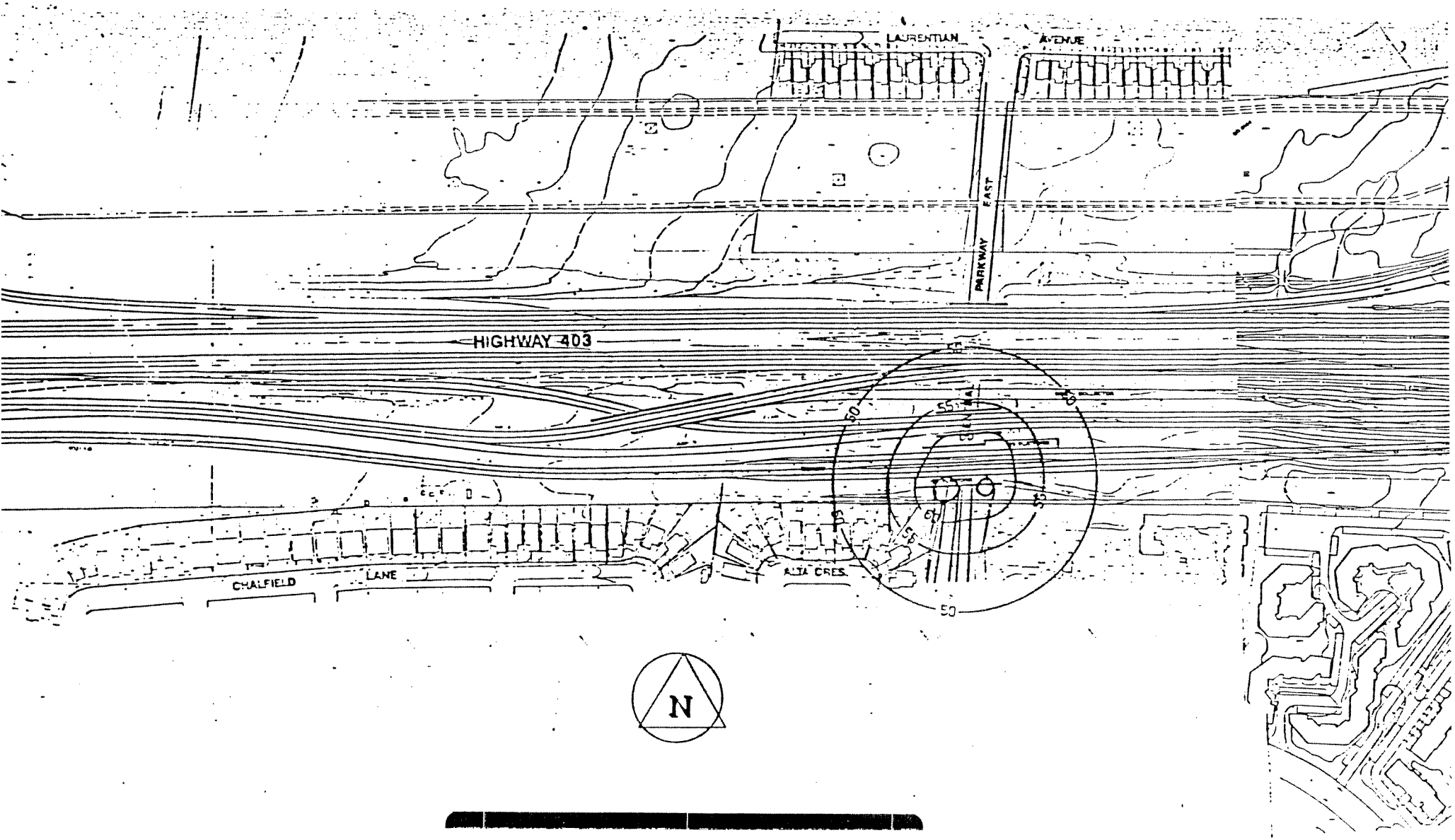


Figure C.8 - Parkway East

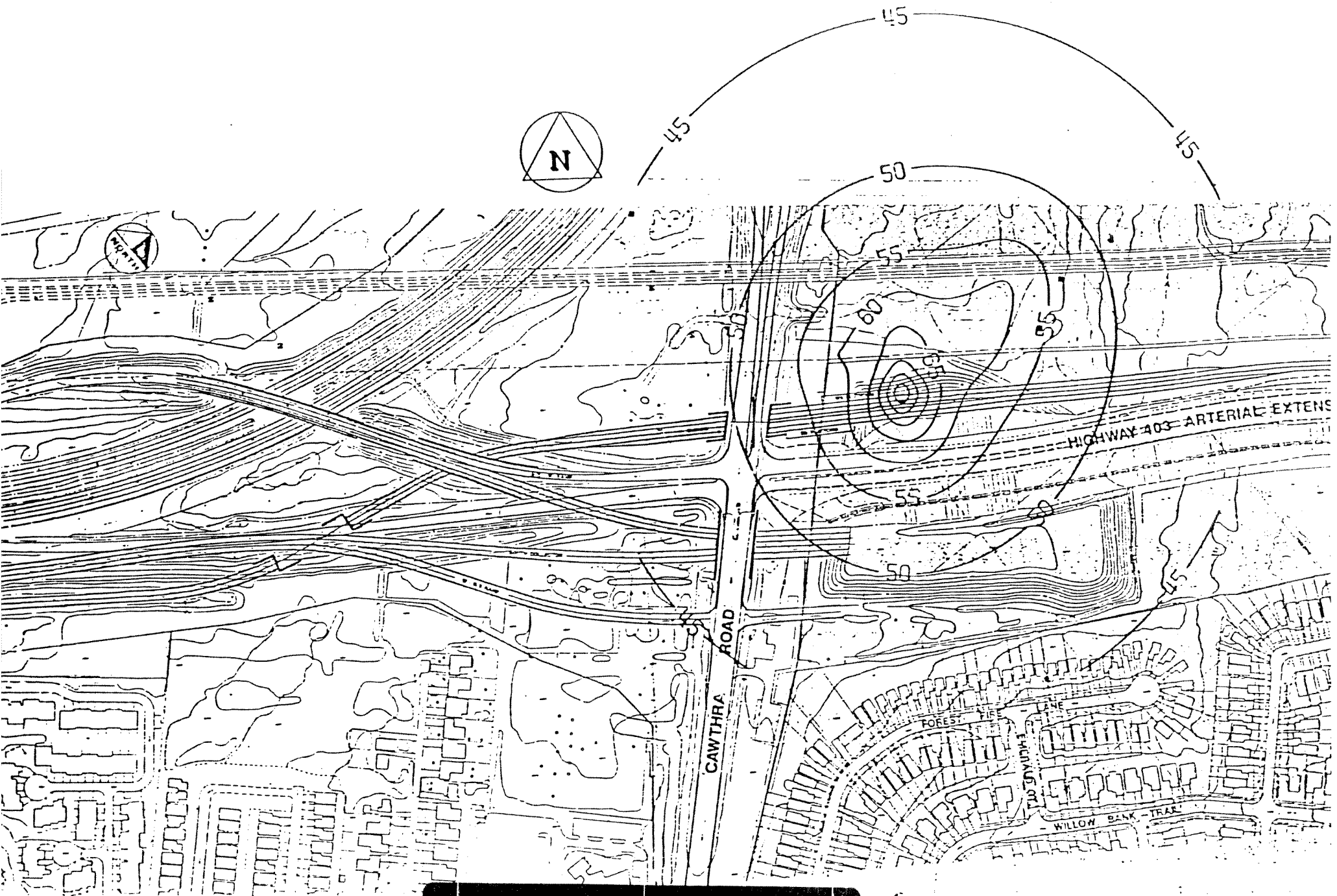


Figure C.9 - Cawthra Road

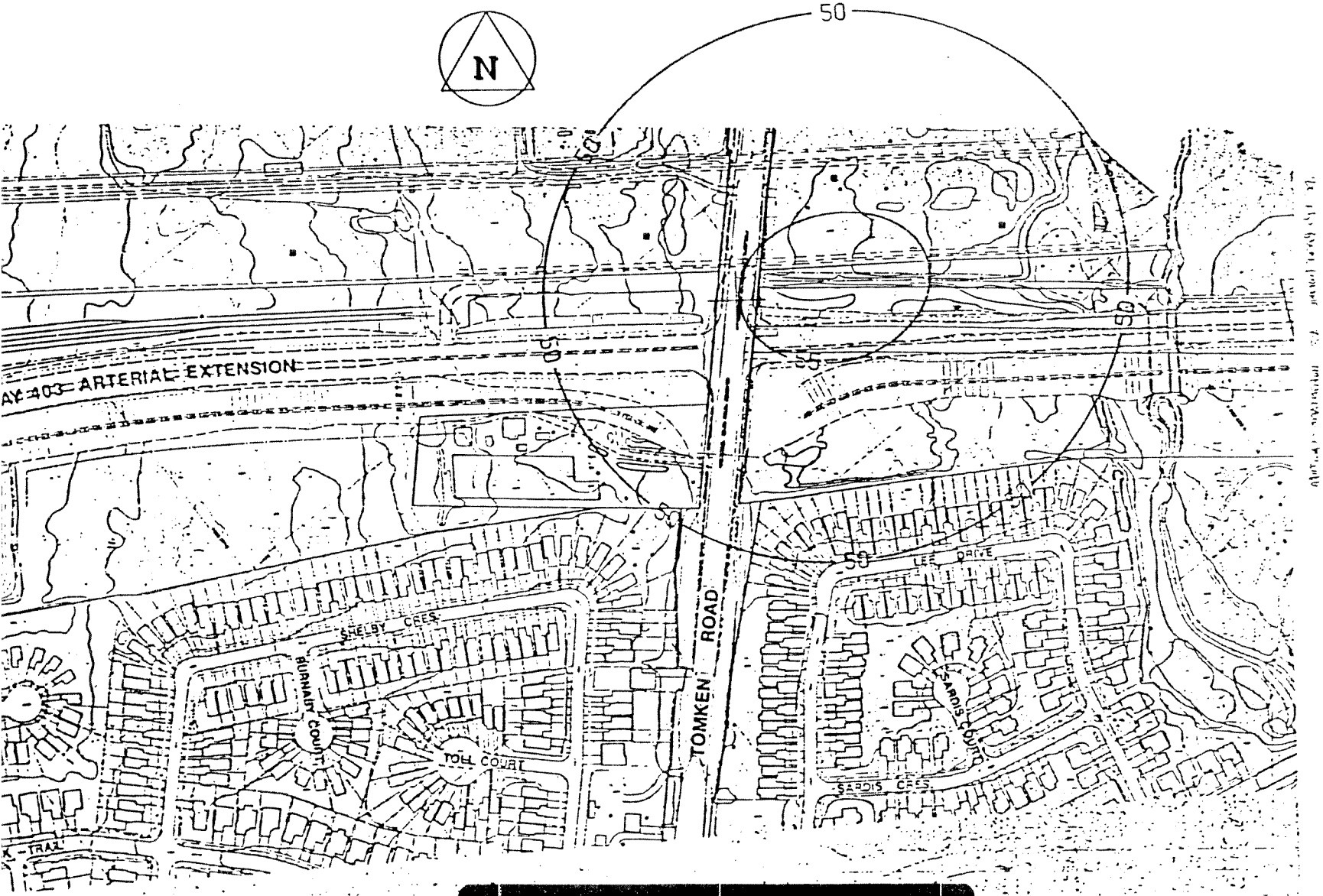


Figure C.10 - Tomken Road

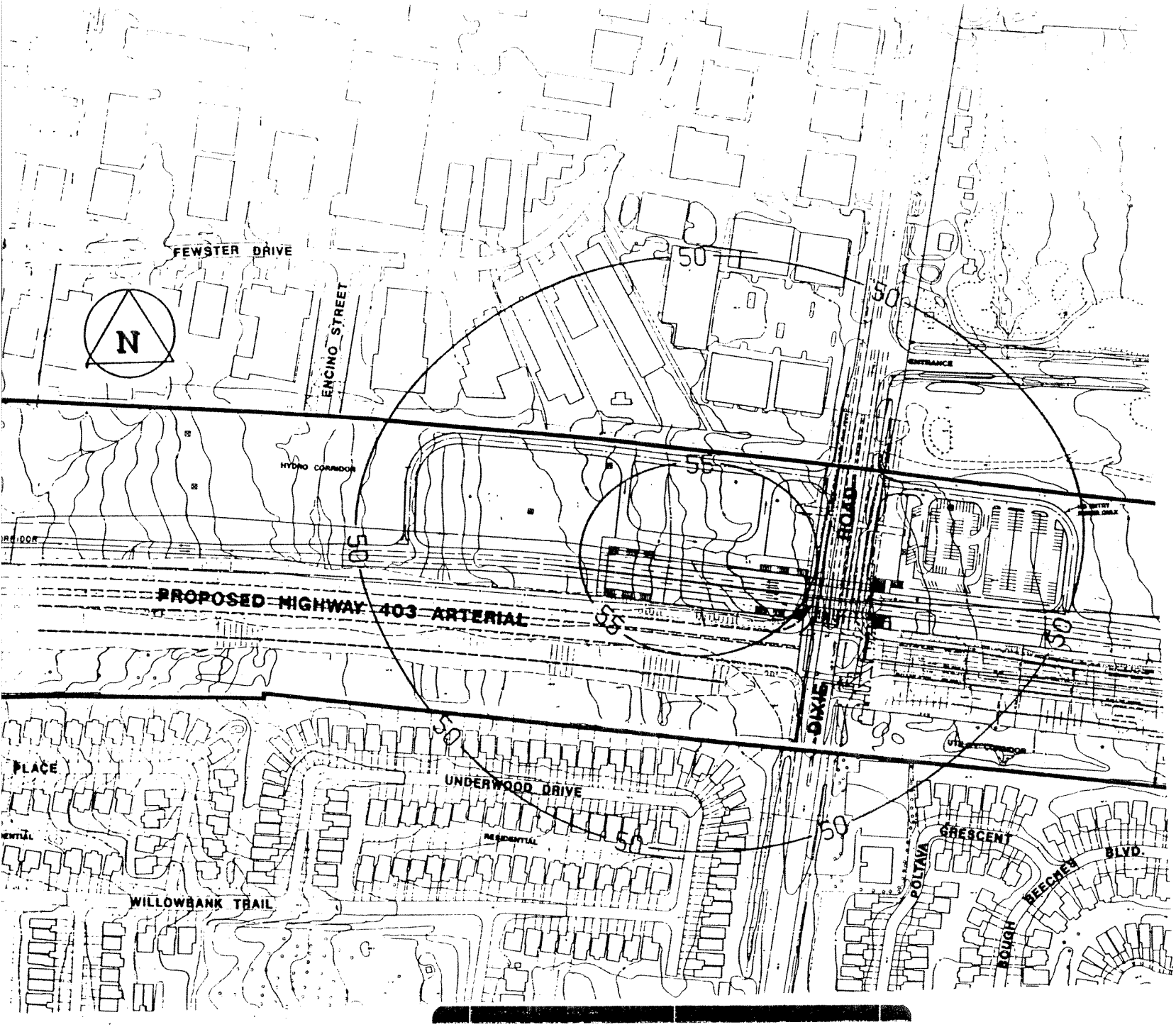


Figure C.11 - Dixie Road

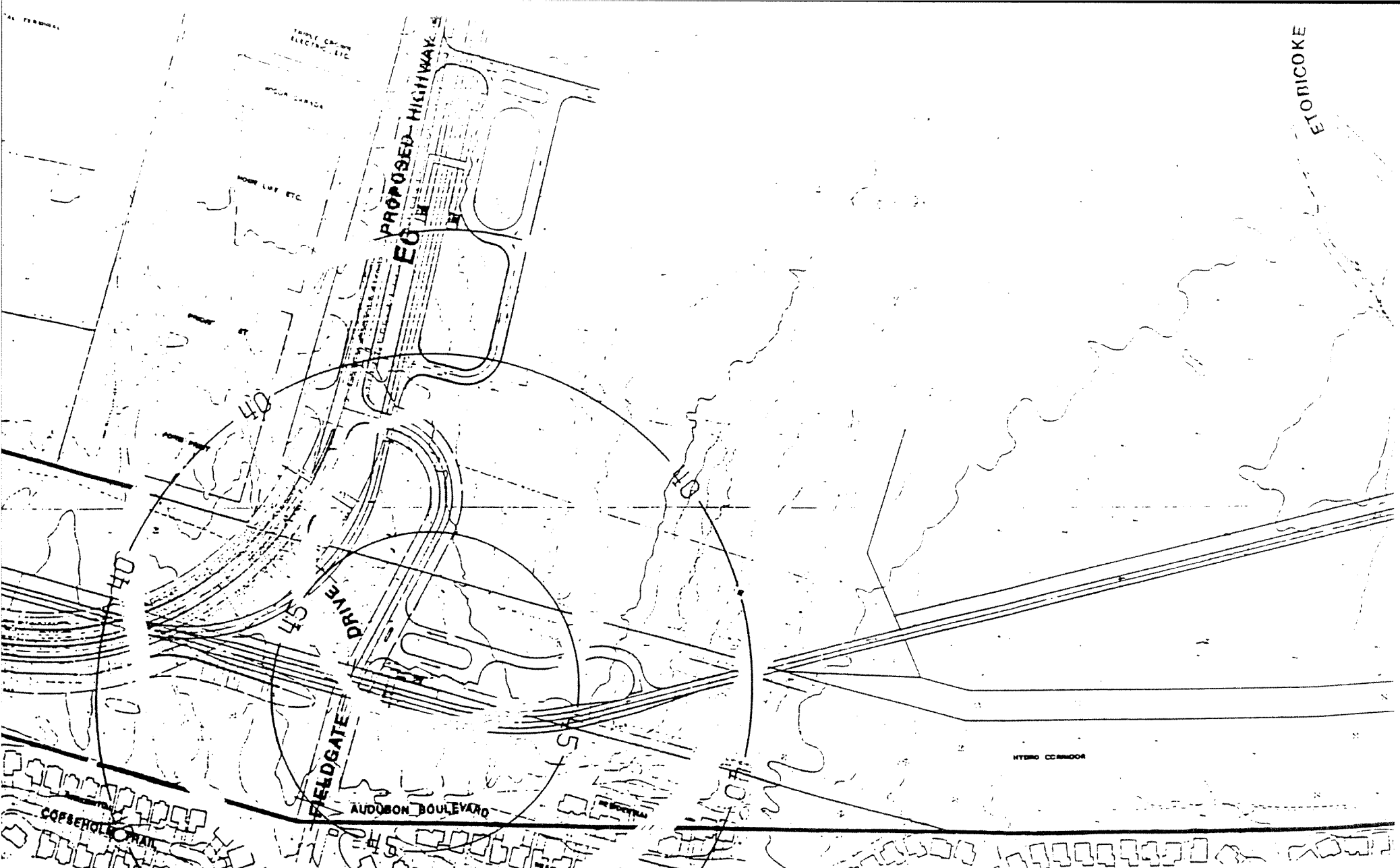


Figure C.12 - Fieldgate Drive

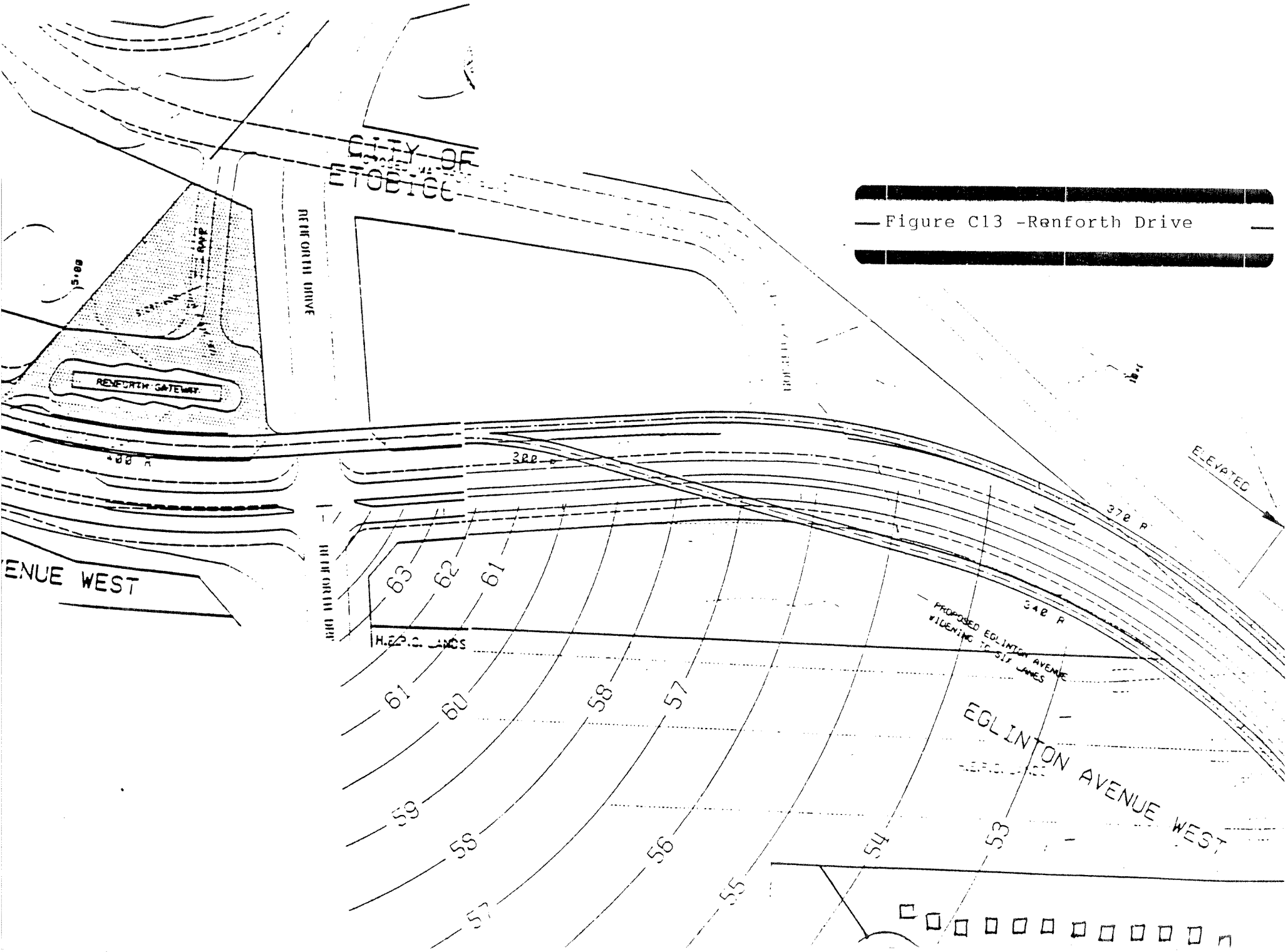


Figure C13 -Renforth Drive

GLOSSARY

GLOSSARY

Some of the terms used in this report may require an explanation.

AADT: is the abbreviation for Annual Average Daily Traffic and refers to the average daily volume of vehicles (cars and trucks) on a roadway for a calendar yard.

Ambient Sound Level: in the context of this report ambient sound level is the level existing in an area of at a receptor without the addition of any noise which may be generated by the operations under consideration.

dBA: The decibel (dB) is a dimensionless measure of sound pressure level. "A weighting" is the frequency weighting characteristic intended to approximate the relative sensitivity of the normal human ear to different frequencies (pitches) of sound.

Heavy Trucks (H.T.): Cargo vehicles having 3 or more axles. Generally, the vehicle gross weight is more than 12,000 Kg. inter-city buses are also classified as heavy vehicles.

Leq: The equivalent energy sound level (Leq) is the value of the constant sound level which would result in exposure to the same total A-weighted energy as would the specified time-varying sound, if the constant sound level persisted over an equal time interval. It is measured in dBA.

Medium Trucks (M.T.): Cargo vehicles having 2 axles and 6 wheels. Generally, the vehicle gross weight is within the range 4,500 to 12,000 Kg. Urban transit buses are classified as medium trucks.

Pascal: is a unit for measurement of pressure expressed in the International System (SI) of Units.

Sound Level: is the weighted sound pressure level.

Sound Pressure Level (SPL): in decibels, at a point is 20 times the logarithm (to the base 10) of the ratio of the effective pressure of a sound (at the point) to a reference pressure of 20 micro pascals.

Decibel: The "decibel" is a dimensionless measure of sound level or sound pressure level; see sound pressure level.

Frequency: The "frequency" of a periodic quantity is the number of times that the quantity repeats itself in a unit interval of time. The unit of measurement is hertz (Hz) which is the same as cycles per second.

Percentile Sound Level: The "x percentile sound level", designated L_x, is the statistical sound level exceeded x percent of a specified time period. It is measured in dBA most commonly used descriptors are L_{10}, L_{50} and L_{90}.

Sound: "Sound" is an oscillation in pressure, stress, particle displacement or particle velocity, in a medium with internal forces (e.g. elastic, viscous), or the superposition of such propagated oscillations, which may cause an auditory sensation.

Noise: "Noise" is defined as any unwanted sound.

APPENDIX A
GENERAL PROCEDURES AND ADJUSTMENTS

APPENDIX A

GENERAL PROCEDURES AND ADJUSTMENTS

1.1 MOE ROAD TRAFFIC NOISE PREDICTION TECHNIQUE

The road traffic noise assessment method is based on a model originally developed by the U.S. Federal Highway Administration in 1978 as modified by the Ontario Ministry of the Environment to suit the provincial requirements.

The analytical model predicts hourly Leq due to road traffic. It is modular in structure and thereby lends itself to applications requiring detailed analysis.

The variables required for the road traffic assessment include the following: road traffic volume per hour, percentages of automobiles, medium trucks and heavy trucks, average speed of traffic flow, roadway gradient, source to receiver distance(s), type of ground cover, road element size and shielding applicable.

The details of the model could be found in the publication "Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT)[1]", Ministry of the Environment, November 1988.

The applicable procedures are summarized in the following paragraphs. Sample calculations are included in this report for a typical receiver location.

1.1.1. Predicted sound level data are generally based on two daily periods or the full 24 hour period as requested by the MOE for specific sources:

07:00 to 23:00 hours
23:00 to 07:00 hours

1.1.2. Roadway traffic volumes (AADT) split:

Regional Roads	Provincial Highways
07:00 to 23:00 hours = 91%	07:00 to 23:00 hours = 85%
23:00 to 07:00 hours = 9%	23:00 to 07:00 hours = 15%

1.1.3. Reference Hour Sound Level:

$$Leq_{ref} = 10 \log \sum_{i=1}^{3} \{K_g \, P_i \, 10^{\frac{(L_0)_i}{10}}\} - 10 \log S + 2.76$$

---

[1] The computerized versions of this model are 'STAMSON 3.0 and STAMSON 4.1'.

$(L_0)_{AUTOMOBIL}$ - 38.1 log(S) - 2.4

$(L_0)_{MEDIUM\ TRUCK}$ - 33.9 log(S) + 16.4

$(L_0)_{HEAVY\ TRUCK}$ - 24.6 log(S) + 38.5

where Leq_{ref} is the reference hourly sound level;
K_g the road gradient adjustment factor for heavy trucks;
P_i the percentage of ith vehicle class, expressed as fraction of the total volume;
$(L_0)_i$ the reference energy mean emission level of ith vehicle class;
S the posted speed limit in km/h.

1.1.4. Adjustments to Reference Level (dB)

o Traffic Volume:

Adjustment = 10 log (V/V_{ref}) = 10 log (V/40)

where V is the total traffic volume.

o Distance:

Adjustment = 10 log $(D_{ref}/D)^{1+\alpha}$

where D_{ref} is reference distance of 15 m.

α = 0 for reflective surfaces (hard ground)

α = 0.66 for absorptive surfaces (soft ground) where $h_{eff} \leq 3$ m

$\alpha = 0.75(1-(h_{eff}/25))$ for absorptive surfaces where $3 < h_{eff} \leq 25$ m

α = 0 for absorptive surfaces where $h_{eff} > 25$ m

$h_{eff} = s + p + t + r$

where h_{eff} is the total effective height.

α is ground absorbtion coefficient.

o Road Segment

<u>Non-Reflective Surface :</u>

$$Adjustment - 10 \log \left\{\frac{1}{\pi}\int_{\Phi_1}^{\Phi_2} \cos^{\alpha}\Phi \, d\Phi\right\}$$

Reflective Surface :

$$Adjustment = 10 \log \{\frac{\Phi_2 - \Phi_1}{\pi}\}$$

where ϕ_1 is the negative angle of view;
ϕ_2 is the positive angle of view.

1.1.5. Typical Receiver and Source Heights:

Outdoor Living Areas (OLA) = 1.5 m

Second Storey Bedroom = 4.5 m

Source Height = 0.5 m where $P_{HT} < 0.01$

Source Height = $\sqrt[4]{100\ P_{HT}}$ where $0.01 \leq P_{HT} \leq 0.30$

Source Height = 2.4 m where $P_{HT} > 0.30$

where P_{HT} is the percentage of heavy trucks, unadjusted by the gradient factor, expressed as a fraction of the total volume.

1.2 BARRIER CALCULATION MODEL

1.2.1. Barrier attenuation is calculated using optical diffraction theory.

1.2.2. Attenuation for road traffic noise is calculated at 500 Hz for an incoherent infinite line source.

1.2.3. The barrier prediction model has been developed by the National Research Council which is somewhat more conservative than the Kurze and Anderson original model.

$$Barrier\ Atenuation = 0\ dB, \qquad for\ (N_0)_i \cos\phi \leq -0.1916$$

$$Barrier\ Attenuation = 10\log\{\frac{1}{\Phi_2-\Phi_1}\int_{\Phi_1}^{\Phi_2}\frac{\tan^2\sqrt{2\pi\,|N_0|_i\cos\phi}}{\sqrt{10}\ 2\pi\,|N_0|_i\cos\phi}\,d\Phi\},$$

$$for\ -0.1916 \leq (N_0)_i \cos\phi \leq 0$$

$$Barrier\ Attenuation = 10\log\{\frac{1}{\Phi_2-\Phi_1}\int_{\Phi_1}^{\Phi_2}\frac{\tanh^2\sqrt{2\pi\,(N_0)_i\cos\phi}}{\sqrt{10}\ 2\pi\,(N_0)_i\cos\phi}\,d\Phi\},$$

$$for\ 0 \leq (N_0)_i \cos\phi \leq 5.03$$

$$Barrier\ Attenuation = 20\ dBA \qquad for\ (N_0)_i \cos\phi \geq 5.03$$

where N_0 is Fresnel Number, $N_0 = 2.915 \times (P.L.D.)$

APPENDIX B
MEASUREMENT PROCEDURES AND RESULTS

APPENDIX B

MEASUREMENT OF BUS SOUND LEVELS

B.1 INTRODUCTION

The scope of the bus noise measurements is to conduct actual field testing of the sound levels emitted by the City of Mississauga buses when operated under normal operating conditions for the purpose of estimating the overall sound levels generated by the proposed bus stations. The bus sound levels measured may be considered as sound emission levels for buses performing different operations such as idling, accelerating, decelerating, ... etc. within a typical station.

B.2 TEST LOCATION AND BUSES USED

The measurements were conducted within the service and storage facilities owned by the City of Mississauga Transit located in the City of Mississauga.

Testing was conducted on an access lane adjacent to the storage building where buses would have adequate distance to reach the desired speeds or to stop where required at a specially marked location. A plan view and photographs of parts of the test lane are shown in Figures B.1 and B.2. Bus noise measurements were conducted while the bus was operating between the two outer markers (North and South markers) when moving or at the centre marker when stationary.

The buses tested included Orion and GM units which are typical of the Mississauga Transit fleet that will be used on the proposed busway corridor. The tests also included an articulated GM unit due to the potential for higher sound levels. Figures B.3 and B.4 illustrate the tested buses.

The test area is a relatively flat asphalt area with very little sound absorbing surfaces, such as grass or trees, from the bus to the measurement position. Therefore, the levels are expected to be reasonably conservative.

There was one major acoustically reflecting surface within 20 metres from the measurement position which is the east side of the Mississauga Transit garage building shown in Figure B.2, the effect of which was accounted for in the final results.

B.3 EQUIPMENT USED AND PROCEDURES

A precision Sound Level Meter, B&K Type 2218 was used to measure the steady noise emitted by the different noise sources in accordance with the measurement procedure specified by the Ministry of the Environment in Publication NPC-103.

The Sound Level Meter was calibrated before and after the measurements using a precision calibrator, B&K Type 4230 and the microphone was fitted with a windscreen. The weather conditions were favourable as the wind speed was less than 20 km/hr. and there was no precipitation.

The bus drivers were given the instructions to operate their vehicles under normal operating conditions to simulate a variety of activities as described below. Figures B.5 and B.6 illustrate the actual instructions given to the drivers outlining the various test runs.

The maximum sound level, the Leq sound level, the elapsed time and the Single Event Level (SEL) were measured for most of the activities as required.

B.4 RESULTS

Table B.1 includes the results of all tests conducted at a distance of 10m from the centre line of the test lane.

Table B.2 includes a summary of the logarithmically averaged sound levels of the results in Table B.1 which were used for the sound level modelling after adjusting the levels by 1 dB to remove the effect of the extra reflection off the wall near the measurement location. The levels in Table B.2 are considered the Sound Emission Levels for the various bas activities as detailed in Section 3 of this report.

While the procedures followed in this specific sound level testing are different than that specified by the Federal Government for the testing of new vehicles by the manufacturers, it is worth noting that the measured bus sound levels under a variety of operating conditions did not exceed 79 dBA at 10m (equivalent to 76 dBA at 15m); i.e. the levels are 4 dB lower than the maximum sound level of 83 dBA at 15m for new buses.

TABLE B.1
TEST RESULTS OF BUS SOUND LEVELS

BUS TYPE •ORION (REGULAR) •GM (ARTICULATED)	DIRECTION OF TRAVEL •P = PORT(L) •S = STARBOARD(R)	Leq, dBA	L_{max}, dBA	TIME, HOURS	SEL, dBA	SPEED KM/HR
TEST NO. 1: PASS-BY AT CONSTANT SPEED						
Orion	S	60.1	65	0.009	75.4	5
	P	60.8	66	0.009	77.1	5
GM	S	66	62	0.009	74.2	5
	P	68	63	0.009	76	5
Orion	S	58.2	64	0.008	73.1	10
	P	61.5	66	0.007	75.1	10
GM	S	63.8	68	0.003	74.2	10
	P	71.5	71	0.003	82.6	10
Orion	S	59.4	66	0.004	71.2	20
	P	65.0	70	0.005	75.1	20
GM	S	65.3	69	0.002	74.3	20
	P	68	71	0.002	77	20
TEST NO. 2: STATIONARY BUS						
Orion	Stationary (S)	-	65	-	-	NormalId
	Stationary (P)	-	66	-	-	le
GM	Stationary (S)	-	66	-	-	"
	Stationary (P)	-	65	-	-	"
Orion	Stationary (S)	-	79	-	-	High
	Stationary (P)	-	78	-	-	Idle
GM	Stationary (P)	-	78	-	-	"
	Stationary (S)	-	73	-	-	"

BUS TYPE •ORION (REGULAR) •GM (ARTICULATED)	DIRECTION OF TRAVEL •P = PORT(L) •S = STARBOARD(R)	Leq, dBA	L_{max}, dBA	TIME, HOURS	SEL, dBA	SPEED KM/HR
TEST NO. 3: STOP AND GO AT A STOP SIGN						
Orion	S	67.4	72	0.005	80	N/A
	P	68.6	74	0.005	81.8	"
GM	P	74.4	76	0.004	86.7	"
	S	72.5	79	0.004	84.8	"
TEST NO. 4: LIGHT ACCELERATION						
Orion	S	58.7	63	0.005	71.3	10
	P	63.3	70	0.005	76.3	10
GM	P	66.3	70	0.005	79.5	10
	S	66.8	72	0.004	77.6	10
Orion	S	60.2	64	0.003	71.3	20
	P	65.2	72	0.004	76.9	20
GM	P	69.7	74	0.002	79.7	20
	S	63.0	69	0.002	73.8	20
TEST NO. 5: TYPICAL STOP AND GO AT A BUS STOP						
Orion	S	66.8	75	0.010	82.6	
	P	70.5	78	0.010	85.8	
GM	P	72.4	79	0.007	86.5	
	S	69.8	77	0.006	83.6	

TABLE B.2
SUMMARY OF BUS SOUND EMISSION LEVELS

BUS ACTIVITY	SOUND EMISSION LEVEL
Stop and Go at a Stop Sign	71.5 dBA @ 10 m
Light Acceleration @ 10 km/hr.	69.7 dBA @ 10 m
Light Acceleration @ 20 km/hr.	71.0 dBA @ 10 m
Bus Idling (Normal Idle)	65.5 dBA @ 10 m (3 minutes)
Stop and Go at a Bus Stop	77.5 dBA @ 10 m

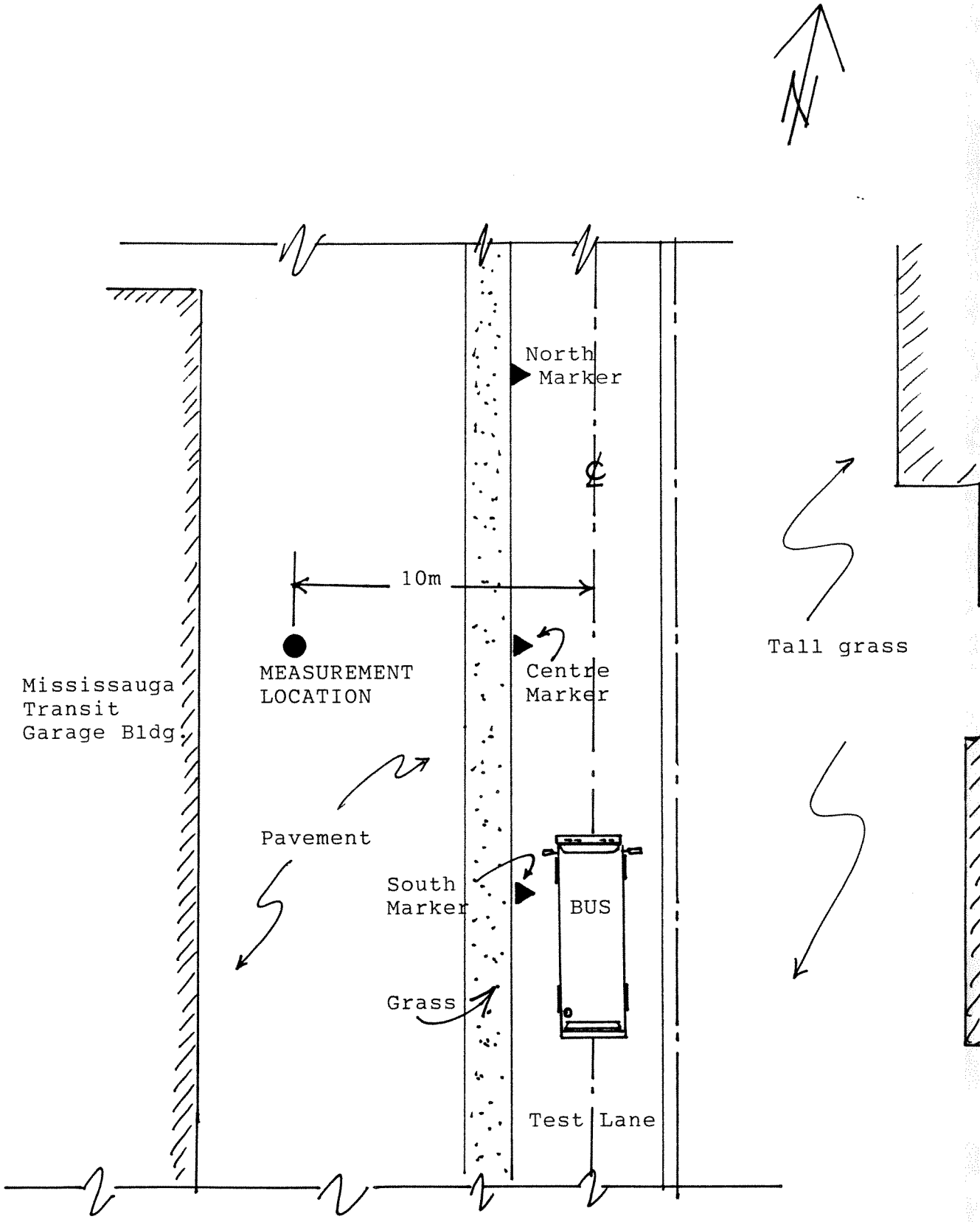
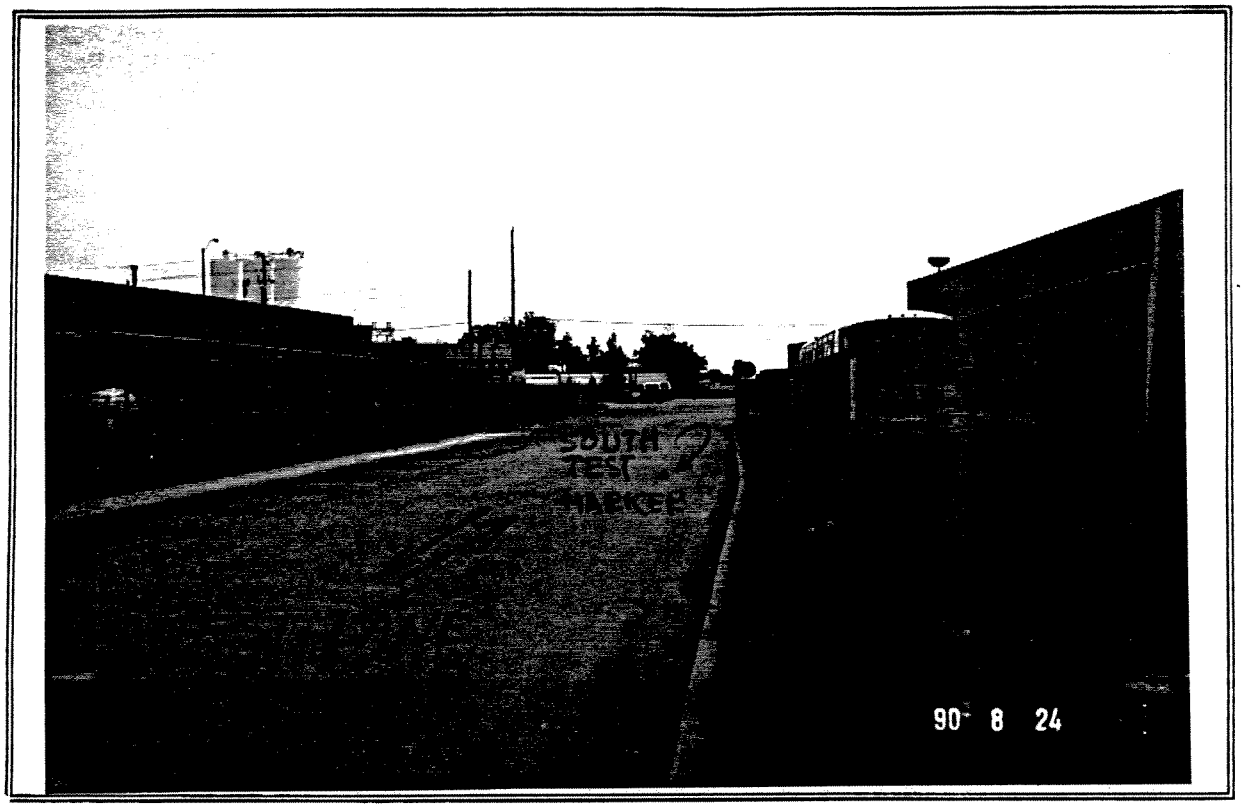
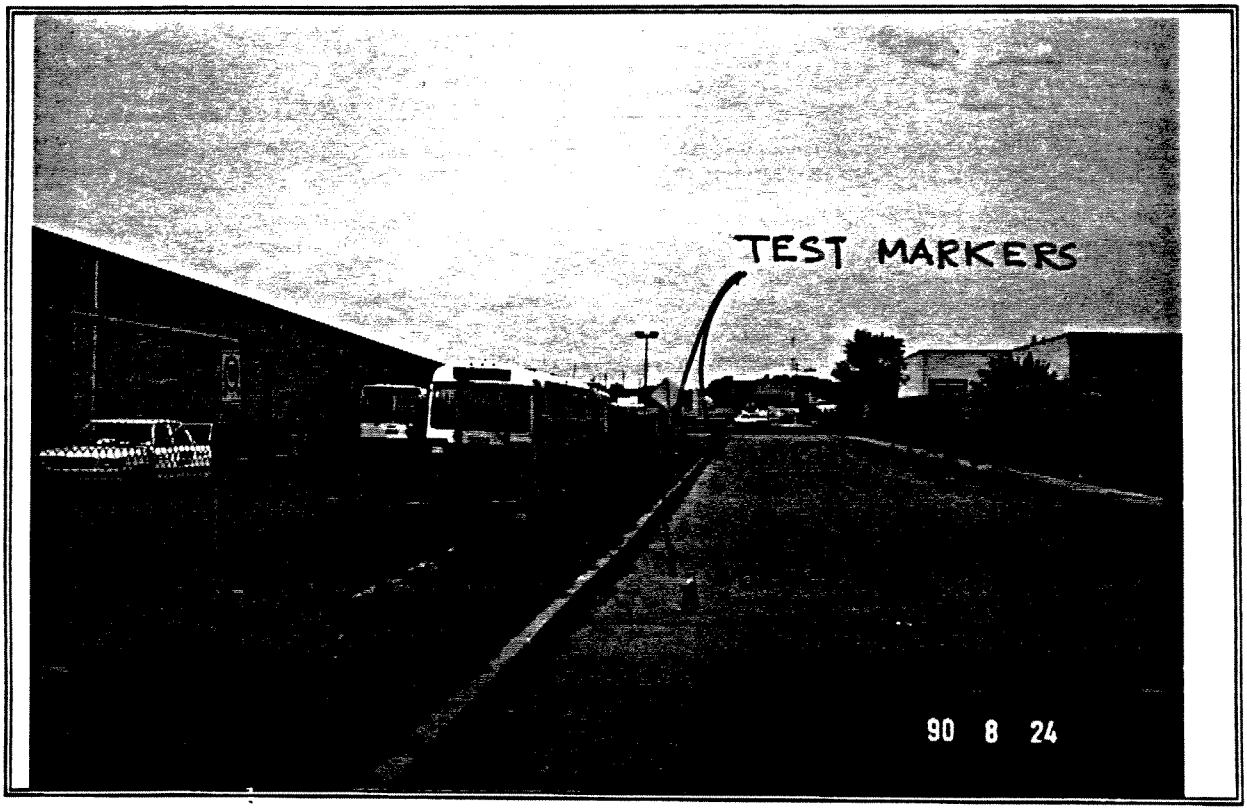


FIGURE B.1 : MEASUREMENT LOCATION



(a) View looking south



(b) View looking north

FIGURE B.2 : VIEW OF THE TEST AREA

(a) Front View

(b) Side View

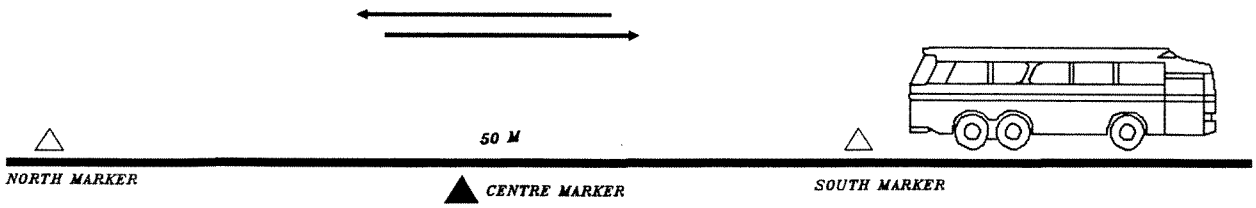
FIGURE B.3: ORION TEST BUS

(a) Front View

(b) Side View

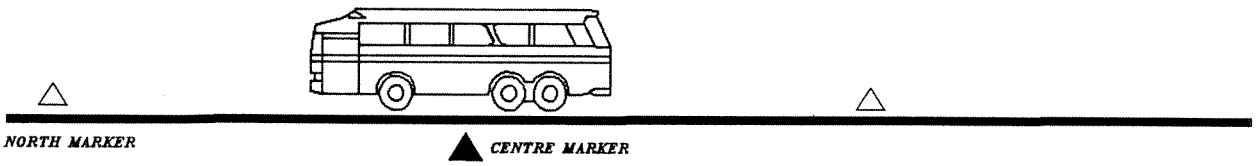
FIGURE B.4 : G.M. TEST BUS

TEST # 1 PASS-BY AT CONSTANT SPEED



PASS-BY AT :
(a). 5 KM/HR
(b). 10 KM/HR
(c). 20 KM/HR

TEST # 2 STATIONARY BUS



(a). NORMAL IDLE AT STATION /BUS STOP
(b). HIGH IDLE DURING START UP

TEST # 3 STOP AND GO AT A STOP SIGN

(DECELERATION AND ACCELERATION)

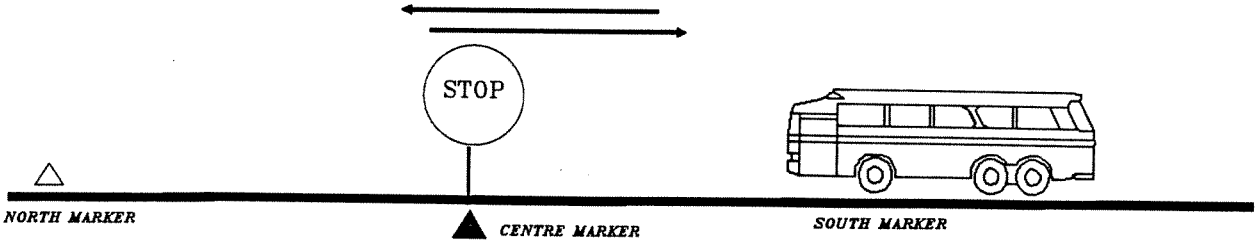
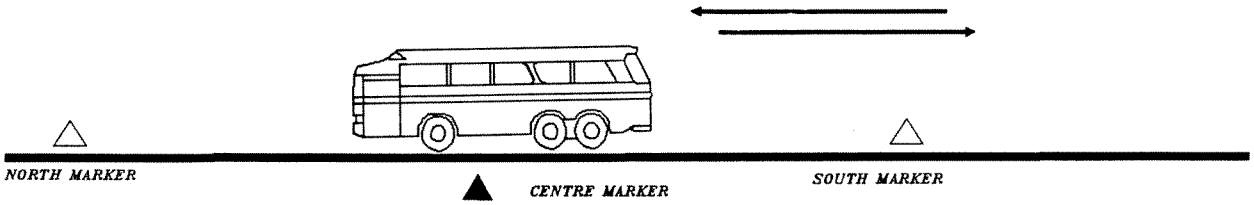


FIGURE B.5

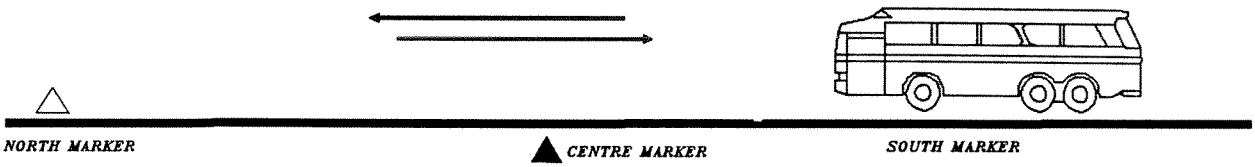
TEST # 4 LIGHT ACCELERATION



(a). 10 KM/HR
(b). 20 KM/HR

TEST # 5 TYPICAL STOP AT A BUS STOP

(DECELERATION AND ACCELERATION)



(a). NORMAL IDLE AT STATION /BUS STOP
(b). HIGH IDLE DURING START UP

FIGURE B.6

APPENDIX C
SAMPLE SOUND LEVEL CALCULATION

AMBIENT SOUND LEVEL CALCULATIONS - RECEPTOR A4

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:29 1990

Name of datafile: A4-AMB.MET Road element 1 of 5

Car traffic volume	=	2126	vehicles per hour
Medium truck traffic volume	=	203	vehicles per hour
Heavy truck traffic volume	=	203	vehicles per hour
Legal speed limit	=	100	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-50	degrees
Road angle 2	=	90	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	230.00	metres
Barrier-receiver distance	=	36.00	metres
Road elevation	=	173.00	metres
Receiver ground elevation	=	174.00	metres
Barrier base elevation	=	174.00	metres
Barrier angle 1	=	-50	degrees
Barrier angle 2	=	90	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	90	0.65	80.26	0.00	-19.62	-2.13			-3.63	54.89

Element Leq = 54.9 dBA WARNING: Bright zone

O N T A R I O M I N I S T R Y O F T H E E N V I R O N M E N T

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

R O A D T R A F F I C N O I S E P R E D I C T I O N M O D E L

S T A M S O N V e r s i o n 3.00

Document date and time: Fri Nov 23 12:20:29 1990

Name of datafile: A4-AMB.MET Road element 2 of 5

Car traffic volume	= 2126	vehicles per hour
Medium truck traffic volume	= 203	vehicles per hour
Heavy truck traffic volume	= 203	vehicles per hour
Legal speed limit	= 100	kilometres per hour
Road gradient	= 0.0	percent
Road angle 1	= -50	degrees
Road angle 2	= 90	degrees
Road pavement type	= 1	=> typical asphalt or concrete.
Depth of woods	= 0	=> no woods.
No. of rows of houses	= 0	rows
Intermediate surface type	= 1	=> absorptive
Topography	= 2	=> flat/gentle slope; with barrier.
Receiver height	= 1.50	metres
Barrier height	= 0.00	metres
Source-receiver distance	= 250.00	metres
Barrier-receiver distance	= 36.00	metres
Road elevation	= 174.00	metres
Receiver ground elevation	= 174.00	metres
Barrier base elevation	= 174.00	metres
Barrier angle 1	= -50	degrees
Barrier angle 2	= 90	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	90	0.65	80.26	0.00	-20.22	-2.13			-3.26	54.66

Element Leq = 54.7 dBA WARNING: Bright zone

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:29 1990

Name of datafile: A4-AMB.MET Road element 3 of 5

Car traffic volume	=	105	vehicles per hour
Medium truck traffic volume	=	10	vehicles per hour
Heavy truck traffic volume	=	10	vehicles per hour
Legal speed limit	=	40	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-35	degrees
Road angle 2	=	90	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	200.00	metres
Barrier-receiver distance	=	36.00	metres
Road elevation	=	172.00	metres
Receiver ground elevation	=	174.00	metres
Barrier base elevation	=	174.00	metres
Barrier angle 1	=	-35	degrees
Barrier angle 2	=	90	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-35	90	0.65	59.84	0.00	-18.61	-2.64			-4.01	34.58

Element Leq = 34.6 dBA WARNING: Bright zone

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:29 1990

Name of datafile: A4-AMB.MET Road element 4 of 5

Car traffic volume	=	473	vehicles per hour
Medium truck traffic volume	=	45	vehicles per hour
Heavy truck traffic volume	=	45	vehicles per hour
Legal speed limit	=	40	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-10	degrees
Road angle 2	=	30	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	270.00	metres
Barrier-receiver distance	=	36.00	metres
Road elevation	=	174.00	metres
Receiver ground elevation	=	174.00	metres
Barrier base elevation	=	174.00	metres
Barrier angle 1	=	-10	degrees
Barrier angle 2	=	30	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	30	0.65	66.37	0.00	-20.77	-6.63			-2.73	36.23

Element Leq = 36.2 dBA WARNING: Bright zone

O N T A R I O M I N I S T R Y O F T H E E N V I R O N M E N T

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

R O A D T R A F F I C N O I S E P R E D I C T I O N M O D E L

S T A M S O N V e r s i o n 3.00

Document date and time: Fri Nov 23 12:20:29 1990

Name of datafile: A4-AMB.MET Road element 5 of 5

Car traffic volume	= 1328	vehicles per hour
Medium truck traffic volume	= 74	vehicles per hour
Heavy truck traffic volume	= 74	vehicles per hour
Legal speed limit	= 60	kilometres per hour
Road gradient	= 0.0	percent
Road angle 1	= -30	degrees
Road angle 2	= 65	degrees
Road pavement type	= 1	=> typical asphalt or concrete.
Depth of woods	= 0	=> no woods.
No. of rows of houses	= 0	rows
Intermediate surface type	= 1	=> absorptive
Topography	= 4	=> elevated; with barrier.
Receiver height	= 1.50	metres
Barrier height	= 0.00	metres
Elevation change	= 3.00	metres
Source-receiver distance	= 120.00	metres
Barrier-receiver distance	= 70.00	metres
Road elevation	= 177.00	metres
Receiver ground elevation	= 174.00	metres
Barrier base elevation	= 174.00	metres
Barrier angle 1	= -30	degrees
Barrier angle 2	= 65	degrees

Source height = 1.50 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-30	65	0.57	72.07	0.00	-14.18	-3.21			0.00	54.69

Element Leq = 54.7 dBA WARNING: Bright zone

* * * * * Total Leq for all elements = 59.6 dBA * * * * *

BUSWAY TRAFFIC SOUND LEVEL CALCULATIONS - RECEPTOR A4

O N T A R I O M I N I S T R Y O F T H E E N V I R O N M E N T

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

R O A D T R A F F I C N O I S E P R E D I C T I O N M O D E L

S T A M S O N V e r s i o n 3.00

Document date and time: Fri Nov 23 12:20:00 1990

Name of datafile: A4-BUS.MET Road element 1 of 1

Car traffic volume	= 0	vehicles per hour
Medium truck traffic volume	= 300	vehicles per hour
Heavy truck traffic volume	= 0	vehicles per hour
Legal speed limit	= 80	kilometres per hour
Road gradient	= 0.0	percent
Road angle 1	= -50	degrees
Road angle 2	= 90	degrees
Road pavement type	= 1	=> typical asphalt or concrete.
Depth of woods	= 0	=> no woods.
No. of rows of houses	= 0	rows
Intermediate surface type	= 1	=> absorptive
Topography	= 4	=> elevated; with barrier.
Receiver height	= 1.50	metres
Barrier height	= 0.00	metres
Elevation change	= 7.00	metres
Source-receiver distance	= 50.00	metres
Barrier-receiver distance	= 36.00	metres
Road elevation	= 167.00	metres
Receiver ground elevation	= 174.00	metres
Barrier base elevation	= 174.00	metres
Barrier angle 1	= -50	degrees
Barrier angle 2	= 90	degrees

Source height = 0.50 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	90	0.48	73.42	0.00	-7.74	-1.90			-13.87	49.91

Element Leq = 49.9 dBA

* * * * * Total Leq for all elements = 49.9 dBA * * * * *

AMBIENT SOUND LEVEL CALCULATIONS - RECEPTOR A5

O N T A R I O M I N I S T R Y O F T H E E N V I R O N M E N T

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

R O A D T R A F F I C N O I S E P R E D I C T I O N M O D E L

S T A M S O N V e r s i o n 3.00

Document date and time: Fri Nov 23 12:20:18 1990

Name of datafile: A5-AMB.MET Road element 1 of 4

Car traffic volume	=	2441	vehicles per hour
Medium truck traffic volume	=	233	vehicles per hour
Heavy truck traffic volume	=	233	vehicles per hour
Legal speed limit	=	100	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-90	degrees
Road angle 2	=	90	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	206.00	metres
Barrier-receiver distance	=	14.00	metres
Road elevation	=	171.00	metres
Receiver ground elevation	=	173.00	metres
Barrier base elevation	=	173.00	metres
Barrier angle 1	=	-90	degrees
Barrier angle 2	=	90	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	80.86	0.00	-18.82	-1.45			-1.50	59.09

Element Leq = 59.1 dBA WARNING: Bright zone

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:18 1990

Name of datafile: A5-AMB.MET Road element 2 of 4

Car traffic volume	=	2441	vehicles per hour
Medium truck traffic volume	=	233	vehicles per hour
Heavy truck traffic volume	=	233	vehicles per hour
Legal speed limit	=	100	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-90	degrees
Road angle 2	=	90	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	236.00	metres
Barrier-receiver distance	=	14.00	metres
Road elevation	=	171.00	metres
Receiver ground elevation	=	173.00	metres
Barrier base elevation	=	173.00	metres
Barrier angle 1	=	-90	degrees
Barrier angle 2	=	90	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.65	80.86	0.00	-19.80	-1.45			-1.47	58.15

Element Leq = 58.1 dBA WARNING: Bright zone

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:18 1990

Name of datafile: A5-AMB.MET Road element 3 of 4

Car traffic volume	=	840	vehicles per hour
Medium truck traffic volume	=	80	vehicles per hour
Heavy truck traffic volume	=	80	vehicles per hour
Legal speed limit	=	40	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-50	degrees
Road angle 2	=	50	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	216.00	metres
Barrier-receiver distance	=	30.00	metres
Road elevation	=	172.00	metres
Receiver ground elevation	=	173.00	metres
Barrier base elevation	=	173.00	metres
Barrier angle 1	=	-50	degrees
Barrier angle 2	=	50	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	50	0.65	68.87	0.00	-19.17	-2.93			-2.96	43.81

Element Leq = 43.8 dBA WARNING: Bright zone

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:18 1990

Name of datafile: A5-AMB.MET Road element 4 of 4

Car traffic volume	=	105	vehicles per hour
Medium truck traffic volume	=	10	vehicles per hour
Heavy truck traffic volume	=	10	vehicles per hour
Legal speed limit	=	40	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-10	degrees
Road angle 2	=	10	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	2	=> flat/gentle slope; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Source-receiver distance	=	268.00	metres
Barrier-receiver distance	=	50.00	metres
Road elevation	=	173.00	metres
Receiver ground elevation	=	173.00	metres
Barrier base elevation	=	173.00	metres
Barrier angle 1	=	-10	degrees
Barrier angle 2	=	10	degrees

Source height = 1.68 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-10	10	0.65	59.84	0.00	-20.72	-9.56			-3.25	26.31

Element Leq = 26.3 dBA WARNING: Bright zone

* * * * * Total Leq for all elements = 61.7 dBA * * * * *

BUSWAY TRAFFIC SOUND LEVEL CALCULATIONS - RECEPTOR A5

ONTARIO MINISTRY OF THE ENVIRONMENT

NOISE ASSESSMENT & SYSTEMS SUPPORT UNIT

ROAD TRAFFIC NOISE PREDICTION MODEL

STAMSON Version 3.00

Document date and time: Fri Nov 23 12:20:09 1990

Name of datafile: A5-BUS.MET Road element 1 of 1

Car traffic volume	=	0	vehicles per hour
Medium truck traffic volume	=	56	vehicles per hour
Heavy truck traffic volume	=	0	vehicles per hour
Legal speed limit	=	80	kilometres per hour
Road gradient	=	0.0	percent
Road angle 1	=	-90	degrees
Road angle 2	=	90	degrees
Road pavement type	=	1	=> typical asphalt or concrete.
Depth of woods	=	0	=> no woods.
No. of rows of houses	=	0	rows
Intermediate surface type	=	1	=> absorptive
Topography	=	4	=> elevated; with barrier.
Receiver height	=	1.50	metres
Barrier height	=	0.00	metres
Elevation change	=	8.00	metres
Source-receiver distance	=	40.00	metres
Barrier-receiver distance	=	14.00	metres
Road elevation	=	165.00	metres
Receiver ground elevation	=	173.00	metres
Barrier base elevation	=	173.00	metres
Barrier angle 1	=	-90	degrees
Barrier angle 2	=	90	degrees

Source height = 0.50 metres

angle1	angle2	alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.45	66.13	0.00	-6.18	-1.08			-8.08	50.79

Element Leq = 50.8 dBA

* * * * * Total Leq for all elements = 50.8 dBA * * * * *

WINSTON CHURCHILL STATION
STATION ACTIVITIES SOUND LEVEL CONTOURS CALCULATIONS

W90-71.1

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: BUS STOP & GO
X-Coordinate: 27.00
Y-Coordinate: 100.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.09
Correcion Details:

Code: S1
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS STOP & GO
X-Coordinate: 27.00
Y-Coordinate: 110.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.09
Correcion Details:

Code: S2
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH
X-Coordinate: 67.00
Y-Coordinate: 111.00
Z-Coordinate 11.00
Number of Events: 20
Duration of Each Event: 0.13
Correcion Details:

Code: S3
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.2

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: LIGHT ACC. AT 20 KPH
X-Coordinate: 124.00
Y-Coordinate: 112.00
Z-Coordinate 11.00
Number of Events: 20
Duration of Each Event: 0.13
Correcion Details:

Code: S4
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. AT 20 KPH
X-Coordinate: 152.00
Y-Coordinate: 112.00
Z-Coordinate 11.00
Number of Events: 20
Duration of Each Event: 0.13
Correcion Details:

Code: S5
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS STOP & GO
X-Coordinate: 177.00
Y-Coordinate: 112.00
Z-Coordinate 11.00
Number of Events: 20
Duration of Each Event: 0.15
Correcion Details:

Code: S6
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.3

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: BUS STOP & GO
X-Coordinate: 190.00
Y-Coordinate: 105.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.15
Correcion Details:

Code: S7
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS STOP & GO
X-Coordinate: 185.00
Y-Coordinate: 84.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.24
Correcion Details:

Code: S8
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS IDLING
X-Coordinate: 167.00
Y-Coordinate: 78.00
Z-Coordinate 11.00
Number of Events: 4
Duration of Each Event: 3.00
Correcion Details:

Code: S9
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.4

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 167.00
Y-Coordinate: 73.00
Z-Coordinate 11.00
Number of Events: 4
Duration of Each Event: 0.12
Correcion Details:

Code: S10
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: IDLING
X-Coordinate: 135.00
Y-Coordinate: 78.00
Z-Coordinate 11.00
Number of Events: 4
Duration of Each Event: 3.00
Correcion Details:

Code: S11
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 135.00
Y-Coordinate: 73.00
Z-Coordinate 11.00
Number of Events: 4
Duration of Each Event: 0.12
Correcion Details:

Code: S12
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.5

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: BUS IDLING
X-Coordinate: 115.00
Y-Coordinate: 78.00
Z-Coordinate 11.00
Number of Events: 4
Duration of Each Event: 3.00
Correcion Details:

Code: S13
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 115.00
Y-Coordinate: 73.00
Z-Coordinate 11.00
Number of Events: 1
Duration of Each Event: 0.12
Correcion Details:

Code: S14
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: IDLING
X-Coordinate: 100.00
Y-Coordinate: 78.00
Z-Coordinate 11.00
Number of Events: 1
Duration of Each Event: 3.00
Correcion Details:

Code: S15
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.6

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP AND GO
X-Coordinate: 100.00
Y-Coordinate: 73.00
Z-Coordinate 11.00
Number of Events: 1
Duration of Each Event: 0.12
Correcion Details:

Code: S16
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS STOP & GO
X-Coordinate: 55.00
Y-Coordinate: 79.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.18
Correcion Details:

Code: S19
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: BUS STOP & GO
X-Coordinate: 38.00
Y-Coordinate: 92.00
Z-Coordinate 10.00
Number of Events: 10
Duration of Each Event: 0.12
Correcion Details:

Code: S20
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 69.70
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.7

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: LIGHT ACC. 20KM/HR.
X-Coordinate: 35.00
Y-Coordinate: 118.00
Z-Coordinate 9.00
Number of Events: 10
Duration of Each Event: 0.12
Correcion Details:

Code: S21
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 10KPH
X-Coordinate: 43.00
Y-Coordinate: 144.00
Z-Coordinate 10.00
Number of Events: 10
Duration of Each Event: 0.06
Correcion Details:

Code: S22
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 69.70
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 20KPH
X-Coordinate: 75.00
Y-Coordinate: 148.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.14
Correcion Details:

Code: S23
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.8

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: ACC. 20KPH
X-Coordinate: 125.00
Y-Coordinate: 148.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.14
Correcion Details:

Code: S24
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 20KPH
X-Coordinate: 155.00
Y-Coordinate: 148.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.14
Correcion Details:

Code: S25
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 10KPH
X-Coordinate: 185.00
Y-Coordinate: 138.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.09
Correcion Details:

Code: S26
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 69.70
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.9

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 188.00
Y-Coordinate: 122.00
Z-Coordinate 11.00
Number of Events: 10
Duration of Each Event: 0.15
Correcion Details:

Code: S27
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 20 KPH
X-Coordinate: 214.00
Y-Coordinate: 112.00
Z-Coordinate 10.00
Number of Events: 16
Duration of Each Event: 0.11
Correcion Details:

Code: S28
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 20 KPH
X-Coordinate: 250.00
Y-Coordinate: 112.00
Z-Coordinate 9.00
Number of Events: 16
Duration of Each Event: 0.11
Correcion Details: 0

Code: S29
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.10

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: ACC. 10 KPH
X-Coordinate: 269.00
Y-Coordinate: 101.00
Z-Coordinate 7.00
Number of Events: 16
Duration of Each Event: 0.12
Correcion Details:

Code: S30
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 69.70
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: ACC. 10 KPH
X-Coordinate: 274.00
Y-Coordinate: 77.00
Z-Coordinate 5.00
Number of Events: 16
Duration of Each Event: 0.12
Correcion Details:

Code: S31
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 69.70
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 265.00
Y-Coordinate: 59.00
Z-Coordinate 3.00
Number of Events: 4
Duration of Each Event: 0.18
Correcion Details:

Code: S32
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.11

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 265.00
Y-Coordinate: 45.00
Z-Coordinate 3.00
Number of Events: 4
Duration of Each Event: 0.18
Correcion Details:

Code: S33
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 285.00
Y-Coordinate: 59.00
Z-Coordinate 3.00
Number of Events: 8
Duration of Each Event: 0.18
Correcion Details:

Code: S35
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 71.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO AT BUS STOP
X-Coordinate: 90.00
Y-Coordinate: 57.00
Z-Coordinate 3.00
Number of Events: 6
Duration of Each Event: 0.60
Correcion Details:

Code: S36
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 77.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: -3

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.12

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO AT BUS STOP
X-Coordinate: 90.00
Y-Coordinate: 44.00
Z-Coordinate 3.00
Number of Events: 4
Duration of Each Event: 0.60
Correcion Details:

Code: S37
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 77.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: -3

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO AT BUS STOP
X-Coordinate: 50.00
Y-Coordinate: 57.00
Z-Coordinate 3.00
Number of Events: 5
Duration of Each Event: 0.60
Correcion Details:

Code: S38
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 77.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: -3

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO AT BUS STOP
X-Coordinate: 50.00
Y-Coordinate: 44.00
Z-Coordinate 3.00
Number of Events: 3
Duration of Each Event: 0.60
Correcion Details:

Code: S39
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 77.50
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: -3

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.13

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: CAR STOP & GO
X-Coordinate: 27.00
Y-Coordinate: 100.00
Z-Coordinate 9.50
Number of Events: 66
Duration of Each Event: 0.09
Correcion Details:

Code: S40
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: CAR STOP & GO
X-Coordinate: 27.00
Y-Coordinate: 110.00
Z-Coordinate 9.50
Number of Events: 166
Duration of Each Event: 0.09
Correcion Details:

Code: S41
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 67.00
Y-Coordinate: 111.00
Z-Coordinate 9.50
Number of Events: 232
Duration of Each Event: 0.10
Correcion Details:

Code: S42
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.14

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 100.00
Y-Coordinate: 112.00
Z-Coordinate 9.50
Number of Events: 232
Duration of Each Event: 0.10
Correcion Details:

Code: S43
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 124.00
Y-Coordinate: 112.00
Z-Coordinate 9.50
Number of Events: 232
Duration of Each Event: 0.10
Correcion Details:

Code: S44
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 152.00
Y-Coordinate: 112.00
Z-Coordinate 9.50
Number of Events: 232
Duration of Each Event: 0.10
Correcion Details:

Code: S45
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.15

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 177.00
Y-Coordinate: 112.00
Z-Coordinate 9.50
Number of Events: 232
Duration of Each Event: 0.15
Correcion Details:

Code: S46
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 214.00
Y-Coordinate: 112.00
Z-Coordinate 8.50
Number of Events: 232
Duration of Each Event: 0.11
Correcion Details:

Code: S47
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 250.00
Y-Coordinate: 112.00
Z-Coordinate 7.50
Number of Events: 100
Duration of Each Event: 0.11
Correcion Details:

Code: S48
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.16

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: LIGHT ACC. 20 KPH CARS
X-Coordinate: 290.00
Y-Coordinate: 112.00
Z-Coordinate 7.50
Number of Events: 100
Duration of Each Event: 0.11
Correcion Details:

Code: S49
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 61.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO CARS
X-Coordinate: 317.00
Y-Coordinate: 112.00
Z-Coordinate 7.50
Number of Events: 100
Duration of Each Event: 1.50
Correcion Details:

Code: S50
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: CARS IDLING
X-Coordinate: 372.00
Y-Coordinate: 112.00
Z-Coordinate 7.50
Number of Events: 100
Duration of Each Event: 1.50
Correcion Details:

Code: S51
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 55.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.17

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 230.00
Y-Coordinate: 105.00
Z-Coordinate 8.50
Number of Events: 132
Duration of Each Event: 0.05
Correcion Details:

Code: S52
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 249.00
Y-Coordinate: 95.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.18
Correcion Details:

Code: S53
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 265.00
Y-Coordinate: 80.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.12
Correcion Details:

Code: S54
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.18

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 249.00
Y-Coordinate: 65.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.18
Correcion Details:

Code: S55
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 220.00
Y-Coordinate: 65.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.18
Correcion Details:

Code: S56
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

Source: STOP & GO
X-Coordinate: 200.00
Y-Coordinate: 80.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.12
Correcion Details:

Code: S57
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.19

WINSTON CHURCHILL BLVD.

SOURCE & RECEIVER INPUT DATA

Source: STOP & GO
X-Coordinate: 205.00
Y-Coordinate: 95.00
Z-Coordinate 8.50
Number of Events: 66
Duration of Each Event: 0.18
Correcion Details:

Code: S58
Reference Distance: 10.00
Distance Reduction Factor: 20.00
Reference Sound Level: 65.00
Atmospheric Attenuation: Y
Predominant Frequency: 500
dB: 0

Receiver: HOUSE ON LOT A4
X-Coordinate: 130.00
Y-Coordinate: 0.00
Z-Coordinate: 9.50
Correcion Details: N

Code: R1
Ground Attenuation: N

dB: 0

W90-71.20

WINSTON CHURCHILL BLVD.

INTERMEDIATE RESULTS

Source Code	Receiver Code	Reference Sound Level(dB)	Source Receiver Distance(m)	Distance Correction (dB)	Attenuation Ground (dB)	Attenuation Atmospheric (dB)	Correction Source (dB)	Correction Receiver (dB)	Correction Time (dB)	Net Sound Level (dB)
S1	R1	71.50	143.56	-23.14	0.00	0.33	0	0	-18.24	29.79
S2	R1	71.50	150.70	-23.56	0.00	0.35	0	0	-18.24	29.35
S3	R1	71.00	127.63	-22.12	0.00	0.29	0	0	-13.63	34.96
S4	R1	71.00	112.16	-21.00	0.00	0.26	0	0	-13.63	36.11
S5	R1	71.00	114.14	-21.15	0.00	0.26	0	0	-13.63	35.96
S6	R1	71.50	121.46	-21.69	0.00	0.28	0	0	-13.01	36.52
S7	R1	71.50	120.93	-21.65	0.00	0.28	0	0	-16.02	33.55
S8	R1	71.50	100.40	-20.04	0.00	0.23	0	0	-13.98	37.25
S9	R1	65.50	86.33	-18.72	0.00	0.20	0	0	-6.99	39.59
S10	R1	71.50	81.84	-18.26	0.00	0.19	0	0	-20.97	32.08
S11	R1	65.50	78.16	-17.86	0.00	0.18	0	0	-6.99	40.47
S12	R1	71.50	73.17	-17.29	0.00	0.17	0	0	-20.97	33.07
S13	R1	65.50	79.43	-18.00	0.00	0.18	0	0	-6.99	40.33
S14	R1	71.50	74.53	-17.45	0.00	0.17	0	0	-26.99	26.89
S15	R1	65.50	83.57	-18.44	0.00	0.19	0	0	-13.01	33.86
S16	R1	71.50	78.92	-17.95	0.00	0.18	0	0	-26.99	26.38
S19	R1	71.50	108.93	-20.74	0.00	0.25	0	0	-15.23	35.28
S20	R1	69.70	130.11	-22.29	0.00	0.30	0	0	-16.99	30.13
S21	R1	71.00	151.49	-23.61	0.00	0.35	0	0	-16.99	30.05
S22	R1	69.70	168.24	-24.52	0.00	0.39	0	0	-20.00	24.80
S23	R1	71.00	157.89	-23.97	0.00	0.36	0	0	-16.32	30.35
S24	R1	71.00	148.08	-23.41	0.00	0.34	0	0	-16.32	30.93
S25	R1	71.00	150.10	-23.53	0.00	0.34	0	0	-16.32	30.81
S26	R1	69.70	148.56	-23.44	0.00	0.34	0	0	-18.24	27.68
S27	R1	71.50	135.09	-22.61	0.00	0.31	0	0	-16.02	32.56
S28	R1	71.00	140.00	-22.92	0.00	0.32	0	0	-15.33	32.43
S29	R1	71.00	164.15	-24.30	0.00	0.38	0	0	-15.33	30.99
S30	R1	69.70	171.82	-24.70	0.00	0.39	0	0	-14.95	29.65
S31	R1	69.70	163.29	-24.26	0.00	0.37	0	0	-14.95	30.11
S32	R1	71.50	147.33	-23.37	0.00	0.34	0	0	-19.21	28.58
S33	R1	71.50	142.30	-23.07	0.00	0.33	0	0	-19.21	28.89
S35	R1	71.50	165.85	-24.40	0.00	0.38	0	0	-16.20	30.52
S36	R1	77.50	69.63	-16.89	0.00	0.16	-3	0	-12.22	45.23
S37	R1	77.50	59.46	-15.54	0.00	0.14	-3	0	-13.98	44.85
S38	R1	77.50	98.23	-19.86	0.00	0.23	-3	0	-13.01	41.40
S39	R1	77.50	91.30	-19.23	0.00	0.21	-3	0	-15.23	39.83
S40	R1	65.00	143.56	-23.14	0.00	0.33	0	0	-10.04	31.49
S41	R1	65.00	150.70	-23.56	0.00	0.35	0	0	-6.04	35.05
S42	R1	61.00	127.63	-22.12	0.00	0.29	0	0	-4.13	34.46
S43	R1	61.00	115.95	-21.29	0.00	0.27	0	0	-4.13	35.32
S44	R1	61.00	112.16	-21.00	0.00	0.26	0	0	-4.13	35.62
S45	R1	61.00	114.14	-21.15	0.00	0.26	0	0	-4.13	35.46
S46	R1	61.00	121.46	-21.69	0.00	0.28	0	0	-2.37	36.67
S47	R1	61.00	140.00	-22.92	0.00	0.32	0	0	-3.71	34.04
S48	R1	61.00	164.15	-24.31	0.00	0.38	0	0	-7.37	28.95

W90-71.21

WINSTON CHURCHILL BLVD.

INTERMEDIATE RESULTS

Source Code	Receiver Code	Reference Sound Level(dB)	Source Receiver Distance(m)	Distance Correction (dB)	Attenuation Ground (dB)	Attenuation Atmospheric (dB)	Correction Source (dB)	Correction Receiver (dB)	Correction Time (dB)	Net Sound Level (dB)
S49	R1	61.00	195.30	-25.81	0.00	0.45	0	0	-7.37	27.37
S50	R1	65.00	217.97	-26.77	0.00	0.50	0	0	3.98	41.71
S51	R1	55.00	266.66	-28.52	0.00	0.61	0	0	3.98	29.85
S52	R1	65.00	145.00	-23.23	0.00	0.33	0	0	-9.59	31.85
S53	R1	65.00	152.27	-23.65	0.00	0.35	0	0	-7.03	33.96
S54	R1	65.00	156.92	-23.91	0.00	0.36	0	0	-8.79	31.93
S55	R1	65.00	135.59	-22.65	0.00	0.31	0	0	-7.03	35.01
S56	R1	65.00	111.02	-20.91	0.00	0.25	0	0	-7.03	36.80
S57	R1	65.00	106.30	-20.53	0.00	0.24	0	0	-8.79	35.43
S58	R1	65.00	121.04	-21.66	0.00	0.28	0	0	-7.03	36.03

W90-71.22

WINSTON CHURCHILL BLVD.

OUTPUT DATA

Code	Source	Overall Sound Level(dB)
R1	HOUSE ON LOT A4	53.67

WINSTON CHURCHILL STATION
STATION ACTIVITIES SOUND LEVEL CONTOURS CALCULATIONS

MISSISSAUGA BUSWAY
WINSTON CHURCHILL

OCTOBER 31, 1990

Min. X-coordinate:	-200.00(m)
Max. X-coordinate:	500.00(m)
Incr. in X-coordinate:	17.50(m)
Min. Y-coordinate:	-200.00(m)
Max. Y-coordinate:	500.00(m)
Incr. in Y-coordinate:	17.50(m)
Scale of Graph:	1:4000
Grid Elevation:	1.50(m)
Base Time:	60.00(min)
Predominant Frequency:	500.00(Hz)
Correction Factor 1:	-1.00(dB) is
Correction Factor 2:	0.00(dB) is

Molecular absorption not included
Ground attenuation effects not included

Min. Sound Level Contour:	20.00
Max. Sound Level Contour:	80.00
Contour Increment:	5.00
No. of Smoothings:	10
No. of Divisions:	4
No. of Arcs:	10
Number of Sources:	54

Source Code:	S1

Source:	BUS
X-coordinate:	27.00(m)
Y-coordinate:	100.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.09
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S2

Source:	BUS
X-coordinate:	27.00(m)
Y-coordinate:	110.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.09
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S3

Source:	BUS
X-coordinate:	67.00(m)
Y-coordinate:	111.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	20
Duration of Event:	0.13
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S4
Source:	BUS
X-coordinate:	124.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	20
Duration of Event:	0.13
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S5
Source:	BUS
X-coordinate:	152.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	20
Duration of Event:	0.13
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S6
Source:	BUS
X-coordinate:	177.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	20
Duration of Event:	0.15
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S7

Source:	BUS
X-coordinate:	190.00(m)
Y-coordinate:	105.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.15
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S8

Source:	BUS
X-coordinate:	185.00(m)
Y-coordinate:	84.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.24
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S9

Source:	BUS
X-coordinate:	167.00(m)
Y-coordinate:	78.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	65.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	3.00
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S10

Source:	BUS
X-coordinate:	167.00(m)
Y-coordinate:	73.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S11

Source:	BUS
X-coordinate:	135.00(m)
Y-coordinate:	78.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	65.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	3.00
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S12

Source:	BUS
X-coordinate:	135.00(m)
Y-coordinate:	73.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S13

Source:	BUS
X-coordinate:	115.00(m)
Y-coordinate:	78.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	65.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	3.00
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S14

Source:	BUS
X-coordinate:	115.00(m)
Y-coordinate:	73.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	1
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S15

Source:	BUS
X-coordinate:	100.00(m)
Y-coordinate:	78.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	65.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	1
Duration of Event:	3.00
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S16
Source:	BUS
X-coordinate:	100.00(m)
Y-coordinate:	73.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	1
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S19
Source:	BUS
X-coordinate:	55.00(m)
Y-coordinate:	79.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S20
Source:	BUS
X-coordinate:	38.00(m)
Y-coordinate:	92.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	69.95(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S21
Source:	BUS
X-coordinate:	35.00(m)
Y-coordinate:	118.00(m)
Source Elevation:	9.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S22
Source:	BUS
X-coordinate:	43.00(m)
Y-coordinate:	144.00(m)
Source Elevation:	10.00(m)
Ref. Sound Level:	69.70(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.06
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S23
Source:	BUS
X-coordinate:	75.00(m)
Y-coordinate:	148.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.14
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S24
Source:	BUS
X-coordinate:	125.00(m)
Y-coordinate:	148.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.14
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S25
Source:	BUS
X-coordinate:	155.00(m)
Y-coordinate:	148.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.14
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S26
Source:	BUS
X-coordinate:	185.00(m)
Y-coordinate:	138.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	69.70(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.09
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S27
Source:	BUS
X-coordinate:	188.00(m)
Y-coordinate:	122.00(m)
Source Elevation:	11.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	10
Duration of Event:	0.15
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S28
Source:	BUS
X-coordinate:	214.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	10.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	16
Duration of Event:	0.11
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S29
Source:	BUS
X-coordinate:	250.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	9.00(m)
Ref. Sound Level:	71.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	16
Duration of Event:	0.11
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S30
Source:	BUS
X-coordinate:	269.00(m)
Y-coordinate:	101.00(m)
Source Elevation:	7.00(m)
Ref. Sound Level:	69.70(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	16
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S31
Source:	BUS
X-coordinate:	274.00(m)
Y-coordinate:	77.00(m)
Source Elevation:	5.00(m)
Ref. Sound Level:	69.70(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	16
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S32
Source:	BUS
X-coordinate:	265.00(m)
Y-coordinate:	59.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S33
Source:	BUS
X-coordinate:	265.00(m)
Y-coordinate:	45.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S35
Source:	BUS
X-coordinate:	285.00(m)
Y-coordinate:	59.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	71.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	8
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S36
Source:	BUS
X-coordinate:	90.00(m)
Y-coordinate:	57.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	77.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	6
Duration of Event:	0.60
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S37

Source:	BUS
X-coordinate:	90.00(m)
Y-coordinate:	44.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	77.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	4
Duration of Event:	0.60
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S38

Source:	BUS
X-coordinate:	50.00(m)
Y-coordinate:	57.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	77.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	5
Duration of Event:	0.60
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S39

Source:	BUS
X-coordinate:	50.00(m)
Y-coordinate:	44.00(m)
Source Elevation:	3.00(m)
Ref. Sound Level:	77.50(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	3
Duration of Event:	0.60
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S41
Source:	CAR
X-coordinate:	27.00(m)
Y-coordinate:	110.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	166
Duration of Event:	0.09
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S42
Source:	CAR
X-coordinate:	67.00(m)
Y-coordinate:	111.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.10
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S43
Source:	CAR
X-coordinate:	100.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.10
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S44
Source:	CAR
X-coordinate:	124.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.10
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S45
Source:	CAR
X-coordinate:	152.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.10
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S46
Source:	CAR
X-coordinate:	177.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	9.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.15
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S47
Source:	CAR
X-coordinate:	214.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	232
Duration of Event:	0.11
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S48
Source:	CAR
X-coordinate:	250.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	7.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	100
Duration of Event:	0.11
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S49
Source:	CAR
X-coordinate:	290.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	7.50(m)
Ref. Sound Level:	61.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	100
Duration of Event:	0.11
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S50

Source:	CAR
X-coordinate:	317.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	7.50(m)
Ref. Sound Level:	55.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	100
Duration of Event:	1.50
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S51

Source:	CAR
X-coordinate:	372.00(m)
Y-coordinate:	112.00(m)
Source Elevation:	7.50(m)
Ref. Sound Level:	55.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	100
Duration of Event:	1.50
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S52

Source:	CAR
X-coordinate:	230.00(m)
Y-coordinate:	105.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	132
Duration of Event:	0.05
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S53
Source:	CAR
X-coordinate:	249.00(m)
Y-coordinate:	95.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S54
Source:	CAR
X-coordinate:	265.00(m)
Y-coordinate:	80.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S55
Source:	CAR
X-coordinate:	249.00(m)
Y-coordinate:	65.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S56
Source:	CAR
X-coordinate:	220.00(m)
Y-coordinate:	65.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S57
Source:	CAR
X-coordinate:	200.00(m)
Y-coordinate:	80.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.12
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

Source Code:	S58
Source:	CAR
X-coordinate:	205.00(m)
Y-coordinate:	95.00(m)
Source Elevation:	8.50(m)
Ref. Sound Level:	65.00(dB)
P - Factor:	0.00(m)
T - Factor:	0.00(m)
D - Ref:	10.00(m)
No. of Events:	66
Duration of Event:	0.18
Distance Reduction Factor:	20.00
Correction Factor 1:	0.00 is
Correction Factor 2:	0.00 is

APPENDIX D
MOE PUBLICATIONS NPC-115 & NPC-118

Construction Equipment

1. Scope

This Publication sets sound emission standards for various items of new construction equipment according to the date of manufacture of the equipment.

2. Technical Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Sound Emission Standards

Tables 115-1 to 115-4 inclusive list Residential Area sound emission standards and Quiet Zone sound emission standards for specific items of new construction equipment measured in accordance with the procedures indicated.

TABLE 115-1

Quiet Zone and Residential Area Sound Emission Standards for Excavation Equipment, Dozers, Loaders, Backhoes or Other Equipment Capable of Being Used for Similar Application

Maximum Sound Level as determined using Publication NPC-103 - Procedures, section 6 dBA		
Date of Manufacture	Power Rating Less than 75 kW	Power Rating 75 kW and larger
January 1, 1979 to December 31, 1980	85	88
January 1, 1981 and after	83	85

Sound Emission Standards for Pneumatic Pavement Breakers

Standard	Date of Manufacture	Maximum Sound Level as measured using Publication NPC-103 - Procedures, Section 7 dBA
Quiet Zone Sound Emission Standard	Jan. 1, 1979 and after	85
Residential Area Sound Emission Standard	Jan. 1, 1979 to Dec. 31 1980	90
	Jan. 1, 1981 and after	85

TABLE 115-3

Sound Emission Standards for Portable Air Compressors

Standard	Date of Manufacture	Maximum Sound Level as measured using Publication NPC-103 - Procedures, Section 7 dBA
Quiet Zone Sound Emission Standard	Jan. 1, 1979 to Dec. 31, 1980	76
	Jan. 1, 1981 and after	70
Residential Area Sound Emission Standard	Jan. 1, 1979 and after	76

TABLE 115-4

Sound Emission Standard for Tracked Drills

Standard	Date of Manufacture	Maximum Sound Level as measured using Publication NPC-103 - Procedures, section 6. dBA
Quiet Zone and Residential Area Sound Emission Standard	Jan. 1, 1981 and after	100

Motorized Conveyances

1. Scope

This Publication sets sound emission standards for motorized conveyances of various types.

2. Technical Definitions

(1) The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

(2) Definitions Specific to this Publication

Heavy Vehicle

"Heavy vehicle" means a motorized conveyance having a registered gross weight of more than 4,500 kg.

3. Sound Emission Standards - Governed Diesel Engines

Table 118-1 lists for various years of manufacture, the sound emission standard for a heavy vehicle powered by a governed diesel engine when measured in accordance with the procedure set out in the Table.

TABLE 118-1

Sound Emission Standards for Heavy Vehicles with Governed Diesel Engines

Date of Manufacture	Maximum Sound Level as Measured Using Publication NPC-103 - Procedures, section 9
Prior to Jan. 1, 1979	100
Jan. 1, 1979 and after	95

4. Sound Emission Standards - Gasoline Engines

Table 118-2 lists for various years of manufacture, the sound emission standard for a heavy vehicle powered by an ungoverned gasoline engine, when measured in accordance with the procedure set out in the Table.

TABLE 118-2

UNDER PREPARATION

APPENDIX E
LETTER FROM S.S. WILSON AND ASSOCIATES TO THE MOE, SEPTEMBER 17, 1990

S.S. WILSON AND ASSOCIATES
DIV. OF M.H.G. ENGINEERING INC.
Consulting Engineers

September 17, 1990

Mr. Leslie G. Kende, P. Eng.
Supervisor, Noise Assessment and
Systems Support Unit
Ministry of the Environment
250 Davisville Avenue, 3rd Floor
Toronto, Ontario
M4S 1H2

BY MAIL/FAX: 440-6973

Dear Les:

Re: Proposed Noise Criteria for the City of Mississauga Busway System

The services of S.S. Wilson and Associates have been retained by M.M. Dillon Ltd., the IBI Group and McCormick Rankin and Assoc. Ltd. on behalf of the City of Mississauga to study the noise impact potential due to the proposed Busway transit system in the City of Mississauga.

The proposal is subject to a one-stage individual Environmental Assessment under the authority of the EAA. My client will be preparing the necessary documentation to contain environmental noise as one of the issues to be addressed.

The proposal calls for the construction of a dedicated bus transit corridor (Busway) as well as different levels of bus station designs from west of Winston Churchill Blvd. to east of Commerce Blvd. in the proximity of the existing Highway 403 Corridor, the proposed Highway 403 Arterial Road and Eglinton Ave. The attached Exhibit 1 illustrates the integrated operating strategy for the entire system. The attached Figure 1 also shows copies of some of the proposed station locations and preliminary layouts.

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I have been advised by the Study Team that the ultimate capacity will be approximately 200 x 2 = 400 bus movements per hour on the busiest part of the Busway Corridor itself with lower bus movements within each station.

I have been asked by members of the Study Team to confirm with the MOE two main issues related to environmental noise:

1. PREDICTION MODELS

Bus Movements Between Stations

Use the Stamson 3 or 4 programs to calculate the ambient due to vehicular traffic on the existing road network in the area. Also use the Stamson 3 or 4 programs to calculate the busway noise impact assuming that each bus is represented by a "Medium Truck".

Bus/Vehicle Movements Within the Stations

Calculate the overall Leq sound levels due to all bus movements within the Station in a manner similar to stationary source calculations. This will include bus movements, acceleration, idling, ventilation equipment; if any, etc. Enclosed, please find sample results for a hypothetical station showing the various Leq sound level contours for a 40 buses per hour station using the computer program developed by this firm.

The existing ambient sound levels due to vehicular traffic on the near-by roadways will be based on the Stamson 3 or 4 models.

2. APPLICABLE CRITERIA

In the following paragraphs (a) and (b) I will summarize the results of our discussions on August 27, 1990 and our proposal to deal with this issue:

(a) Bus Movements Between Stations

The Busway impact should be characterized by developing the 2 descriptors Leq 16 hour (daytime) and the Leq 8 hours (night-time), i.e. 07:00-23:00 and 23:00-07:00 Leq values. This approach seems reasonable since the AM and PM peak bus activities will occur at the same time as that due to the ambient/background vehicular traffic on other roads. Similarly low ambient on Sundays will correspond with low Sunday bus service anyway, therefore, no additional calculations will be needed for the weekend case.

The calculated Busway Leq 16 and Leq 8 will then be compared against the MOE general objective of; the higher of both: Leq 55 dBA or the ambient/background due to vehicular traffic elsewhere; i.e. use the same principles included in the MOE/MTO Protocol for Highway Noise Assessments. At this point I also need confirmation as to whether the MOE will accept a maximum excess of 5 dB (to be consistent with the MOE/MTO Protocol) for this transit system which may be equated to a new roadway?. As you very well know, if we design the busway so that its level will be equal to that of the applicable ambient then we end up with a +3 dB increase which is considered acoustically marginal. It is the opinion of the Study Team members that if 0 (zero) dB excess is desired it will not be possible to construct this transit service to serve the general public as its overall level will have to be approximately 10 dB lower than the ambient, which is very difficult to achieve from the technical view point.

(b) Station Noise

If you examine the variety of Station designs for this project you will find that the stations may be as simple as an ordinary road side "bus stop" just like TTC bus stops along City streets up to a full station involving bus turning movements, Kiss & Ride, public parking, a structure and platforms.

As discussed, all sources within a station (with the exception of a simple road side bus stop) should be treated as a Stationary Source that is subject to the MOE's Publications NPC-105 and NPC-106 (i.e. the higher of either the ambient or the NPC-106-2 Table).

The following exceptions or variations are offered for your approval for this specific project:

(i) The assessment to be performed in terms of the Leq 16 and Leq 8 in order to be consistent with the busway impact between stations. It is also important to note that hourly bus volume projections at this stage are extremely difficult and may result in reducing the desired accuracy at the first place (At the present time it is still challenging for the Study Team to come up with average daily (16 hr.) and night (8 hr.) bus volumes for each station). As also mentioned earlier the general activities in a bus station is expected to follow the ambient activities, therefore 16 hour and 8 hour averages appear to be reasonable and plausible.

(ii) The excess that may be allowed by the MOE for the busway should also be allowed for the stations as well as for the combined effect of stations plus the busway. Therefore, if the 5 dB MOE/MTO Protocol excess or any other excess is allowed, the proposed stations and the combined effect of stations and busway should also be allowed the same excess.

I am looking forward to hear from you at the earliest opportunity as the City of Mississauga is anxious to proceed with the study. If a meeting is necessary I will be happy to meet with you. Thank you.

Yours truly

Hazem Gidamy

Hazem Gidamy, P. Eng.
Principal

GC:7 "Busway-1"

c.c.:	Bob Sasaki,	City of Mississauga	(By Fax (416) 896-5220)
	Chris Bishop,	M.M. Dillon	(By Fax 229-4692)
	Lee Sims,	IBI Group	(By Fax 596-0644)
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Received by Mail by S.S. Wilson & Assoc. Friday Feb. 22/91

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Feb. 15, 1991
~~November 29~~, 1990

Mr. Hazem Gidamy, P.Eng.
S.S. Wilson and Associates
305 Renfrew Drive
Suite 101
Markham, Ontario L3R 9S7

Dear Hazem:

Re: MINISTRY NOISE CRITERIA FOR THE CITY OF MISSISSAUGA
BUSWAY SYSTEM

Your letters dated September 17, 1990 and November 28, 1990 described an approach to the assessment of the acceptability of the noise impact by a new bus route in Mississauga. This approach is in agreement by and large with the concepts of our previous approaches to similar transportation activities and also in agreement with the procedures that we discussed over the telephone recently. The subject has also been discussed within our group and a general understanding of the criteria was reached as follows:

1. BUS MOVEMENT BETWEEN STATIONS

The recommendations that the noise should be assessed on an 16/8 hour basis, 07:00 - 23:00 and 23:00 - 07:00 is acceptable. However, the criteria should be 55 dBA, day-time, and 50 dBA, night-time, or the ambient in either period, whichever is higher. The MOE/MTO Protocol is applicable, i.e. control measures need be applied only if the excess is more than 5 dB.

2. BUS STOPS

Simple bus stops, such as the TTC bus stops, do not have to be separated from the general noise produced by the moving buses.

3. BUS STATIONS

The assessment procedure for the main bus stations is well established. Bus stations, except the simple bus stops addressed above, are stationary sources and should be assessed in accordance with NPC-105. This implies assessment using 1 hour L_{eq} and the limit being defined by the pre-existing ambient noise level.

4. GENERAL

The above criteria are mostly following the general practices of our noise guidelines. Where they differ from our guidelines, they are to be considered

as interim approach, yet to be verified by practice and used as draft guidelines until approved and published by the Ministry.

Yours truly,

L.G. Kende, P. Eng.
Supervisor
Noise Assessment and Systems Support

VS/vs

APPENDIX F
TRAFFIC VOLUMES

BUS ACTIVITY VOLUMES AT STATIONS (16 HOUR VOLUMES)[1]

Location/Station	BUSWAY PLATFORMS			LOCAL PLATFORMS		
	BUSES THROUGH[2]	BUSES STOPPING[3] BUSWAY ROUTES	BUSES STOPPING[4] LOCAL RPUTES	BUSES STOPPING[5] BUSWAY ROUTES	BUSES STOPPING[3] LOCAL RPUTES	BUSES IDLIING[6]
West of City Centre						
Ridgeway	160	80	-	-	-	80
Winston Churchill	-	240	120	120	32	-
Glen Erin	-	480	560	560	80	-
Erin Mills	1,440	480	-	-	32	320
Mississauga Road	1,680	240	-	-	32	160
Erindale/Creditview	-	1,600	160	160	1,120	160
Mavis	1,760	160	56	56	16	-
East of City Centre						
Central Parkway	2,080	160	-	-	-	48
Cawthra	1,120	1,120	-	-	16	160
Tomken	1,120	1,120	-	-	16	144
Dixie	-	2,080	160	160	144	-
Fieldgate	1,920	160	-	-	-	160
Spectrum/Satellite	1,920	160	-	-	96	-
Orbitor/Explorer	1,920	160	-	-	96	-

(1) 16 hour volumes are assumed to be 8 times the peak hour activity volumes.
(2) Include buses operating through the station without stopping.
(3) Include buses stopping at the station and then proceeding on the route.
(4) Include buses at local routes branching onto busway and stopping at busway station.
(5) Include buses on busway routes branching off the busway and stopping at local stations.
(6) Includes buses stopping at the station, idling and then turning at the station.

Source of Infomation : The IBI Group.

BUSWAY LINK VOLUMES (16 HOUR VOLUMES)

LINK	BUS VOLUME
RIDGEWAY TO WINSTON CHURCHILL	480
WINSTON CHURCHILL TO GLEN ERIN	896
GLEN ERIN TO ERIN MILLS PARKWAY	3,520
ERIN MILLS PARKWAY TO MISSISSAUGA	3,520
MISSISSAUGA TO CREDIT VIEW	3,520
CREDIT VIEW ROAD TO MAVIS	3,520
MAVIS ROAD TO CITY CENTRE	3,520
CITY CENTRE TO CENTRAL PARKWAY	2,240
CENTRAL PARKWAY TO CAWTHRA	2,240
CAWTHRA TO TOMKEN	2,240
TOMKEN TO DIXIE	2,240
DIXIE TO FIELDGATE	2,240
FIELDGATE TO SPECTRUM/SATELLITE	2,240
SPECTRUM/SATELLITE TO ORBITOR/EXPLORER.	2,240

SOURCE OF INFORMATION : THE IBI GROUP

KISS AND RIDE AUTOMOBILE VOLUMES (AM PEAK HOUR VOLUMES)

Location/Station	VOLUME (VEH/HR.)
<u>West of City Centre</u>	
Ridgeway	80
Winston Churchill	200
Glen Erin	100
Erin Mills	100
Mississauga Road	100
Erindale/Creditview	120
Mavis	140
<u>East of City Centre</u>	
Central Parkway	-
Cawthra	100
Tomken	150
Dixie	200
Fieldgate	50
Spectrum/Satellite	50
Orbitor/Explorer	50

Source of Infomation : The IBI Group.