CITY OF NEPEAN

PUBLIC WORKS DEPARTMENT

ENVIRONMENTAL STUDY REPORT

STRANDHERD DRIVE

HIGHWAY 416 TO JOCKVALE ROAD

Transportation Planning Section
Development Services Department
City of Ottawa

VOLUME 1

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McNEELY ENGINEERING

CITY OF NEPEAN

PUBLIC WORKS DEPARTMENT

ENVIRONMENTAL STUDY REPORT

STRANDHERD DRIVE
JOCKVALE ROAD TO HIGHWAY 416

May 1991

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

APPENDICES

Volume 1

Appendix 1	Advertisements/Public Meetings
Appendix 2	Geotechnical Study
Appendix 3	Cost Estimates
Appendix 4	C.N.R. Overpass Preliminary Design
Appendix 5	Traffic Noise Impact Report
Appendix 6	Alignment D: Preliminary Plan/Profile
Appendix 7	Public Works Department Report No. 68-91, RMOC Transportation Department Report
Appendix 8	Fallowfield Road Interim Connection

Volume 2

Appendix A-1	Public Agencies: Comments
Appendix A-2	General Public: Comments

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION AND BACKGROUND

1.1 Environmental Study Report

The Environmental Study Report (ESR) represents the documentation of the Environmental Assessment (EA) process for which a Class Environmental Assessment has been accepted and approved under the Environmental Assessment Act of Ontario. This ESR falls within the boundaries of a Class EA for Municipal Road Projects, Schedule C.

This ESR documents the planning and preliminary design of the proposed 4-lane extension of Strandherd Drive in the City of Nepean, from the proposed realigned Jockvale Road westerly to the proposed interchange with Highway 416. The report includes a discussion of the purpose of the project, project approach, the existing surrounding natural and social environmental conditions, planning and design alternatives and the associated construction requirements required for the implementation of the project. As well, this report will address the environmental impacts and proposed mitigating measures.

1.2 Purpose of the Project

Plans for urban development within the South Urban Community has prompted the City of Nepean to address the need for expansion of the existing road network. The need for an east-west arterial link has been identified by the City of Nepean and the Regional Municipality of Ottawa-Carleton (RMOC), to provide traffic service to/from the future South Urban Community Activity Centre. The Activity Centre will be located in the vicinity of Strandherd Drive and Greenbank Road.

The western limit of this study is fixed by the location and alignment of the proposed Strandherd Drive-Highway 416 interchange. These works were documented in "Environmental Assessment of Highway 416 - Century Road to Highway 416, June, 1985", in which Fallowfield Road formed the interchange with Highway 416. The interchange falls under the jurisdiction of the Ministry of Transportation Ontario (MTO).

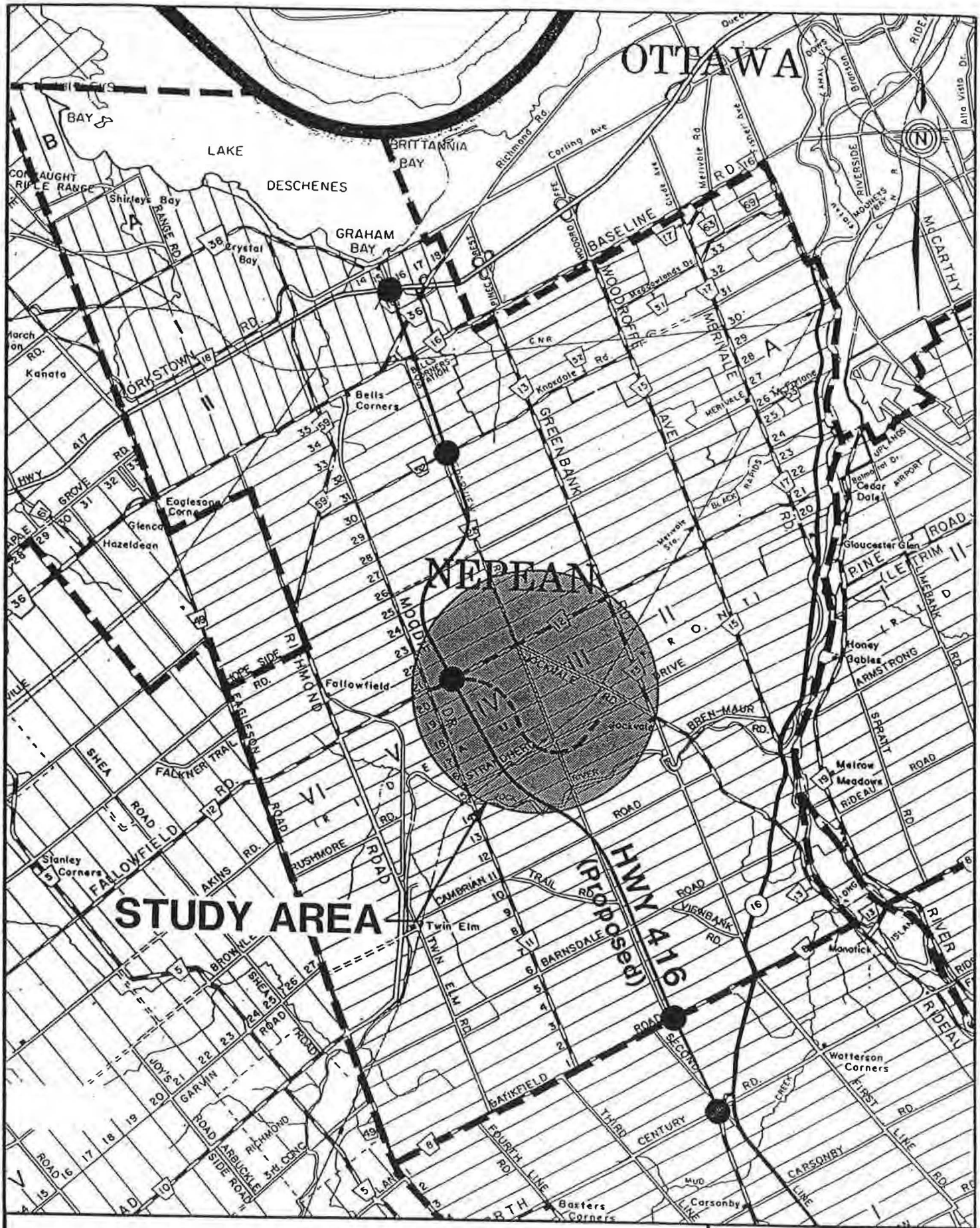
Following completion of the "Strategic Transportation Study-South Urban Centre", the City of Nepean requested that MTO consider a possible realignment of the interchange to allow a connection with Strandherd Drive. Upon discussions with the Ministry of the Environment (MOE), the MTO was informed that the modified alignment of the interchange would be supported providing that any realignment of Fallowfield Road fulfills the requirements of a Class Environmental Assessment for Municipal Roads. The realignment of Fallowfield Road has been included within the scope of this study.

1.4 General Description of the Project

Strandherd Drive is presently an east-west rural road running between Moodie Drive and Woodroffe Avenue as illustrated in Figure 1. Strandherd Drive represents the southern limit of urban growth.

The section of Strandherd Drive under consideration in this ESR is from Highway 416 to the realigned Jockvale Road. Total length of the corridor is approximately 4 km.

RMOC intends (subject to Regional Council approval) to adopt Strandherd Drive as a regional road from the proposed Highway 416 interchange to



LOCATION PLAN

Scale N.T.S.

FIGURE 1

Armstrong Road in Gloucester. Strandherd Drive will be improved to a 4-lane divided arterial (Figure 2) with right-of-way provisions to accommodate a widening of up to a 6-lane section should future traffic volumes make this necessary.

Strandherd Drive will be constructed as necessitated by development within the Strandherd Drive corridor. However, a connection of Fallowfield Road to the Highway 416 interchange must be in place to coincide with the completion of the Highway 416 interchange in 1993 or 1994.

This study will also consider the impacts on the existing road network, specifically Fallowfield Road, Cedarview Road and existing Strandherd Drive.

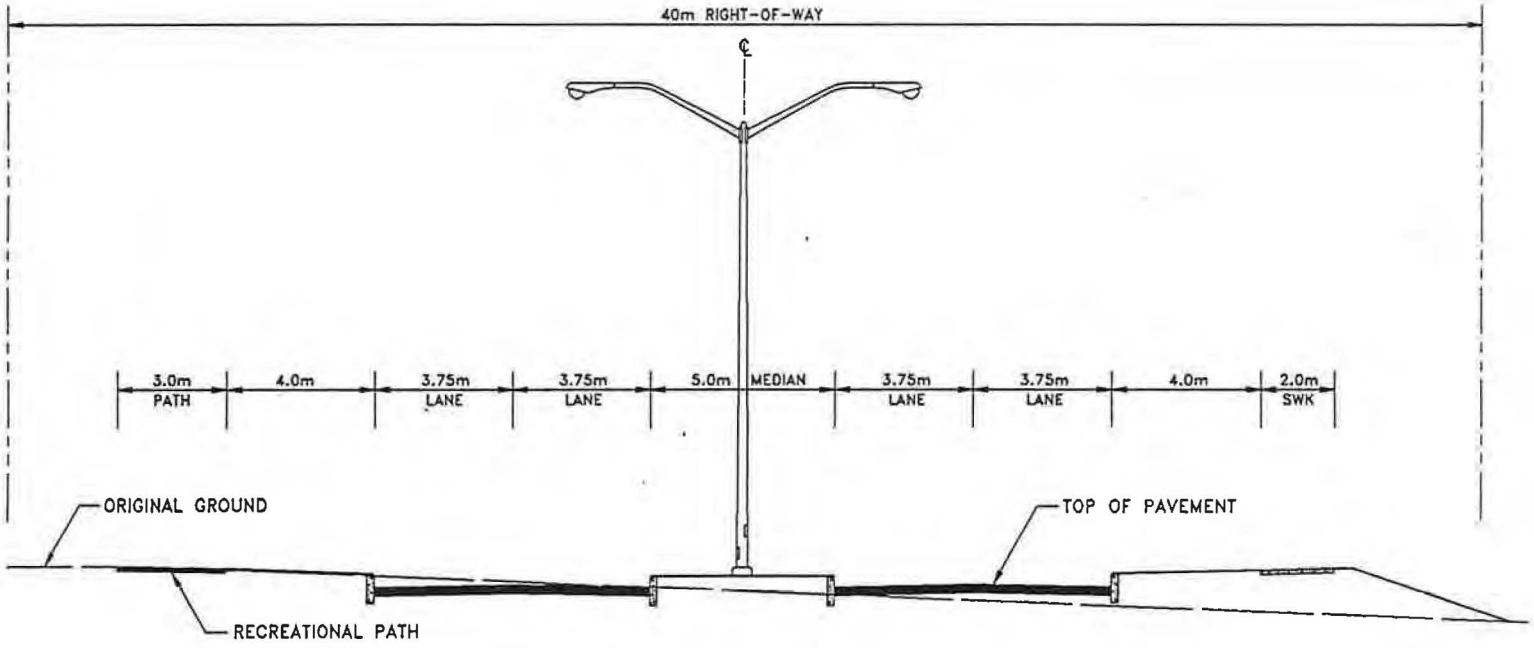
The significant features of the recommended design, subject to the necessary approvals, are as follows:

a) R.O.W. requirements between Cedarview Road and Jockvale Road should be satisfied by the widening of the existing R.O.W. on the south side of existing Strandherd Drive. Expropriation from existing home owners should be avoided wherever possible.

b) Street lights will be installed along the entire length of the road alignment.

c) All intersections along Strandherd Drive will be controlled by traffic signals. Future intersections along Fallowfield Road will also require signals.

d) A recreational path will be provided on the north (and east) sides of the ultimate alignment. A sidewalk will be installed on the south (and west) side of Strandherd Drive.

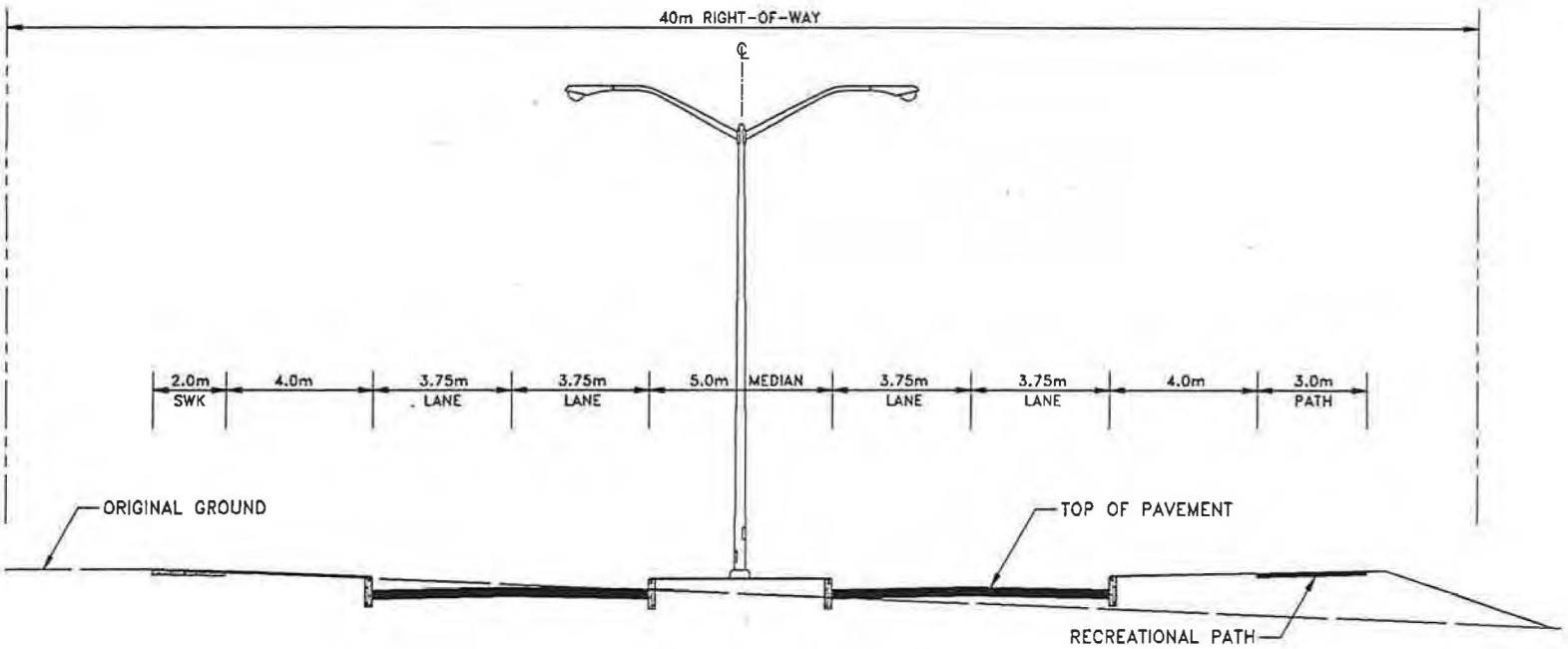


4-LANE URBAN ARTERIAL-DIVIDED

ULTIMATE STRANDHERD DRIVE
TYPICAL SECTION

Scale N.T.S.

FIGURE 2



ULTIMATE FALLOWFIELD ROAD
TYPICAL SECTION

Scale N.T.S.

FIGURE 3

e) Road drainage will outlet to existing Foster and O'Keefe Municipal drains, Kennedy Burnett Stormwater Management Facility or to a future trunk storm sewer system.

1.5 Rationale for the Project

Construction of a 4-lane urban arterial roadway complete with signalized intersections, acceleration and deceleration lanes for turning movements and centreline medians will provide roadway capacity to satisfy future traffic demand for recent and future development to the year 2011. A further widening to a 6-lane section could readily be accommodated, if necessary, with the preferred alignment.

Installation of a recreational pathway, sidewalk and street lighting system will also improve safety for vehicles, bicycles and pedestrians.

A possible southerly realignment of Strandherd Drive immediately west of Jockvale Road would minimize the impact on existing residences backing onto the Strandherd Drive corridor.

2.0 PROJECT APPROACH

2.1 The Environmental Assessment

Data collection included assembly and review of all the necessary information to determine the need to construct the roadway as well as mitigating requirements. Consideration was given to alternatives to improvements to Strandherd Drive alignment as well as to the possible alternative alignments of Strandherd Drive itself.

Data collection included the following:

- Base mapping at 1:4000 scale
- City of Nepean land use concept plan
- Municipal drainage plans
- Property plan
- Traffic projections
- Noise analysis
- Soils analysis
- Utility identification
- Highway 416-Strandherd Drive interchange plans and E.S.R.
- Strandherd Drive-Opal Lane to Greenbank Road plans and E.S.R.

2.2 Project Stages and Organization

a) Functional Design Stage

The functional design stage included the establishment of design criteria for horizontal and vertical alignments, typical section and investigation of existing utilities, future traffic demands, noise and

geotechnical studies. The results were recommendations pertaining to the preferred alignment, property requirements and preparation of a preliminary cost estimate.

b) Preliminary Design: The results from the functional design stage were expanded upon and preliminary design drawings prepared for the preferred alignments of Strandherd Drive and Fallowfield Road. The preliminary design stage concluded with the preparation of this ESR.

The preliminary design stage will be followed by the following stages:

c) Detail Design Stage: Refinements to preliminary plans based on input from the RMOC and City of Nepean. Contract plans and specifications will be produced.

d) Construction: To be undertaken by calling for tenders. The extension of Strandherd Drive from Highway 416 will occur as development pressures and traffic volumes dictate.

2.3 Internal Involvement

Key personnel involved in the project include the following:

City of Nepean

- Mr. G. Craig, P.Eng., Director of Engineering, Public Works
- Mr. F. Petti, P.Eng., Manager of Development, Public Works
- Mr. W. Holzman, South Urban Co-Ordinator, Public Works
- Mr. W. Wright, Director of Economic & Planning Development

- Mr. C. White, Senior Planner

Regional Municipality of Ottawa-Carleton

- Mr. R. McCallum, P.Eng., Head, Functional Planning Section

McNeely Engineering Consultants Ltd.

- Mr. E. Vickers, P.Eng., Project Manager
- Mr. D. Rathwell, P.Eng., Project Engineer

2.4 External Involvement

Correspondence was established with a number of review agencies as listed in Appendix A-1. Each agency was contacted initially by telephone to introduce the project and to establish a firm contact. A letter and information package describing the project was forwarded to each agency and each was asked to respond in writing with any comments or concerns regarding the project.

Comments received are included in Appendix A-1.

2.5 Public Involvement

The public was notified and solicited for comments on two occasions as required under Schedule C for a Class Environmental Assessment for Municipal Road Projects and received notice of the Works Committee Meeting at which the recommended alignment was presented.

Public Information Sessions were held at the Walter Baker Community Centre in Barrhaven on Thursday, October 18th, 1990 and Wednesday, March 20th, 1991 and were advertised in the following newspapers:

The Ottawa Citizen
Nepean Clarion
Barrhaven Independent

Landowners within the study corridor were sent written notification of the first information session. The mailing list was updated to include those who attended the meetings or who submitted comments regarding the study. Those individuals who specifically requested printed information following the first meeting were sent reductions of the display materials as well as answers to some of the more commonly-asked questions. Copies of the displays were made available at the second information session.

Written notices of the second meeting and the April 23rd, 1991 Works Committee Meeting were also hand delivered to those residents backing onto Strandherd Drive who were not already on the mailing list.

Approximately 140 and 170 people attended the first and second information sessions respectively.

Notification of filing of the ESR will be advertised twice in the aforementioned papers during the public review period.

Copies of the information presented throughout the duration of the project, mailing list and comments are included in Appendix A-2. Advertisements and public information session summaries are included in Appendix 1.

3.0 EXISTING CONDITIONS

3.1 Natural Environment

3.1.1 Topography

The topography of this section of Strandherd Drive is generally flat along the length of the corridor.

3.1.2 General Geology

In general, the soils along the major length of the proposed alignment can be classified as marine deposits consisting of clay, silty clay and silt. Soils at either limit are a glacial till consisting of a mixture of clay, silt, sand, gravel, cobbles and boulders. A clay veneer of variable thickness is typical within the study area. Bedrock is sedimentary consisting of limestone, dolomite, sandstone and shale and is affected by the Hazeldean Fault at Jockvale Road.

3.1.3 Surface Drainage

The right-of-way of the preferred Strandherd Drive alignment is intersected by the Kennedy Burnett Storm Water Management Facility between Opal Lane and Jockvale Road, by the Foster Drain in the vicinity of Cedarview Road and by a branch of the O'Keefe Municipal Drain approximately 600 m from the limit at the 416 interchange.

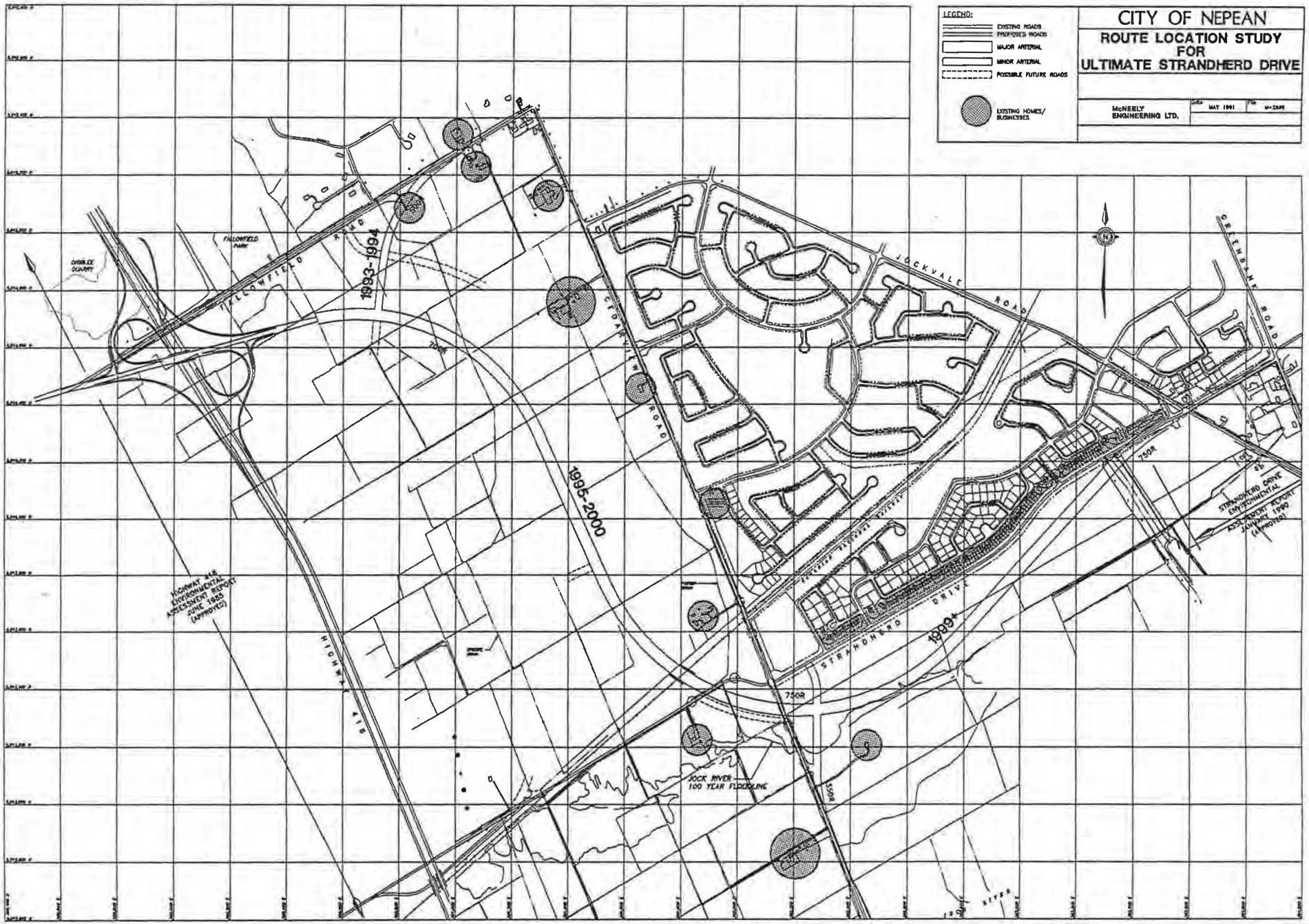
Existing ditches along Strandherd Drive east of Cedarview Road outlet to the Kennedy Burnett Facility, and west of Cedarview Road to the Foster Drain.

The Jock River 100-year floodline runs approximate 400 m south of and parallel to existing Strandherd Drive.

3.2 Socio-Economic Environment

The ultimate Strandherd Drive alignment will be located to the south and west of Barrhaven's Fraservale through land that is currently zoned for agricultural use. The agricultural lands fall within the designated boundaries identified for development of the South Urban Community. Land located between Strandherd Drive and Cedarview Road will be developed as residential and between Strandherd Drive and Highway 416 as business park. Property south of existing Strandherd Drive and east of Cedarview Road will be subject to a further land use study by the City of Nepean.

Existing homes and businesses within the study limits are highlighted in Figure 4. These include approximately 105 homes that back onto the existing Strandherd Drive R.O.W., and an existing tree nursery located in the vicinity of the realigned Fallowfield Road.



EXISTING HOMES/BUSINESSES

Scale N.T.S.

FIGURE 4

3.3 Transportation

3.3.1 Road Network

The "Strategic Transportation Study - South Urban Centre" identified the need for an east-west arterial road to serve future southerly growth of the Nepean and Gloucester urban areas. The Strandherd corridor was recommended as being the best alignment to serve this growth because of its proximity to the planned activity centre at Greenbank Road.

Cedarview Road and Fallowfield Road will be realigned to form intersections with Strandherd Drive. Cedarview Road will be down-graded to a local road within the future residential development.

Fallowfield Road will be upgraded in the future as additional traffic demand is created by the development of the Longfields and Davidson Heights communities. The "Strategic Transportation Study - South Urban Centre" identifies Fallowfield Road as becoming a future 4-lane arterial roadway between the proposed Highway 416 and existing Highway 16.

3.3.2 Traffic

Projected traffic volumes were based on 20 year forecasts from the "Strategic Transportation Study - South Urban Centre". Existing and predicted traffic volumes for Strandherd Drive are as follows:

TABLE 1

TRAFFIC PROJECTIONS

Year	Average Annual Daily Traffic (AADT) Strandherd Drive	Fallowfield Road
1991	2,000 - 3,000	10,000
2011	26,000 - 28,000	22,000

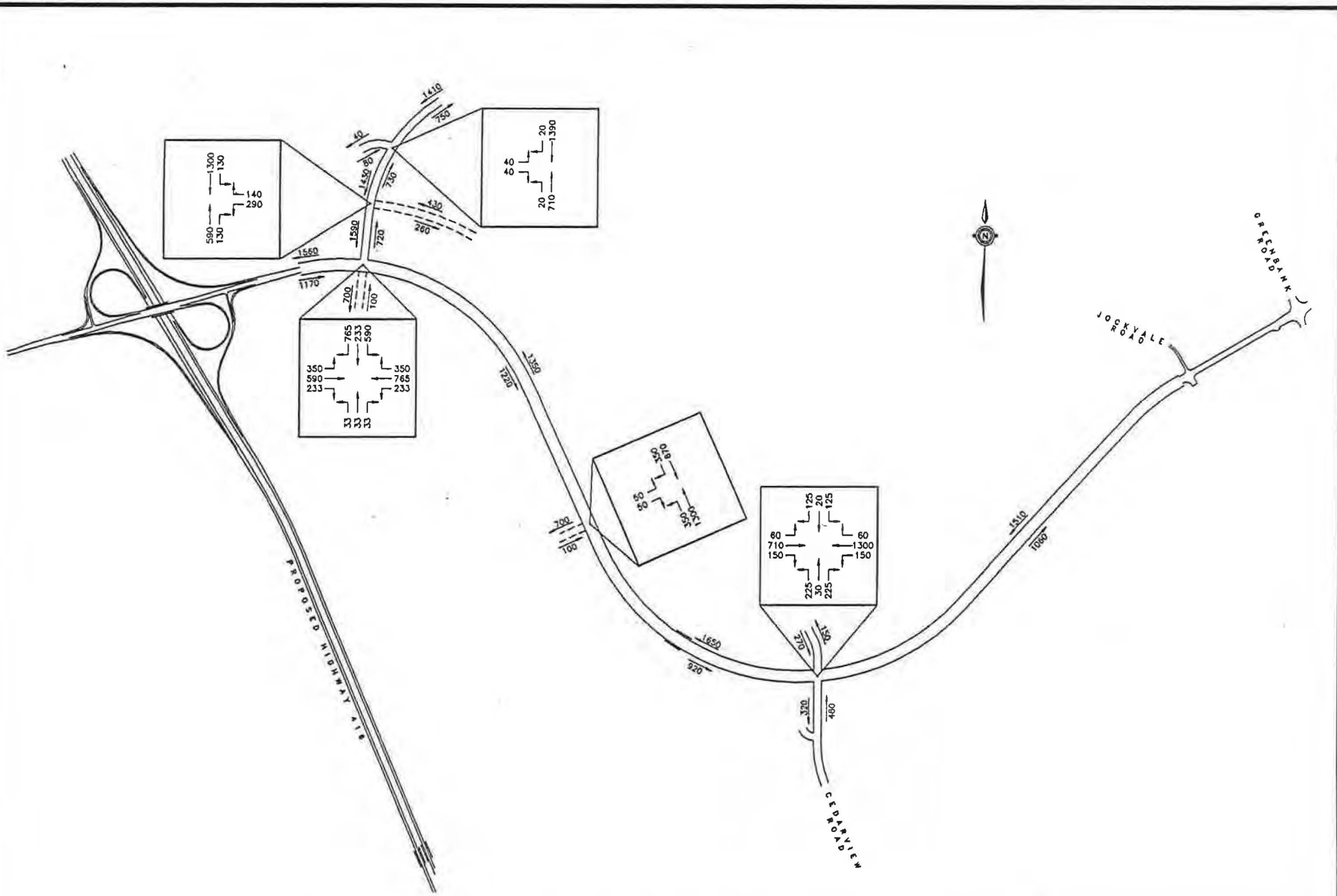
Figures 5 and 6 illustrate the AM and PM peak hour forecasts for the year 2011. Based on these volumes, a 4-lane UAD (Urban-arterial-divided) and 40 m right-of-way are recommended for this section of Strandherd Drive.

3.4 Railroads

Canadian National Railway owns and maintains one track within the dedicated right-of-way crossing to the proposed Strandherd Drive corridor. This line is referred to as the Smiths Falls Subdivision. Currently there are eight daily trains utilizing this facility: six VIA Rail passenger trains travelling 150 kph (95 mph) and two CN freight trains travelling 100 kph (60 mph).

Within the limits of the study are two existing at-grade crossings approximately 900 m apart. The Cedarview Road-CNR crossing is signal and gate controlled with the City of Nepean being the senior of the two authorities. The Strandherd Drive-CNR crossing is signal controlled with the CNR being the senior authority.

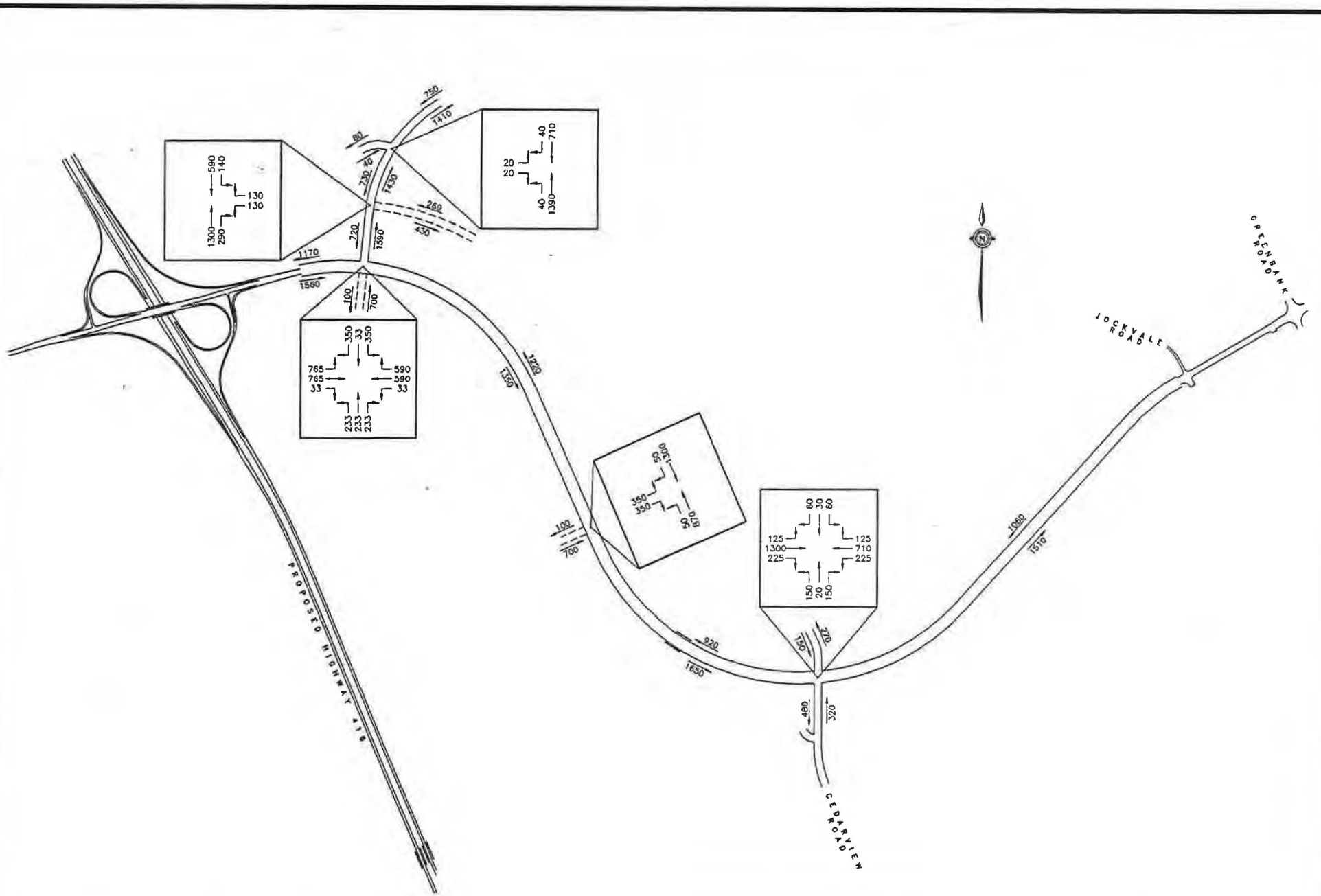
As the ultimate alignment of Strandherd Drive is achieved, the existing Cedarview Road crossing may be abandoned with Cedarview Road being



YEAR 2011 TRAFFIC PROJECTIONS
AM PEAK HOUR

Scale N.T.S.

FIGURE 5



YEAR 2011 TRAFFIC PROJECTIONS
PM PEAK HOUR

Scale N.T.S.

FIGURE 6

downgraded to a local road. An application could then be made to transfer seniority to the proposed crossing.

The existing Strandherd Drive-CNR crossing will be maintained by the City of Nepean to provide access to property south of Strandherd Drive and west of Cedarview Road.

3.5 Soils Geology

Soil instability is inherent to marine clays typically found in the Ottawa area and are of great significance in the design of the CNR overpass, approach fills and roadway profile. A soils investigation was undertaken to examine the soil conditions along the proposed Strandherd Drive corridor and to aid in the preparation of cost estimates. Route borings were taken at 500 m intervals and a full borehole taken at the proposed overpass location.

Based on the findings of the soils investigation (Appendix 2), no geological limitations on the approach fills to the overpass or on the road profile are evident. However, a more extensive soils investigation will be required prior to detailed design of the bridge and pavement structure.

3.6 Utilities

3.6.1 Consumers' Gas

A major gas pipeline exists within the existing Fallowfield Road right-of-way.

3.6.2 Bell Canada

Small cables exist on the west side of Cedarview Road and on the south side of Strandherd Drive west of Cedarview Road. A carrier trunk system exists on the south side of Fallowfield Road.

3.6.3 Maclean Hunter Cable T.V.

Existing cables are located within easements at the rear of Strandherd Drive properties. Cable crossings of Strandherd Drive exist at a few locations.

3.6.4 Nepean Hydro

Existing hydro poles located along the south side of Strandherd Drive, west side of Cedarview Road, and north side of Fallowfield Road.

4.0 ALTERNATIVES AND EVALUATION

4.1 Planning Alternatives

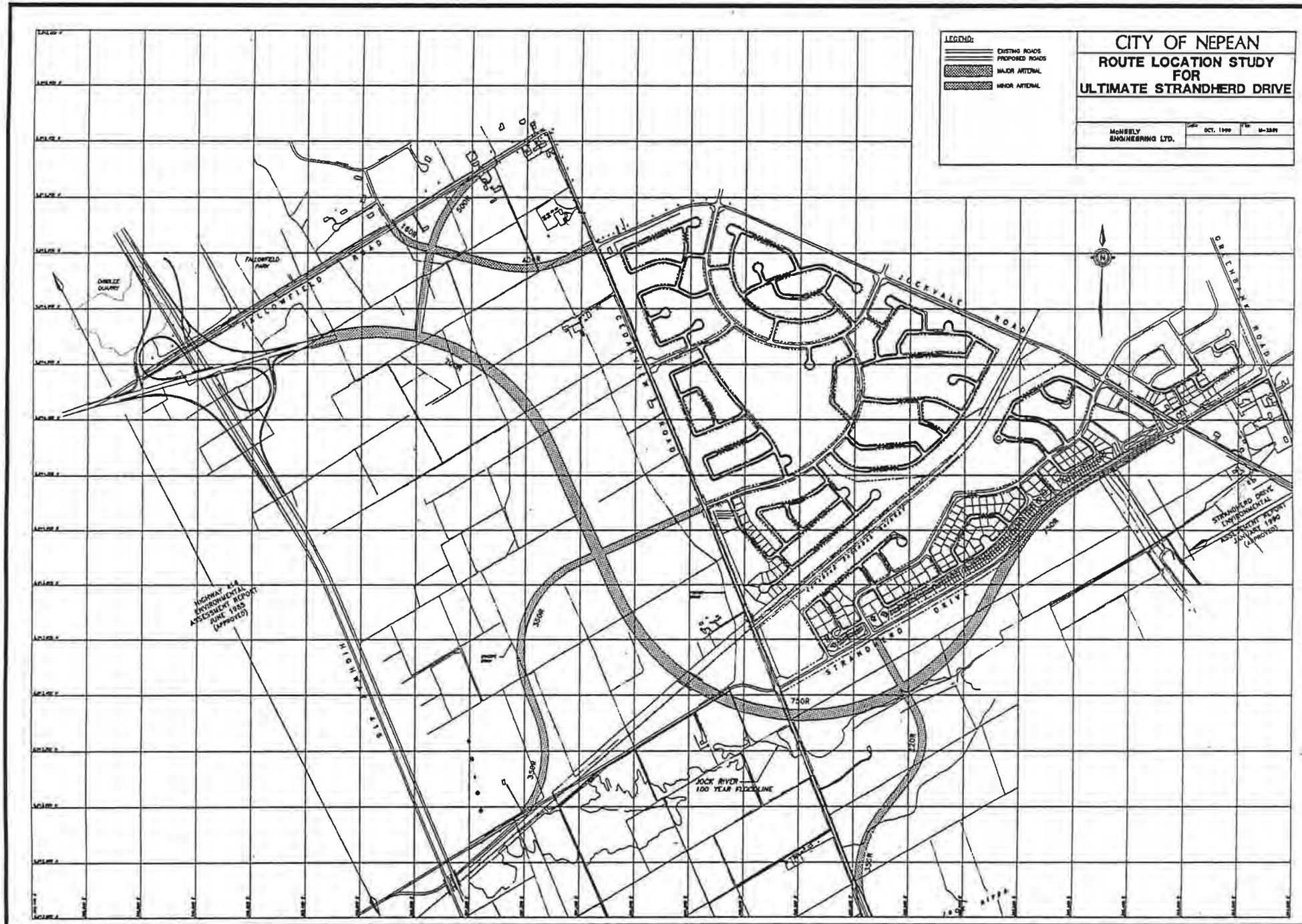
The "Strategic Transportation Study - South Urban Centre" provides the basis for future expansion of the transportation network in Nepean and Gloucester. The study dealt with planning issues regarding urban transportation systems such as arterial roadways and the expansion of the bus transit system to Barrhaven and South Gloucester. The network was based on existing and future land uses, growth projections and existing road network. The extension and expansion of Strandherd Drive to Highway 416 is a direct result of the recommendations contained within the report.

Strandherd Drive provides the benefits of convenience due to its proximity to the proposed Activity Centre. Fallowfield Road, as an alternative, would not provide these advantages. As the Longfields and Davidson Heights Subdivisions develop and with Highway 416 in operation, traffic volumes will warrant a Fallowfield Road widening to four lanes.

A "do-nothing" option (i.e. to maintain Strandherd Drive as two lanes west of Jockvale Road) does not address future capacity problems or convenience to users of Strandherd Drive.

4.2 Design Alternatives

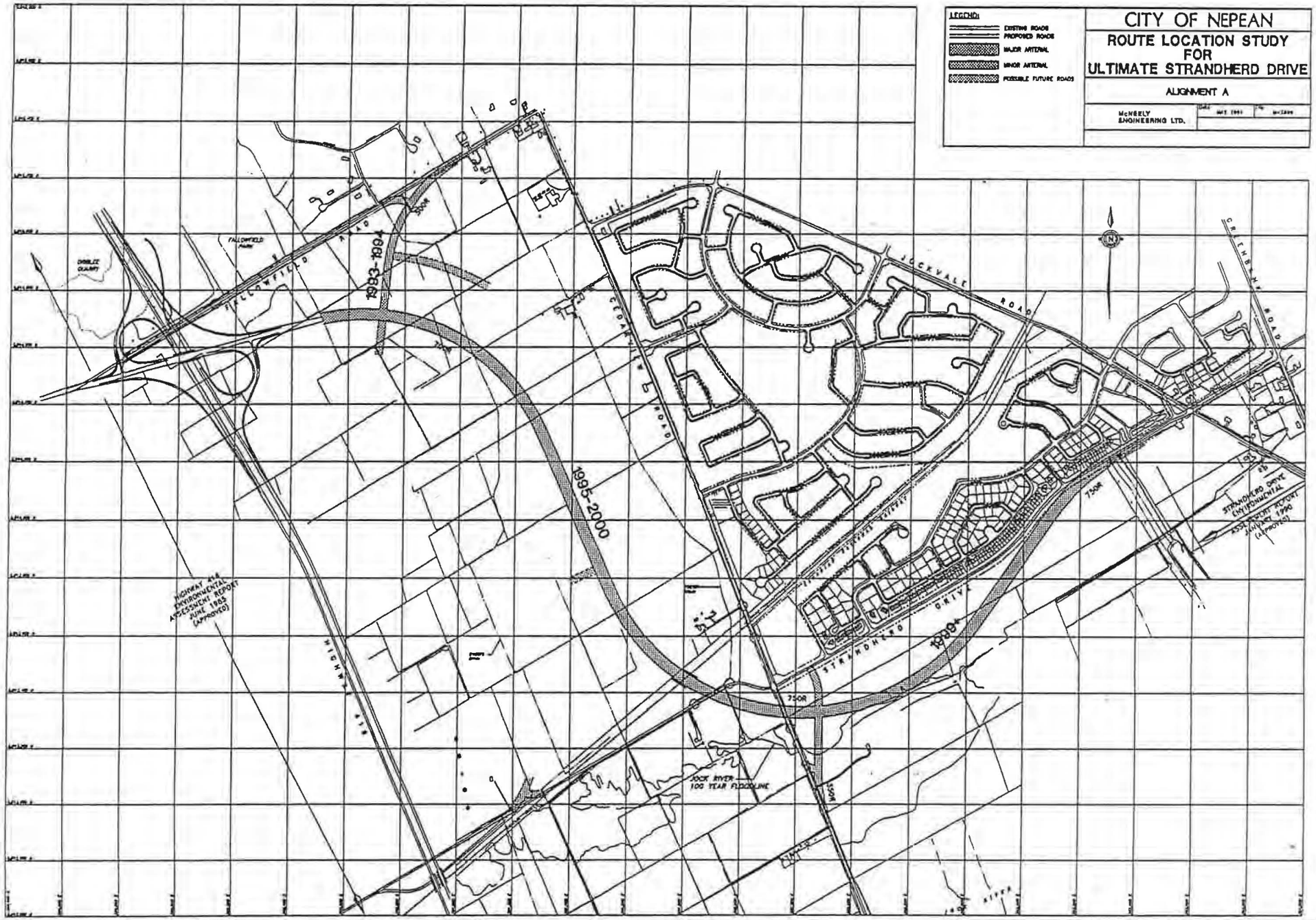
One alignment option (Figure 7) was presented at the first Public Information Session. Based on comments received from the public agencies contacted and members of the public, three alignment options, Alignment A, B and C (Figures 8, 9 and 10) were identified and evaluated. Each



PRELIMINARY ALIGNMENT

Scale N.T.S.

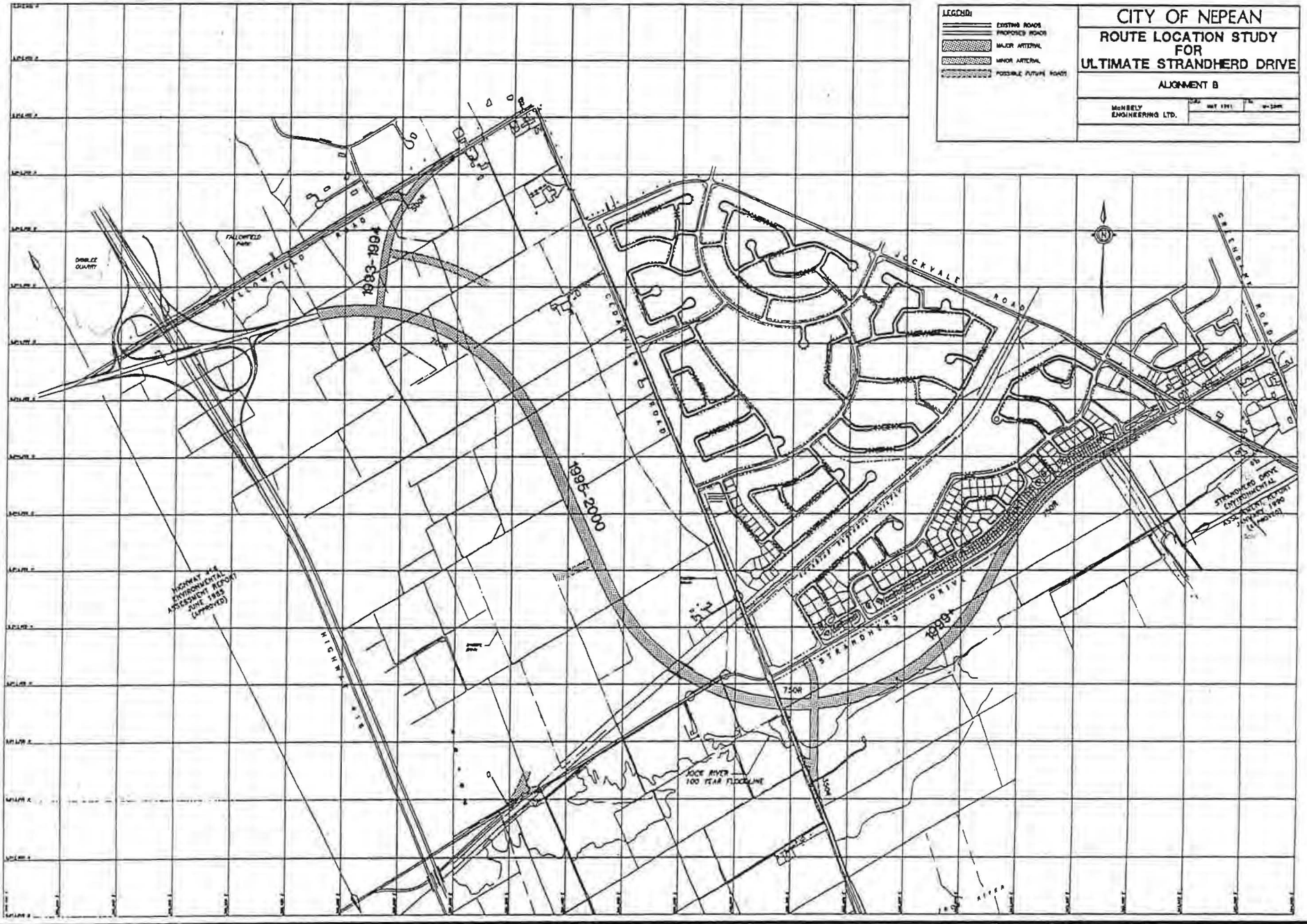
FIGURE 7



ALIGNMENT A

Scale N.T.S.

FIGURE 8



ALIGNMENT B

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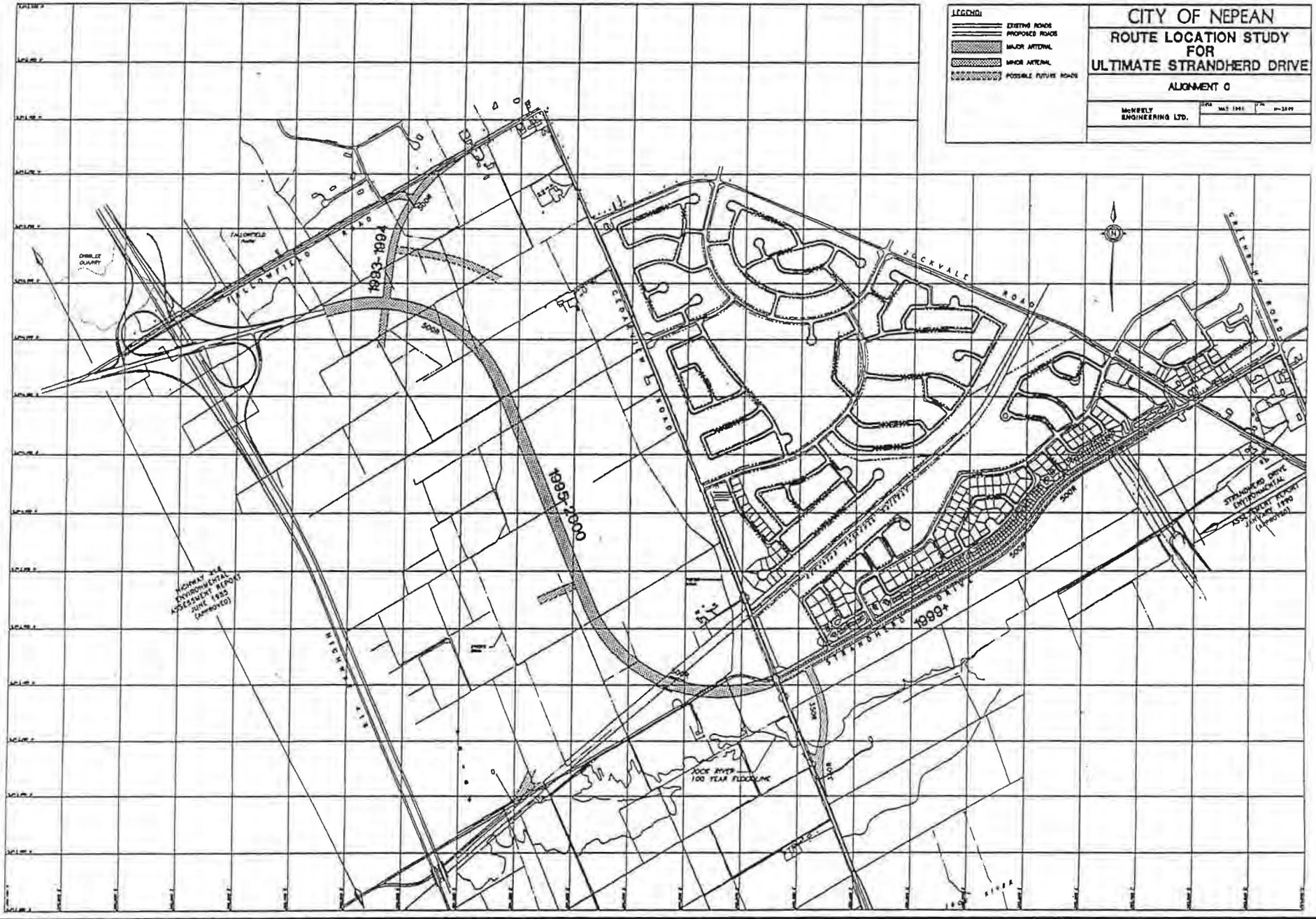
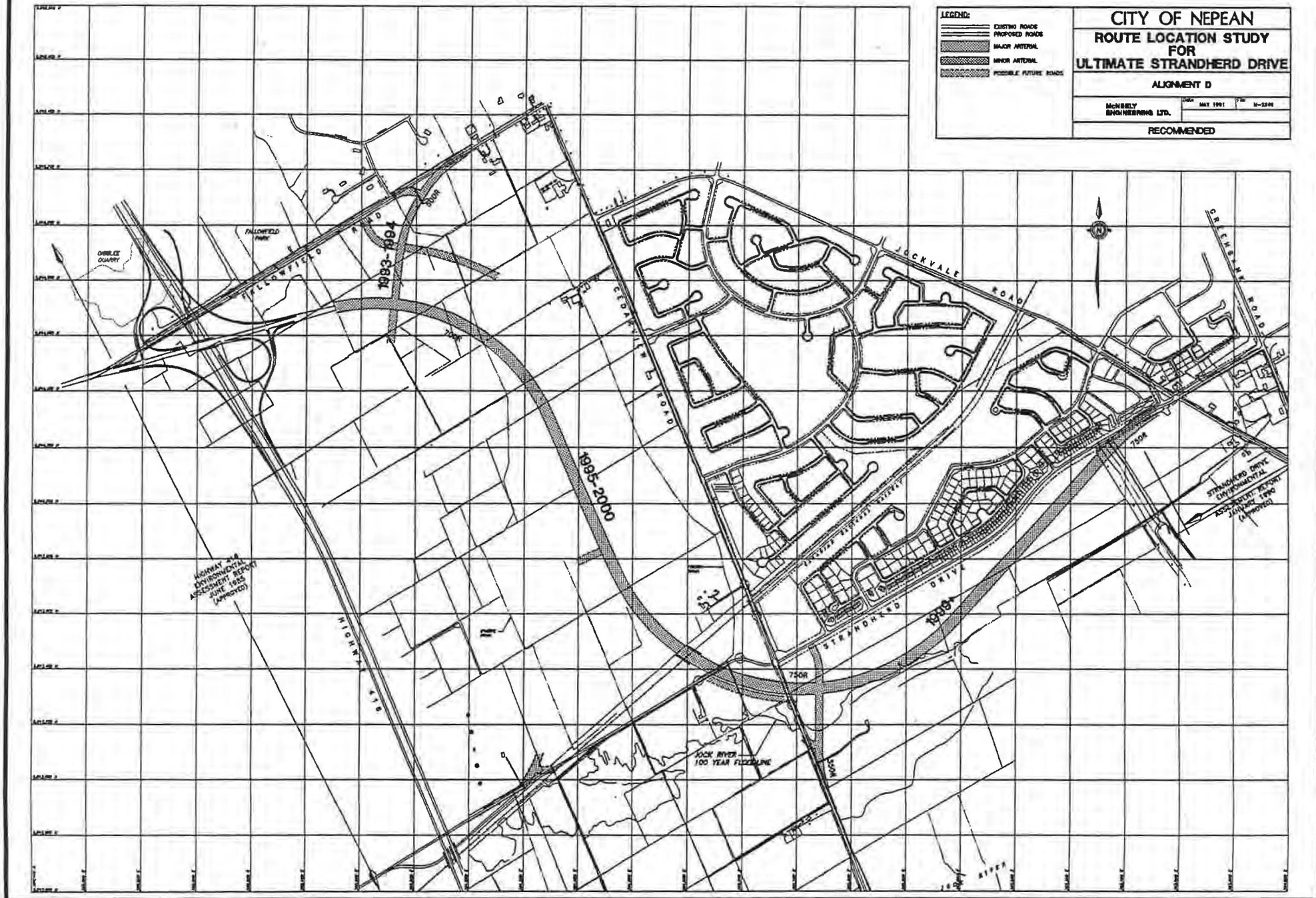
FIGURE 9



ALIGNMENT C

Scale N.T.S.

FIGURE 10



ALIGNMENT D - RECOMMENDED

Scale N.T.S.

FIGURE 11

provides the same basic function, linking the Highway 416 interchange and Strandherd Drive at Jockvale Road.

Following comments received from the second Public Information Session, it was evident that the "preferred" Alignment A was still not acceptable to residents of Soho Crescent as they benefited little from the realignment. The project limit was then extended as far as Jockvale Road to allow a further southerly alignment of Strandherd Drive. The resultant Alignment D (Figure 11) provides a "buffer zone" between the roadway and the existing properties.

4.2.1 Design Criteria

The design criteria are based on the Transportation Association of Canada (T.A.C.) standards. The design speed was set by the Regional Municipality of Ottawa-Carleton at 90 kph which is consistent with the design standards set for Strandherd Drive east of Jockvale Road. A summary of design criteria is shown in Figure 12. The design criteria establish minimum horizontal and vertical controls upon which the alternative alignments are based. Design minimums represent absolute minimum criteria for a given design speed. However, recommended minimum criteria will result in operational advantages such as increased sight distance, driving comfort and safety.

The posted speed limit on Strandherd Drive will be set between 60 and 70 kph and will be determined by the City of Nepean and R.M.O.C. at a later date.

Design criteria for the realignment of Fallowfield Road (Figure 13) were based on a design speed of 80 kph with a likely posted speed limit of 60 kph.

4.2.2 Alignments A and B

Alignments A and B differ only in the relative proximity of Strandherd Drive to existing homes backing onto Strandherd Drive along Halley Street and Soho Crescent.

Approximately fourteen properties back directly onto the proposed right-of-way of Alignment A and thirty-four for Alignment B.

Advantages of Alignments A and B are the increased separation between existing homes on Halley Street, the recommended horizontal curvature is achieved, and improved skew angle at the C.N.R. overpass. Alignment A provides a "buffer zone" between the road and existing residences just west of Opal Lane but results in more undevelopable land.

Alignments A and B are aligned to minimize the amount of unusable land between the proposed right-of-way and Jock River floodline.

4.2.3 Alignment C

Alignment C incorporates into its design the existing right-of-way from Jockvale Road to Cedarview Road. Some minor alignment modifications would be necessary at the existing back-to-back curves west of Opal Lane.

MUNICIPAL ROAD AND BRIDGE DESIGN CRITERIA

MUNICIPALITY OF OTTAWA-CARLETON

(A) EXISTING DATA SUMMARY

Road ☒ or Bridge ☐ Urban ☐ Semi-urban ☐ or Rural ☒

Inventory Section No. _____, A.A.D.T. _____, Year _____, Capacity _____

Road: Name and/or Number Strandherd Drive Length _____

From Jockvale Road to Highway 416 Interchange

Bridge: MTC Site No. _____ Inventory Structure No. _____ Local Bridge Name _____

Location _____ Type of Crossing _____

Safe Load Limit _____ Roadway Width _____

(B) PROPOSED DESIGN ELEMENTS

Urban ☒ Semi-urban ☐ Rural ☐

Road: Metric ☒ or Imperial ☐ Growth due to Improvement _____

Growth Factor _____ Design Year 2011 A.A.D.T. 26-28,000 Design Class 4-UAD 90

Design Hour Volume 2600 - 2800 Directional Split 60/40 % Trucks 20

Design Speed 90 kph Maximum Gradient 6% (Max) 3% (Desired) Property Required Yes

Maximum Horizontal Curvature or Minimum Horizontal Radius R (min) = 340 m; R (desired) = 770+ m

Minimum Vertical Curves: Crest K = 50 Sag K = 40

Number and Width of Lanes: Traffic 4, 3.5 m each Parking _____

Widths: Median 5.0 m Boulevard 4.0 m

Shoulder _____ Roadway 20.0 m

Surface Type and Depth Hot Mix, 40 mm H.L.3, 100 mm H.L.8

Bridge: Type of Structure Overpass Sidewalks 2 x 1.5 m

Width: Between Curbs 18.0 m Between Protective Barriers 25.3 m

(C) GENERAL

Degree of Improvement: Spot Improvement ☐ To Tolerable Standards ☐ To Design Standards ☐

Type of Improvement: Complete Reconstruction ☒ Base and Surface ☐ Resurface and Minor Widening ☐

Estimated Cost: Road $ 20.6M Bridge $2.8M Total $23.4M

Soils Investigation and Report to be provided: Yes ☒ No ☐

Design: Complete ☐ Partial ☒ None ☐

by Municipality ☐ by Consultant ☒

Planned Construction Phases and Estimated Costs (1) 19___ _____ $_____ (2) 19___ _____ $_____

(3) 19___ _____ $_____ (4) 19___ _____ $_____

Construction Planned by: Contract ☐ Day-Labour ☐

Construction Supervision: Municipality ☐ Consultant ☐

Remarks: _____

Date _____ Date _____

ULTIMATE STRANDHERD DRIVE
DESIGN CRITERIA

FIGURE 12

MUNICIPAL ROAD AND BRIDGE DESIGN CRITERIA

MUNICIPALITY OF OTTAWA-CARLETON

(A) EXISTING DATA SUMMARY

Road [x] or Bridge [ ] Urban [ ] Semi-urban [ ] or Rural [ ]

Inventory Section No._____, A.A.D.T._____, Year_____, Capacity_____

Road: Name and/or Number Fallowfield Road Length_____

From Cedarview Road to Strandherd Drive

Bridge: MTC Site No._____ Inventory Structure No._____ Local Bridge Name_____

Location_____ Type of Crossing_____

Safe Load Limit_____ Roadway Width_____

(B) PROPOSED DESIGN ELEMENTS

Urban [x] Semi-urban [ ] Rural [ ]

Road: Metric [x] or Imperial [ ] Growth due to Improvement_____

Growth Factor_____ Design Year 2011 A.A.D.T. 20,000 Design Class 4 UAD 80

Design Hour Volume 2000 Directional Split 60/40 % Trucks 20

Design Speed 80 kph Maximum Gradient 6% (max.) 3% (desired) Property Required Yes

Maximum Horizontal Curvature or Minimum Horizontal Radius R (min) = 280 m R(desired) = 575+ m

Minimum Vertical Curves: Crest K = 35 Sag K = 30

Number and Width of Lanes: Traffic 4, 3.5 m each Parking No

Widths: Median_____ Boulevard_____

Shoulder_____ Roadway_____

Surface Type and Depth Hot Mix - 40 mm H.L.3, 100 mm H.L.8

Bridge: Type of Structure_____ Sidewalks_____

Width: Between Curbs_____ Between Protective Barriers_____

(C) GENERAL

Degree of Improvement: Spot Improvement [ ] To Tolerable Standards [ ] To Design Standards [ ]

Type of Improvement: Complete Reconstruction [x] Base and Surface [ ] Resurface and Minor Widening [ ]

Estimated Cost: Road $3.1M Bridge_____ Total $3.1M

Soils Investigation and Report to be provided: Yes [x] No [ ]

Design: Complete [ ] Partial [x] None [ ]
by Municipality [ ] by Consultant [x]

Planned Construction Phases and Estimated Costs (1) 19___ _____$_____ (2) 19___ _____$_____
(3) 19___ _____$_____ (4) 19___ _____$_____

Construction Planned by: Contract [ ] Day-Labour [ ]

Construction Supervision: Municipality [ ] Consultant [ ]

Remarks:_____

Date_____ Date_____

ULTIMATE FALLOWFIELD ROAD DESIGN CRITERIA | **FIGURE 13**

Alignment C provides the benefit of maximizing development land between Strandherd Drive and the Jock River 100-year floodline.

Roadway costs may be reduced by utilizing a portion of the existing roadbed. These savings are offset by higher bridge costs associated with a larger overpass skew angle, hydro pole relocations and an additional signalized intersection at Tartan Drive.

Approximately 105 homes back directly onto the existing R.O.W. and although the Noise Impact Study does not identify a need to provide noise mitigation measures, Alignment C will be perceived to be a less desirable location for Strandherd Drive than Alignments A and B.

4.2.4 Alignment D

Alignment D was developed as a result of the concerns raised by existing home owners regarding noise, air pollution, safety and property values. Following the second Public Information Session, the consultant was asked to examine the realignment of Strandherd Drive from immediately west of the proposed Jockvale Road intersection. The resultant alignment requires an additional extension of the Kennedy Burnett culvert system and results in additional land behind existing Soho Crescent homes.

4.2.5 CNR Crossing

The proposed Strandherd Drive-CNR crossing will be located approximately 300 m west of the existing Cedarview Road at-grade crossing. The existing crossing may be abandoned when it is necessary

to construct the Strandherd Drive crossing. An application would, at that time, be made to the CNR to transfer seniority to the new crossing.

For the 4-lane urban section, the proposed crossing will be in the form of a grade separation. A level crossing would not be acceptable in terms of safety or traffic service as Strandherd Drive will be a high-functioning, limited access arterial roadway. Transport Canada guidelines indicate that a grade separation is warranted for a train-vehicle cross product of 200,000 or greater. A grade separation will be warranted based on the year 2011 traffic projections.

The two grade separation options are to construct either an underpass or overpass. The Strandherd Drive underpass option offers the advantages of reducing visual impacts and earthwork costs. This option was discounted because gravity drainage could not be provided to the Jock River system. It was therefore concluded that a Strandherd Drive overpass was the best feasible option.

4.2.6 Fallowfield Road

The objectives for the realignment of Fallowfield Road were to minimize costs and impacts on existing properties while at the same time achieving desirable geometrics consistent with the design criteria discussed above.

The location of the Fallowfield Road-Strandherd Drive intersection was based on three criteria: Firstly, the RMOC recommends a minimum intersection spacing of 400 m to enable proper traffic signal

coordination. Secondly, the proximity of the intersection to the interchange is governed by minimum weaving lengths between Fallowfield Road and the interchange ramp. Thirdly, construction costs would be minimized by locating the intersection as close to the interchange as possible.

Following comments received at the second public meeting regarding the location of Fallowfield Road with respect to the recently opened Country Garden Nursery, the alignment of Fallowfield Road was re-examined and realigned further west. This realignment does not completely avoid the nursery property altogether and additional costs will still be incurred to relocate the existing slab-on-grade building.

4.2.7 Cedarview Road

Two alignment options for Cedarview Road to the south of Strandherd Drive were examined. At the first public meeting, Cedarview Road was shown as being realigned approximately 420 east to form an intersection with Strandherd Drive and an extension of Tartan Drive (Figure 7). The consultant was asked to re-examine the alignment of Cedarview Road to minimize construction costs and to maintain the frontage of existing properties.

The location of the Strandherd Drive-Cedarview Road intersection (Figures 8-11) was determined by the consideration of safe stopping distance and acceleration rates within the vicinity of the proposed overpass. It is desirable to maintain a relatively flat grade (2% maximum) through the intersection to facilitate turning and stopping.

4.2.8 Public Concerns

The major natural and social environmental concerns expressed over the location of the roadway were:

- Noise
- Property values
- Expropriation
- Safety
- Loss of recreational use
- Air pollution
- Property access
- Heavy truck patterns

4.3 Evaluation

Table 2 summarizes the results of the evaluation.

4.3.1 Roadway Costs

Total estimated costs for all works associated with each alignment (except land) are as follows:

o	Alignment A	$26,428,000
o	Alignment B	$26,448,000
o	Alignment C	$26,583,000
o	Alignment D	$27,146,000

The breakdown of the costs are included in Appendix 3.

4.3.2 Roadway Geometrics

Design speed is set by the R.M.O.C. as Strandherd Drive will ultimately become a part of the Regional Road Network. Generally, it has been the R.M.O.C.'s practice to set the design speed for arterial roadways at 20 kph above the anticipated posted limit, but more recently has favoured designing to 30 kph above the posted speed limit. A 90 kph design speed will provide the flexibility of setting a 60 or 70 kph posted speed limit.

The design criteria were discussed briefly in Section 4.2.1. Comments received from the R.M.O.C. (Appendix A-1) indicates that the absolute minimum horizontal curvature for a 90 kph design speed is 340 m which yields a maximum rate of superelevation of 4%. However, where there is a major arterial intersecting on a curve (such as Fallowfield Road) a superelevation of 3% or less and horizontal curvature of 770 m or more is recommended. Larger curves and lower superelevations are preferable because they yield better operating conditions such as increased sight distance, driving comfort, safety and traffic capacity.

It has also been the R.M.O.C.'s practice to recommend maximum grades up to 6% as suggested by M.T.O. and T.A.C. standards. A maximum of 5% is preferable with a desirable maximum grade of 3%. It was found that approach fill volumes to the proposed C.N.R. overpass did not vary significantly between profile grades of 3% and 5%. The benefits of using flatter grades are increased traffic capacity on upgrades, lower safe stopping distance and increased comfort. A

ROUTE ALIGNMENT EVALUATION SUMMARY

ITEM	MEASURABLE QUANTITY	ALIGNMENT			
		A	B	C	D
1. COST (Excluding Land)	$$	◒	◒	◒	○
2. ROAD GEOMETRICS	LENGTH, RADII SUPERELEVATION, PROFILE GRADE	◒	◒	○	◒
3. BRIDGE GEOMETRICS	LENGTH	◒	◒	○	◒
4. NOISE	△dBA x NO. HOMES	◔	◒	○	●
5. ENVIRONMENT (Excepting Noise)	AREA(Ha), SPECIES	◒	◒	◒	◒
6. LAND USE (Developable Land, Property Requirements)	AREA(Ha), COST	◒	◔	●	◒
7. RECREATION	AREA(Ha)	◒	◒	○	◒

● MOST PREFERABLE
◔
◒ EQUAL PREFERENCE
◕
○ LEAST PREFERABLE

PREFERRED ALIGNMENT - "D"

TABLE 2

maximum grade of 3% was used for the profile of each alignment option.

4.3.3 Bridge Geometrics

Design and construction costs of the overpass will depend on factors including roadway and railway cross-sections, structure type, length, soil stability and bridge skew.

Preliminary bridge cost estimates were prepared based on the proposed alignment options, results of the soils investigation, and on the bridge design included in Appendix 4. The overpass design was modified and cost estimates updated to reflect comments received from the RMOC Structural Department following the second public meeting. A protective concrete barrier was incorporated into the design to separate the bike lanes from the vehicle lanes.

Overpass costs for Alignments A, B and D are estimated at $2.8 million including design, construction and supervision costs. Bridge skew is approximately 15°, where a bridge skew of 0° would result in the shortest span bridge and hence lowest cost. The Alignment C overpass costs (bridge skew of 30°) are estimated at $2.9 million.

4.3.4 Noise

A noise impact study was undertaken to examine the impacts of the three alignments on existing residences along the existing Strandherd Drive right-of-way. The study results are presented in Appendix 5.

The requirements for noise mitigation are specified jointly by the M.O.E. and M.T.O. The objective outdoor sound levels is the higher of 55 dBa or the existing ambient which, in this case, is 60-62 DbA. However, the undertaking of sound mitigation measures depends primarily on the difference in sound levels between the proposed roadworks and the "Do nothing" case. The guidelines specify that sound mitigation is required if at least one of the following two criteria are met:

1. The future noise levels for the proposed roadway are more than 5.0 dBa greater than the future "Do nothing" noise levels, or
2. Sound levels exceed 70 DbA.

The findings of the study are that no noise mitigation is required along existing homes. Firstly, future project sound levels generated by the year 2011 traffic predictions result in only a 3 dBa excess over the year 2011 "Do nothing" levels. Secondly, the worst case sound levels are estimated to be 69 dBa, still within M.O.E./M.T.O. guidelines.

4.3.5 Environment (Excepting Noise)

Analysis of the alignment options involved the collection and review of existing plans and documents of the various resources and natural features within the study area. Public Ministries were also contacted for their input. The following is a list of the existing features.

- Current land use: Agricultural land use systems include monoculture (no crop rotation - corn, cereal), mixed (rotation,

corn cereal grain, hay, pasture), and grazing. Will be rezoned to residential and business park.

- Woodlands: Approximately 2 ha in the vicinity of the future Strandherd Drive - Fallowfield Road intersection affected equally by each alignment scheme.

- Wildlife: No endangered species identified within the study limits.
- Archaeological Sites/Heritage Resources: None within the study limits.

- Floodplain: The Jock River 100 year floodline is a limiting feature of urban development. The City of Nepean has identified land use within the floodplain as open space, for recreation or conservation.

- Drainage: Tile drainage exists in some agricultural properties, Foster and O'Keefe Municipal Drains, and Kennedy-Burnett Stormwater Management Facility within study limits. Culverts are required for each alignment option.

The effects on the natural environment are equal for each of the alignment options.

4.3.6 Land Use

Existing agricultural lands within the study area have been identified by the City of Nepean as future residential and business park

development. The total area of land that can be developed depends on the location of the Strandherd Drive corridor, horizontal and vertical geometrics and proximity to existing features. Land that cannot be developed as residential or business park because of its location or irregular shape could be developed as parkland or left undeveloped.

Alignment C provides the greatest amount of developable land by maintaining the current alignment east of Cedarview Road and eliminating unused land between the Jock River floodline and Strandherd Drive.

In the zone bounded by Fallowfield Road, Highway 416, Cedarview Road and the CNR, Strandherd Drive will separate the business park and residential developments. Alignment C provides a greater area for residential and a lesser area for business park development (98 ha and 139 ha, respectively) than do Alignments A, B and D (86 ha and 151 ha).

Land values of homes backing onto Strandherd Drive in the vicinity of Opal Lane are not expected to decrease due to increased noise. Projected sound levels for the year 2011 do not indicate the need for sound barriers for any of the four alignment options.

4.3.7 Recreation

A number of residents submitted comments regarding the negative impact of a major arterial roadway on the recreational use of the existing surroundings. With the construction of both a 3 m wide

recreational pathway, and a 2.0 m sidewalk where neither currently exist, cyclists and pedestrians will experience a higher degree of safety. The pathway and sidewalk will be interconnected with existing and future pathway systems in the area. Proposed plans also provide for a pedestrian and bicycle overpass over the railway within the Fraservale Community. Alignment A provides the added benefit of having space for a future strip park between the existing homes and Strandherd Drive west of Opal Lane.

4.4 Construction Requirements

Prior to the construction of any of the proposed works, the designer shall include in the contract documents instructions obliging the contractor to comply with all restrictions as outlined in the MTO Form M-100, Special Provisions and applicable City and Regional by-laws.

5.0 RECOMMENDED DESIGN AND CONSTRUCTION REQUIREMENTS

5.1 The Recommended Design

Preliminary plans and profiles have been completed for the recommended Alignment D (Appendix 6). Conceptual intersection designs are based on the predicted year 2011 traffic volumes illustrated in Figures 5 and 6. The design provides a 4-lane divided arterial within a 40 m right-of-way to be built to RMOC standards.

The recommendation was presented to Nepean Works Committee on April 23rd, 1991 as documented in the Public Works Department Report No. 68-91 (Appendix 7). The Committee approved the recommended Alignment D and the request to proceed with the Environment Assessment.

In a meeting held on Wednesday, May 22nd, 1991, the RMOC Transportation Committee approved, in principle, to adopt the realignment of Fallowfield Road east of the proposed Highway 416 interchange. The matters detailed in the Transportation Department Report (Appendix 7) will be considered by Regional Council on June 12th, 1991.

5.1.1 Design Control

a) The design alignment must tie into the proposed alignments of the Highway 416 interchange and to Strandherd Drive immediately west of Jockvale Road.

b) Proximity to the Jock River 100-year floodline must be considered.

c) Visual impact and noise should be minimized in the vicinity of existing homes.

d) Intersections should be spaced at a minimum of 400 m.

5.1.2 Design Features

The selected features relative to the road construction design are as follows:

a) Construct two through lanes in each direction.

b) Include provisions for a signalized 'T' intersection into the future business park north of the proposed overpass.

c) Provide left turn lanes, acceleration and deceleration lanes and channelization at intersections at Fallowfield Road, Cedarview Road and Business Park Access.

d) Install traffic signals at each intersection.

e) Install street lights along the entire corridor within the study limits.

f) Provide stormwater drainage outletting to the Jock River system.

g) Install culverts at Foster and O'Keefe Municipal Drain crossings (subject to a future Master Drainage Study) and lengthen the sewer structures at the Kennedy Burnett outlet.

h) Provide a recreational pathway on north (and east) side of Strandherd Drive and sidewalk on the south (and west) side.

i) The existing at-grade railway crossing at Strandherd Drive will be maintained to provide service to properties west of Cedarview Road and south of the railway.

j) Cedarview Road south of Strandherd Drive will undergo an easterly re-alignment to intersect Strandherd Drive approximately 500 m east of the proposed CNR overpass. The existing Cedarview Road will be maintained to provide access to property.

k) Existing Strandherd Drive east of Cedarview Road will become available for future residential or business park development.

l) Opal Lane will be closed to through traffic.

5.2 Selected Design - Potential Environmental Impacts

5.2.1 Natural Environment

5.2.1.1 Drainage

Stormwater runoff will be controlled by a storm sewer outletting to the Jock River system.

Area drainage patterns in the study area are subject to a Master Drainage Study to design for the increase in runoff created by future residential and business park development.

5.2.1.2 Vegetation

The road construction will result in the removal of some trees along the corridor. An effort should be made to save or replace trees where possible.

5.2.1.3 Noise

Increased noise due to the future road expansion has been the major concern of the public. A noise investigation was performed by S.S. Wilson & Associates and it was concluded that no noise mitigation is required for the existing homes backing onto Strandherd Drive.

5.2.2 Social Environment

5.2.2.1 Land Use and Property

In the development of alternative alignment options, an attempt was made to minimize the impact on existing properties backing onto Strandherd Drive. No expropriation will be required for the recommended alignment.

As a condition of approval, developers wishing to develop the proposed residential and business park lands may be required to provide the necessary road allowance to the City of Nepean for a 40 m right-of-way along the recommended Strandherd Drive corridor.

Access to existing properties located in the vicinity of the CNR will be provided by maintaining sections of Strandherd Drive and Cedarview Road on either side of Strandherd Drive.

5.2.2.2 Traffic

The completion of the Strandherd Drive corridor will provide an efficient and attractive east - west arterial route which could result in cut-through traffic within Neighbourhood No. 5. In response, the City of Nepean Planning Department has developed a preliminary internal road network within the limits of the planned development to minimize cut-through traffic on existing residential streets.

5.2.2.3 Recreation

Provisions have been made to include a recreational pathway within the Strandherd Drive right-of-way that will be linked to a pathway system within Neighbourhood No. 5.

5.2.2.4 Safety

By incorporating into the design of Strandherd Drive the recommended geometry, channelization, acceleration and deceleration lanes, limited access, traffic signals, roadway

lighting and centre median, the proposed design will provide a safe route for vehicular traffic.

The closure of the existing Cedarview Road - C.N.R. level crossing would eliminate the possibility of vehicle - train conflicts.

5.3 Selected Design - Mitigating Measures

5.3.1 Land Use and Property

Widening of existing right-of-way in the vicinity of existing homes will occur to the south of the current alignment. Earth grading will be done to minimize impacts on existing backyards and to provide adequate drainage.

Developers of future residential and business park lands will have to meet the noise mitigation requirements outlined in the noise report (Appendix 5).

5.3.2 Safety

Existing chain link security fence separates existing backyards and Strandherd Drive. This fence will be maintained by the City of Nepean.

5.4 Selected Design - Construction Process

Construction will conform to the restrictions as outlined in the MTO Form M-100, Special Provisions and applicable City and Regional by-laws.

5.5 Specific Construction Requirements - Potential Environmental Impacts

Should any unanticipated negative environmental impacts occur during the construction process, they will be addressed and resolved through on-site meetings with the appropriate agencies.

5.6 Construction Phasing

As indicated on each of the alignment alternative (Figures 8-11), the construction of Strandherd Drive will likely be phased over the next ten or more years. The timing of construction will occur as development proceeds and as traffic demands increase.

The initial stage of construction will occur in the vicinity of the Highway 416 interchange. An interim alignment of Fallowfield Road will maintain a continuous east-west traffic movement between Cedarview Road and Moodie Drive as illustrated by the design drawings in Appendix 8. At such a time as Strandherd Drive is constructed, Fallowfield Road will be realigned to form an intersection with Strandherd Drive. The interim work will also include the connection of Fallowfield Road east of Foxtail Road to provide access to the Orchard Estates community and Fallowfield Park. This connection may be removed in the future and a new intersection constructed to serve future development either side of Fallowfield Road.

The following phases of construction are based on City of Nepean land development projections. It is possible that initially, Strandherd Drive will be constructed as a two-lane road with a level crossing of the CNR. The RMOC has agreed in principle to take over a two-lane rural roadway between Highway 416 and Jockvale Road, and will therefore be financially

responsible for a widening to four lanes. A further study of phasing options will include the examination of a rural vs urban cross-section, profile grade and pavement widths in order to maximize the reusable portion of any interim construction.

6.0 SUMMARY

This report details the planning and design process for the Strandherd Drive and Fallowfield Road ultimate alignments. The process was completed according to the requirements of a Class Environmental Assessment for Municipal Road Projects and included the involvement of public agencies and members of the general public.

Strandherd Drive has been identified as being a future major east-west arterial road linking Highway 416 in Nepean to Armstrong Road in Gloucester. The extension and upgrading of Strandherd Drive will coincide with the development of the South Urban Community.

Four alternative alignments were considered for Strandherd Drive and a recommended alignment selected that, it is felt, best meets the desired engineering and environmental criteria while minimizing the impacts on existing property owners within the corridor.