

Ontario

Ministry  
of  
Transportation

# HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

FROM HIGHWAY 169 NORTHERLY TO THE NORTH JUNCTION  
OF MUSKOKA ROAD 3, A DISTANCE OF 54 Km.

W.P. 341-87-00

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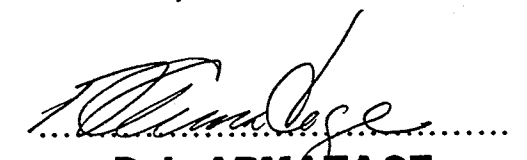


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## **CHAPTER 5**

# **ALTERNATIVES AND EVALUATION**

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## 5.0 ALTERNATIVES AND EVALUATION

### 5.1 ALTERNATIVE INVESTIGATION AND EVALUATION PROCESS

This chapter documents the identification and evaluation of alternatives developed in the Concept Phase and Preliminary Design Phase of this study.

During the concept phase, "network" alternatives were developed for eight segments of Highway 11. The network alternative within each segment must provide a controlled access freeway condition. In areas where direct access to Highway 11 is eliminated by road closures, alternative access must be provided to the new Highway 11 interchanges via a service road network. The service road network may comprise of existing, new or upgraded roads and flyovers.

The end of each network alternative segment is established at crossing roads where network alternatives are not considered. Generally, they occur at existing or proposed interchange locations.

The eight segments are:

- 1) Highway 169 to Muskoka Road 41
- 2) Muskoka Road 41 to Highway 118
- 3) Highway 118 to Taylor Road
- 4) Taylor Road to Highway 117
- 5) Highway 117 to Bracebridge Resource Management Centre
- 6) Bracebridge Resource Management Centre to Highway 141
- 7) Highway 141 to Muskoka Road 3 (South of Huntsville)
- 8) Muskoka Road 3 (South of Huntsville) to Muskoka Road 3 (North of Huntsville).

The conceptual schemes for the recommended and alternative network plans were presented at the first set of Public Information Centres. The network analysis carried out in the Concept Phase is discussed in detail in Section 5.2.

In the Preliminary Design Phase, the recommended interchanges and flyovers proposed in the Concept Phase are studied further. Four of the proposed interchanges are located at segment ends of the recommended network alternatives. The implementation of these interchanges into the network is considered a "given" and not an alternative. They are as follows:

- Highway 169 Interchange Reconstruction
- Muskoka Roads 41 and 6 Interchange Reconstruction
- Highway 141 Interchange
- Muskoka Road No. 3 (north of Huntsville) Interchange

The other recommendations of the concept design analysis resulted in the preparation of preliminary designs for the following locations:

- Pinedale Road / Hewitt Street
- Muskoka Road 37
- High Falls Road
- All Pines Cabins
- South Mary Lake Road
- Allensville Road / Rowanwood Road
- Madill Church Road / Gryffin Lodge Road
- Lindgren Road

The project team developed and evaluated various options at each proposed interchange and flyover location and selected the preferred configuration. The preferred interchange and flyover configurations were presented at the second set of Public Information Centres and form the basis for the selected preliminary design which is discussed in Chapter 6. The preliminary design analysis is discussed in detail in Section 5.3.

TABLE 5.1

**TRAFFIC MODELLING ANALYSIS**  
**TRAVEL DISTANCE AND TRAVEL TIME**  
**HIGHWAY 11 – PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN**

S E G M E N T	OPTION	VEHICLE TRIPS PER DAY	TRAVEL DISTANCE			TRAVEL TIME			COST OF INCREASED / DECREASED TRAVEL DISTANCE (\$)	COST OF INCREASED / DECREASED TRAVEL TIME (\$)	OPERATIONAL COST INCREASE / DECREASE
			VEH-KM PER DAY	INCREASE (DECREASE)		VEH-MIN PER DAY	INCREASE (DECREASE)				
				VEH-KM	%		VEH-MIN	%			
1	EXISTING	2850	44180			54520					
	OPTION 1		44080	-100	0	54560	40	0	-9000	3000	-6000
	OPTION 2		44150	-30	0	54780	260	0	-3000	19000	16000
2	EXISTING	1330	16690			19050					
	OPTION 1		16940	250	1	20780	1730	9	23000	126000	149000
	OPTION 2		17410	720	4	20630	1580	8	66,000	115000	181000
3	EXISTING	3900	65600			74550					
	OPTION 1		66880	1280	2	76600	2050	3	117000	150000	266000
	OPTION 2		67540	1940	3	76270	1720	2	177000	126000	303000
4	EXISTING	300	5030			5110					
	OPTION 1		5380	350	7	5640	530	10	32000	39000	71000
	OPTION 2		5130	100	2	5190	80	2	9000	6000	15000
5	EXISTING	170	3160			3440					
	OPTION 1		3240	80	3	3610	170	5	7000	12000	20000
	OPTION 2		3290	130	4	3670	230	7	12000	17000	29000
6	EXISTING	4760	94820			98130					
	OPTION 1		97360	2540	3	102950	4820	5	232000	352000	584000
	OPTION 1A		98740	3920	4	103550	5420	6	358000	396000	753000
	OPTION 2		98930	4110	4	103360	5230	5	375000	382000	757000
7	EXISTING	1850	24360			23560					
	OPTION 1		25290	930	4	25480	1920	8	85000	140000	225000
	OPTION 2		27900	3540	15	30520	6960	30	323000	508000	831000

ANALYSIS BASED ON EXISTING TRAVEL PATTERNS AND VOLUMES

RECOMMENDED NETWORK – OPTION 1      VEH-KM      –      VEHICLE – KILOMETRES  
 ALTERNATIVE NETWORK – OPTION 2      VEH-MIN      –      VEHICLE – MINUTES



## CRITERIA USED FOR ANALYSIS

The following criteria was used to evaluate the network alternatives;

- Geometric design standards
- Property requirements
- Business access
- Environmental
- Traffic
- Capital Cost

The rationale for analysis for each criteria is discussed below:

### Geometric Design

The preliminary alignments of the various alternatives are evaluated for conformance to desirable road geometry and safety standards.

### Property

The alternatives are analyzed based on impact to private and public property. Potential conflicts with residential homes and businesses are documented. The extent of property required for the alternative and whether the property is developable or undevelopable is taken into consideration.

### Business Access

The impact of each alternative upon the existing business accesses to and from Highway 11 was reviewed. Information contained in the business survey assisted in the evaluation of alternatives, as they affect the viability of the existing business.

### Environmental

Each of the alternatives were reviewed for their impact on the existing natural, cultural and social environment. Preliminary alignments were set considering impact upon known natural features, candidate heritage sites, social and economic values.

### Traffic

The existing and proposed network alternatives within each segment were modelled to estimate the increase in travel distance (vehicle - kilometres) and travel time (vehicle - minutes). The origin/destination data obtained in the 1989 travel survey is used in conjunction with the estimated distances and travel times between zones to develop the increase in travel distance and travel time for each segment alternative. An operational cost was determined using the following cost factors;

- \$12 / hour for travel time
- \$0.25 / kilometre for travel distance

The segment alternative with the lower increase in operational cost is preferred in terms of these transportation factors.

The results of the traffic modelling process is summarized in the matrix analysis of the existing conditions, the alternative and the recommended network for each segment. Table 5.1 outlines in detail the results of the segment-by-segment analysis.

### Capital Cost

Construction costs for each alternative were estimated based on the topography and preliminary design profiles. Suitable per metre unit prices were used for road and structure construction.

### Additional Factors

Additional criteria were used to evaluate Segment Three - Highway 118 to Taylor Road. This additional analysis was required to address the concerns of the Town of Bracebridge and included:

- i) A comparison of traffic growth and turning volumes.
- ii) Impact of interchange location upon development potential.
- iii) Engineering factors such as soil constraints and structure considerations.

## 5.3.1 SEGMENT 1: HIGHWAY 169 TO MUSKOKA ROAD 41

It is proposed that the existing Highway 169 and the Muskoka Road 41 interchanges be reconstructed to full-moves interchange facilities. The options considered for this segment include a flyover across Highway 11 at Pinedale Road/Hewitt Street (See Plate 1) or a service road connection from the Highway 169 interchange to Hewitt Street along the east side of Highway 11 (See Plate 10). The analysis of the options in this segment is shown on Table 5.2.

The Town of Gravenhurst Hahne Farm Site is located within this segment along the west side of Highway 11 between Pinedale Road and Highway 169. A mixed use (residential/industrial) development is proposed on the site by the Town. The site plan for this development utilizes the existing Highway 11 southbound lanes subsequent to the abandonment of the roadbed after realignment of Highway 11. This new road functions as a west service road between Highway 169 and Pinedale Road.

In both options, access to Highway 11 at the Pinedale Road/Hewitt Street intersection is eliminated.

Analysis of both options indicates that the flyover is preferred in terms of property and environmental impacts, traffic factors, and cost. The east service road option negatively affects the natural environment (Jevin's Lake) and the social environment by segregating the Hewitt Street community from the Gravenhurst Town Centre. The flyover option is therefore recommended for further detailed analysis.

TABLE 5.2

SEGMENT ONE: HIGHWAY 169 TO GRAVENHURST NORTH INTERCHANGE  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	FLYOVER AT PINEDALE AND HEWITT ROADS	CLOSURE AT PINEDALE AND HEWITT ROADS
GEOMETRIC DESIGN	ACCEPTABLE FLYOVER GEOMETRY OVER HWY 11 FROM PINEDALE RD. TO HEWITT ST.	ACCEPTABLE SERVICE ROAD ALIGNMENT FROM HWY 169 INTERCHANGE TO HEWITT ST.
PROPERTY	- POTENTIAL CONFLICT WITH EXISTING HYDRO LINES - LANDS WEST OF HWY 11 AND WEST OF PINEDALE ST. ARE CONSIDERED FOR DEVELOPMENT	- SERVICE ROAD LOCATED ON UNDEVELOPED LANDS - MAY CONFLICT WITH EXISTING HYDRO LINES
BUSINESS ACCESS	- NO EXISTING BUSINESSES AFFECTED - PINEDALE RD. IS INTERIM ACCESS FOR HAHNE FARM DEVELOPMENT - DEVELOPMENT TO USE EXISTING HWY 11 ALIGNMENT UPON RECONSTRUCTION OF HWY 11/169 INTERCHANGE	- NO EXISTING BUSINESSES AFFECTED - PINEDALE RD. IS INTERIM ACCESS FOR HAHNE FARM DEVELOPMENT - NEW HAHNE FARM ROAD TO USE EXISTING HWY 11 ALIGNMENT UPON RECONSTRUCTION OF HWY 11/169 INTERCHANGE
ENVIRONMENTAL	LOCALIZED IMPACT AND TREE CLEARING REQUIRED	- SERVICE ROAD IMPACT ON JEVINS LAKE - SERVICE ROAD LOCATED THROUGH DEEP SWAMP - SERVICE ROAD MAY IMPACT "POTHOLES" NEAR JEVINS LAKE
TRAFFIC - % increase veh-km - % increase veh-mins - total increase - operational cost	0 0 - \$6000/YR SUPERIOR OPTION	0 0 \$16,000/YR INFERIOR OPTION
CAPITAL COST	\$ 2.5 M	\$ 3.0 M
REMARKS	CONVENIENT LOCAL ROAD MAINTENANCE BETWEEN PINEDALE ROAD AND HEWITT STREET	- INCONVENIENT LOCAL ROAD MAINTENANCE - HEWITT ST. ACCESSED VIA SERVICE ROAD FROM HWY. 169

☐ PREFERRED OPTION

5.3.2 Segment 2: Muskoka Road 41 to Highway 118

The options investigated for this segment are: a service road along the east side of Highway 11 from Doe Lake Road East to Highway 118 (See Plate Nos. 1 & 2) and an interchange near the Muskoka Airport north of Reay Road (See Plate Nos. 10 & 11). The analysis for the options in this segment is shown on Table 5.3.

Within Segment 2, road closures are proposed at Doe Lake Road, Jones Road, Reay Road East and West of Highway 11 and at Airport Road. Winhara Road (Old Highway 11) functions as a service road on the west side of Highway 11 throughout Segment 2.

Development proposals within this segment include a residential site on Reay Road east of Highway 11, an industrial site at the southwest corner of Highway 11 and Reay Road West, and an industrial development at the Muskoka Airport. The east service road option (Plate Nos. 1 & 2) utilizes the proposed roadway through the airport development.

A preliminary study was carried out to evaluate the impacts of the airport service road and the airport interchange on the operation of the runways at the Muskoka Airport. Meetings were held with Transport Canada, The Town of Gravenhurst and the airport developer (R. Filzmaier) to review these options. The study concluded that neither option affected the operation of the runways. However, the service road option requires that the vertical alignment be depressed for the section of the road immediately north of the runway threshold. The report was sent to Transport Canada and they provided a verbal response indicating approval-in-principle of the study findings.

Also located within Segment 2 is the Shell Service Centre/Skyway Motel complex. Closure of the access to Highway 11 upon implementation of the ultimate freeway condition was considered. Alternative access would be provided by the adjacent service road. However, MTO proposes to carry out additional study to address highway services along Highway 11 over a broader area from Orillia to North Bay. As a result, it is proposed that the existing Highway 11 access for this service centre remain unchanged. Internal site reconfiguration is required to ensure that local road traffic cannot travel through the service centre onto Highway 11 resulting in operation as a partial interchange.

TABLE 5.3  
SEGMENT TWO: GRAVENHURST NORTH INTERCHANGE TO HWY 118  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	CLOSURE AT MUSKOKA AIRPORT	INTERCHANGE AT MUSKOKA AIRPORT
GEOMETRIC DESIGN	-ACCEPTABLE SIDEROAD ALIGNMENT -POTENTIAL SERVICE RD ALIGNMENT DOES NOT CONFLICT WITH MUSKOKA AIRPORT ZONING	ACCEPTABLE INTERCHANGE, RAMP, AND SERVICE ROAD GEOMETRY
PROPERTY	-MINOR PROPERTY ACQUISITION REQUIRED NORTH TO THE EXISTING AIRPORT ROAD -EXISTING CEMETERY AT AIRPORT RD AND HWY 11 TO BE AVOIDED	INTERCHANGE COMPLETELY CONTAINED WITHIN UNDEVELOPED LANDS AND AVOIDS AIRPORT REDEVELOPMENT
BUSINESS ACCESS	-DIRECT HIGHWAY ACCESS TO THE AIRPORT IS NOT PROVIDED -ACCESS IS VIA NEW SERVICE ROAD TO HWY 118 OR SOUTH TO THE GRAVENHURST NORTH INTERCHANGE -IMPACT UPON ACCESS TO GRAVENHURST WORKS YARD AT JONES RD (INCREASED TRAVEL TIME)	-SEMI-DIRECT ACCESS TO/FROM HWY 11 VIA THE NEW INTERCHANGE SOUTH OF THE AIRPORT -REMOVES THE DIRECT ACCESS TO THE EXISTING SERVICE STATION AND MOTEL -IMPROVED ACCESS TO REAY RD. AND THE AIRPORT RELATED BUSINESSES
ENVIRONMENTAL	MINOR IMPACT ALONG NEW SERVICE ROAD ALIGNMENT	LOCALIZED IMPACT AT THE INTERCHANGE SITE
TRAFFIC - % increase veh-km - % increase veh-mins - total increase - operational cost	1 9 \$ 149,000 /YR MARGINALLY SUPERIOR	4 8 \$ 181,000 /YR MARGINALLY INFERIOR
CAPITAL COST	\$ 6.0 M	\$ 10.7 M
REMARKS	-IMPACT TO AIRPORT ORIENTED BUSINESS BY REMOVAL OF DIRECT HIGHWAY ACCESS -GOOD ACCESS TO EXISTING MOTEL/SERVICE CENTRE FACILITY -MODERATE COST	-ENCOURAGES AIRPORT AND REAY RD. DEVELOPMENTS -MINIMIZES IMPACT TO EXISTING COMMERCIAL, INSTITUTIONAL AND RECREATIONAL USES

☒ PREFERRED OPTION

The two options are comparable in terms of environmental and property impacts and geometric design. The interchange option is marginally superior in terms of business access. However the east service road option offers substantial savings in capital construction costs and moderate savings in operational costs. The service road option in Segment 2 is recommended for further analysis. However, the recommendation of the preferred scheme does not preclude an airport interchange in the future.

### 5.3.3 Segment 3 - Highway 118 to Taylor Road

The options considered for Segment 3 are an interchange at Muskoka Road No. 37 (See Plate 3) or an interchange at the existing Fraserburg Road flyover (See Plate 12). The analysis for the options in this segment is shown in Table 5.4.

The Town of Bracebridge is strongly in favour of an interchange at Fraserburg Road and the corresponding improvement to Fraserburg Road west of Highway 11. Development proposals in this Fraserburg Road area include the Town's Activity Centre and Fairgrounds, two industrial sites and a residential development.

The initial analysis for Segment 3 recommended that the interchange at Muskoka Road No. 37 is the preferred option. However upon the insistence of the Town, a much more detailed analysis was carried out for Segment 3. Additional meetings were held with the Town of Bracebridge and MTO to discuss the interchange alternatives. A separate report to outline the additional analysis and recommendation was prepared and is appended to this report with the relevant correspondence with the Town of Bracebridge.

The report concluded that future traffic volumes, impacts to property and the environmental, engineering and construction cost factors, all favoured the location of the interchange at Muskoka Road No. 37. Furthermore, the existing structure at Fraserburg Road introduces sub-standard design elements to the interchange configuration. As a result, the interchange at Muskoka Road No. 37 continues to be the preferred option for Segment 3.

TABLE 5.4

SEGMENT THREE: HIGHWAY 118 TO TAYLOR ROAD INTERCHANGE  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGE AT MUSKOKA ROAD 37	INTERCHANGE AT FRASERBURG ROAD
TRAFFIC		
TURNING MOVEMENTS	1980 TO 1985 TRAFFIC DATA SHOWS 1800 TO 1900 TURNING MOVEMENTS (1.7% GROWTH)	1980 TO 1985 TRAFFIC DATA SHOWS 300 TO 310 TURNING MOVEMENTS (0.7% GROWTH)
TWO-WAY TRAFFIC	WEST OF HWY 11 AADT VOLUMES ARE AS FOLLOWS: 1980 1890 VEH/DAY 1985 2080 VEH/DAY (2% GROWTH)	WEST OF HWY 11 AADT VOLUMES ARE AS FOLLOWS: 1980 600 VEH/DAY 1985 610 VEH/DAY (0.3% GROWTH)
RECENT TRAFFIC GROWTH (1985-1990)	1985 2080 VEH/DAY 1989 2750 VEH/DAY (8% GROWTH) -FROM MTO TRAFFIC DATA	1985 610 VEH/DAY 1990 920 VEH/DAY (10% GROWTH) -DIST. OF MUSKOKA TRAFFIC DATA (COMBINED WITH MTO DATA)
TRAVEL DISTANCE TOTAL INCREASE %	6680 VEH-KM 1280 VEH-KM 2%	6730 VEH-KM 190 VEH-KM 3%
TRAVEL TIME TOTAL INCREASE %	7660 VEH-MIN 200 VEH-MIN 3%	7670 VEH-MIN 170 VEH-MIN 2%
OPERATING COSTS	\$266,000 PER YEAR	\$303,000 PER YEAR
ACCESS	-IMPROVED ACCESS TO MUSKOKA FALLS, MUSKOKA RIVER AND SPENCE LAKE COMMUNITIES -IMPROVED ACCESS TO MUSKOKA ROAD 37 BUSINESSES -GOOD ACCESS TO LANDS ADJACENT TO FRASERBURG RD. AND BRACEBRIDGE ST. -NO CHANGE IN ACCESS TO PROPERTIES EAST OF HWY 11 ON FRASERBURG ROAD	-IMPROVED ACCESS TO ROCKSBOROUGH, FRASERBURG, MONSELL, MACKAY LAKE, FINE LAKE, LEBCH LAKE, HEALY LAKE AND MUSKOKA RIVER COMMUNITIES -REDUCED HWY 11 ACCESS FOR SPENCE LAKE AND MUSKOKA FALLS COMMUNITIES -REDUCED ACCESS CONVENIENCE FOR MUSKOKA ROAD 37 PROPERTIES WEST OF HWY 11 -IMPROVED ACCESS FOR PROPERTIES NEAR FRASERBURG ROAD & BRACEBRIDGE ST.

■ PREFERRED OPTION

TABLE 5.4 CONTINUED

SEGMENT THREE: HIGHWAY 118 TO TAYLOR ROAD INTERCHANGE  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGE AT MUSKOKA ROAD 37	INTERCHANGE AT FRASERBURG ROAD
PROPERTY	MINIMAL PROPERTY ACQUISITION IS REQUIRED	- NORTH-WEST QUADRANT IS RESTRICTED BY THE TOWN'S FAIRGROUND SITE - SOUTH-WEST QUADRANT IS AGRICULTURAL LAND, AND PROPERTY ACQUISITION MAY IMPACT THE FARM'S VIABILITY - RAMPS IN THE NORTH-EAST AND SOUTH-EAST QUADRANT MAY REQUIRE PROPERTY FROM ADJACENT RESIDENTIAL OWNERS
ENVIRONMENTAL FACTORS	- NO IMPACT TO DEER YARD, SPENCE LAKE OR MUSKOKA RIVER - NO DISRUPTION TO EXISTING NATURAL, CULTURAL, OR ECONOMIC ENVIRONMENT	- SHARPE'S CREEK E.S.A. IS DOWNSTREAM OF SITE - POTENTIAL IMPACT TO PLANT AND AQUATIC COMMUNITIES DUE TO DISRUPTION FROM CONSTRUCTION AND SILTATION - INCREASED TRAFFIC ON FRASERBURG ROAD WEST OF HWY 11 - IMPACT OF INTERCHANGE ON ADJACENT HOMES AND PROPERTY OWNERS
DEVELOPMENT POTENTIAL	- LOW SERVICING PRIORITY OF LAND IN VICINITY OF MUSKOKA RD 37 - LITTLE VACANT DEVELOPABLE LAND - MUSKOKA RD 37 AND INTERCHANGE, BRACE-BRIDGE ST. AND TAYLOR ROAD INTERCHANGE PROVIDE GOOD ACCESS TO DEVELOPMENTS ON THE WEST SIDE OF HWY 11	- 70 Ha. OF NEW INDUSTRIAL/COMMERCIAL DEVELOPMENT - NEW FAIRGROUND/ACTIVITY PARK - FAIRGROUND AND PART OF THE INDUSTRIAL DEVELOPMENT IS BEST SERVED BY THE FRASERBURG INTERCHANGE
FUTURE TRAFFIC VOLUMES	2001 TRAFFIC VOLUMES PROJECTED TO BE 3,500 VEHICLES PER DAY	DEVELOPMENT GROWTH OF HWY 11 DESTINED TRAFFIC, VIA FRASERBURG ROAD, IS PROJECTED TO BE 3000 VEH/DAY IN 2001



 PREFERRED OPTION

TABLE 5.4 CONTINUED

SEGMENT THREE: HIGHWAY 118 TO TAYLOR ROAD INTERCHANGE  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGE AT MUSKOKA ROAD 37	INTERCHANGE AT FRASERBURG ROAD
ENGINEERING FACTORS		
SOILS	NO SOILS PROBLEMS ANTICIPATED	DIFFICULT SOILS IN INTERCHANGE AREA: - SETTLEMENTS - WATER TABLE - EROSION PROBLEMS - UNCOMPACTED LAYERS - SOIL STABILITY
GEOMETRY	- GOOD INTERCHANGE GEOMETRY	- TIGHT RADIUS ON S-W AND N-E/W LOOPS - POOR ALIGNMENT AND GRADE ON FRASERBURG ROAD WEST OF HWY 11 - VERTICAL ALIGNMENT OF EXISTING FLYOVER IS SUBSTANDARD FOR A FULL INTERCHANGE
STRUCTURE	STRUCTURE CAN BE BUILT TO CURRENT DESIGN STANDARDS	- NARROW STRUCTURE WIDTH - SUBSTANDARD VERTICAL ALIGNMENT - SUBSTANDARD STRUCTURE SPAN
COST ESTIMATE	\$4.83 MILLION	\$7.85 MILLION
SUMMARY	SUPERIOR IN TERMS OF THE FOLLOWING: - EXISTING TRAFFIC VOLUMES - PROPERTY - ENVIRONMENTAL FACTORS - ENGINEERING FACTORS - COST OF WORK  COMPARABLE IN TERMS OF THE FOLLOWING: - ACCESS CONDITIONS - RECENT TRAFFIC GROWTH - FUTURE TRAFFIC VOLUMES	SUPERIOR IN TERMS OF THE FOLLOWING: - DEVELOPMENT POTENTIAL

 PREFERRED OPTION

## Segment 4: Taylor Road to Highway 117

The only at-grade intersection within this segment is Kirk Line. Both options for this segment propose road closure of Kirk Line at Highway 11. Consideration was given to providing a right in/right out exit and entrance to Kirk Line. However partial interchanges of this type are not consistent with current MTO Controlled Access Freeway Standards.

The options considered for Segment 4 are a reconstruction of Kirk Line west at Cedar Lane (See Plate 4) or the reconstruction of Kirk Line west coupled with the northerly extension of Rosewarne Drive to Highway 117 (See Plate No. 13). The analysis for the options in this segment is shown on Table 5.5.

The reconstruction of Kirk Line West is necessary east of Cedar Lane to allow for year-round access to the section of Kirk Line immediately west of Highway 11. The reconstruction upgrades the roadbed and flattens the road grade to allow for winter maintenance and use. This improvement is required for either option.

A flyover was not considered at this location as existing access to Highway 11 interchanges from both the east and west sides of the highway is adequate.

The two options are comparable in terms of geometric design and traffic factors. The Rosewarne Drive extension provides better access to the limited number of businesses and residents east of Highway 11, however the increased cost and environmental impact do not justify this additional work. The closure of Kirk Line at Highway 11 (and the associated reconstruction of Kirk Line at Cedar Lane) is the recommended alternative for this segment.

TABLE 5.5

SEGMENT FOUR: TAYLOR ROAD TO HIGHWAY 117  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	CLOSURE AT KIRK LINE (KIRK LINE WEST IMPROVEMENTS)	CLOSURE AT KIRK LINE (KIRK LINE WEST IMPROVEMENTS AND HWY 117 ACCESS)
GEOMETRIC DESIGN	- CLOSURE OF EXISTING ACCESS - REDUCED VEHICLE CONFLICTS - KIRK LINE RECONSTRUCTED WEST OF HWY 11	- KIRK LINE RECONSTRUCTED WEST OF HWY 11 - NEW ACCESS FROM KIRK LINE TO HWY 117
PROPERTY	- NO PROPERTY REQUIRED AT HWY 11 - POSSIBLE PROPERTY REQUIRED FOR RECONSTRUCTION AT CEDAR LANE	- POSSIBLE PROPERTY REQUIRED FOR SIDEROAD CONNECTION TO HWY 117 AND RECONSTRUCTION AT CEDAR LANE
BUSINESS ACCESS	- DIRECT ACCESS FROM HWY 11 IS REMOVED - INDIRECT ACCESS IS MAINTAINED VIA EXISTING SIDEROADS (ROSEWARNE RD.) - A NUMBER OF BUSINESSES ARE AFFECTED INCLUDING: GO-KART TRACK, FOWLER CONSTRUCTION, MARTIN LUMBER, AND PILGER EQUIPMENT	IMPROVED BUSINESS ACCESS TO NORTH AND SOUTH ON THE EAST SIDE OF HIGHWAY 11
ENVIRONMENTAL	NO IMPACT IS ANTICIPATED	ENVIRONMENTAL IMPACT IS POSSIBLE WITH THE CONSTRUCTION OF A NEW ROSEWARNE ROAD CONNECTION
TRAFFIC - % increase veh-km - % increase veh-mins - total increase - operational cost	7 10 \$ 71,000 /YR	7 10 \$ 71,000 /YR
CAPITAL COST	\$ 1.0 M	\$ 3.5 M
REMARKS	- CONSISTENT WITH LIMITED ACCESS FREEWAY POLICY - PROVIDES FOR EXISTING RESIDENTS ON KIRK LINE WEST OF HWY 11	- CONSISTENT WITH LIMITED ACCESS FREEWAY POLICY - PROVIDES FOR EXISTING RESIDENTS ON KIRK LINE WEST OF HWY 11 - PROVIDES BETTER ACCESS TO HWY 117

☒ PREFERRED OPTION

5.3.5 Segment 5: Highway 117 to the Bracebridge Resources Management Centre

In Segment 5, it was necessary to develop alternatives which provide access to the Ministry of Natural Resources facilities east and west of Highway 11 and to the community along Holiday Park Drive and residents on High Falls Road.

The Town of Bracebridge proposes a future by-pass west of the Town from Highway 118 to the High Falls Road area of Highway 11. An interchange at High Falls provides access to Highway 11 for this proposed by-pass.

The options considered for this segment are an interchange located north of High Falls Road (See Plate No. 4) or a flyover located north of High Falls Road, coupled with a service road west of Highway 11 from Highway 117 to High Falls Road, which crosses the north branch of the Muskoka River (See Plate No. 13). The analysis for the options in this segment is shown in Table 5.6.

The existing entrance to the Bracebridge Resources Management Centre (BRMC) is addressed within this segment. A right in/right out entrance is not acceptable in terms of the ultimate freeway standards. Therefore, the entrance must be closed and relocated. In both options the proposed location for the entrance to the BRMC is off the new Holiday Park Drive crossing road, at the southerly limit of the BRMC. The proposed entrance location and the access road into the BRMC address a number of the concerns expressed by the MNR in their review of the alternatives.

Factors which favour the interchange option include lesser environmental impacts, superior access to Highway 11 and reduced capital and operational costs. Therefore, even though the interchange is not warranted in terms of traffic volumes it is preferred over the more costly flyover and Muskoka River crossing option and avoids the environmental concerns associated with crossing the Muskoka River in the vicinity of High Falls.

TABLE 5.6  
SEGMENT FIVE: HWY 117 TO BRACEBRIDGE RESOURCE MANAGEMENT CENTRE  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGE AT HIGHFALLS ROAD	FLYOVER AT HIGHFALLS RD.
GEOMETRIC DESIGN	-DESIRABLE GEOMETRY -TIES IN WITH FUTURE BRACEBRIDGE BY-PASS AND BYPASSES GRADE PROBLEMS AT HIGH FALLS ROAD	-UNDESIRABLE GRADES REQUIRED FOR THE FLYOVER -GRADE PROBLEMS ON HIGH FALLS RD. RESTRICTS ACCESSABILITY
PROPERTY	MINOR PROPERTY ACQUISITION IN HOLIDAY PARK DRIVE COMMUNITY FOR ACCESS ROAD	POTENTIAL GRADING CONFLICT WITH EXISTING MNR BUILDING ON WEST SIDE OF HWY 11
BUSINESS ACCESS	-IMPROVED ACCESS TO HWY 11 -GOOD ACCESS MAINTAINED TO MNR BUILDING	-ACCESS IS MAINTAINED VIA NEW SERVICE ROAD AND RIVER CROSSING -CIRCUITOUS ACCESS OVER MUSKOKA RIVER TO HWY 117 INTERCHANGE
ENVIRONMENTAL	-MINOR FILLS NEAR MUSKOKA RIVER FOR RAMP SPEED CHANGE LANES -RELOCATED ACCESS TO RESOURCE MANAGEMENT CENTRE	-MUSKOKA RIVER CROSSING IS REQUIRED WITH SIGNIFICANT IMPACT ON WATERCOURSE -HIGH EMBANKMENTS ARE REQUIRED TO MATCH EXISTING HIGH FALLS ROAD GRADE
TRAFFIC - % increase veh-km - % increase veh-mins - total increase - operational cost	3 5 \$ 20,000 /YR MARGINALLY SUPERIOR OPTION	4 7 \$ 29,000 /YR MARGINALLY INFERIOR OPTION
CAPITAL COST	\$ 14 M	\$ 11 M
REMARKS	-MINIMIZES IMPACT TO MUSKOKA RIVER -NOT WARRANTED DUE TO TRAFFIC VOLUMES BUT LOWER COSTS AND REDUCED ENVIRONMENTAL IMPACTS DICTATE SELECTION AS PREFERRED ALTERNATIVE	SIGNIFICANT ENVIRONMENTAL IMPACTS AND INCREASED COSTS

☒ PREFERRED OPTION



Segment 6: Bracebridge Resources Management Centre to Highway 141

It is proposed that an interchange be constructed at Highway 141 and Highway 11. The options within Segment 6 are an interchange at South Mary Lake Road (See Plate Nos. 5 & 6) or an interchange at Stephenson Road 1 (See Plate Nos. 14 & 15). Both options involve an extensive service road network along the east side of Highway 11. However, the South Mary Lake interchange option considers a flyover at All Pine Cabins Road in lieu of a east service road to Stephenson Road 1. The analysis for this segment is shown on Table 5.7.

Proposed land developments in this segment include the redevelopment of the All Pine Cabins site and a residential development north of Stephenson Road 1 along the west bank of the Muskoka River. Potential sites for development include the lands diagonally opposite the All Pine Cabins on the west side of Highway 11 and the lands south of Stephenson Road 1 to the All Pine Cabins site between Highway 11 and the Muskoka River. Expansion and rezoning of the South Mary Lake Business District is planned by the Town of Huntsville. This will result in additional growth along South Mary Lake Road.

The alternatives to provide access to the All Pine Cabins area were analyzed independent of the interchange alternatives. The flyover is the preferred option at this location. The proposed All Pine Cabins Road provides access from east and west of Highway 11 to Lone Pine Road, which functions as a service road between the High Falls Road and South Mary Lake Road (or Stephenson Road 1) interchanges. The flyover is less costly than the east service road to Stephenson Road 1 option and involves reduced environmental impact. An interchange is not considered a viable alternative at this location because of extremely low traffic volumes.

In terms of interchange location, the traffic warrants at South Mary Lake Road far exceed those at Stephenson Road 1. Although there is speculation regarding growth at Stephenson Road 1, east of Highway 11, the potential for development at that location is hindered because of the lack of year round access to the area. The interchange at South Mary Lake Road diverts District Road 10 traffic from Port Sydney onto South May Lake Road. This is consistent with the Township Master Plan to minimize traffic through the community and maintain the existing character of Port Sydney.

Even though the Stephenson Road 1 interchange is the less expensive option, the South Mary Lake Road option is superior in terms of geometric design, property impact and operational cost factors and will more adequately serve the existing traffic needs and minimize impact to local businesses. Therefore, the flyover at All Pine Cabins Road and the interchange at South Mary Lake Road are the options in Segment 6 recommended for further analysis.

TABLE 5.7

SEGMENT SIX: BRACEBRIDGE RESOURCE MANAGEMENT CENTRE TO HWY 141  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGE AT SOUTH MARY LAKE RD.	INTERCHANGE AT STEPHENSON ROAD 1
GEOMETRIC DESIGN	-ACCEPTABLE INTERCHANGE GEOMETRY AND CONNECTION TO LOCAL ROADS -SERVICE ROAD ACCESS FROM SOUTH MARY ROAD TO STEPHENSON ROAD 1 TIES INTO PROPOSED RESIDENTIAL DEVELOPMENT	-MINIMUM RADIUS ON RAMP DUE TO PROXIMITY OF EXISTING HYDRO LINES -IMPROVEMENT TO STEPHENSON ROAD 1 PROFILE EAST OF HWY 11 TO MUSKOKA RIVER
PROPERTY	-INTERCHANGE CONTAINED WITHIN UNDEVELOPED LANDS	-INTERCHANGE IS COMPLETELY CONTAINED WITHIN UNDEVELOPED LANDS -POTENTIAL CONFLICT WITH EXISTING HYDRO LINES
BUSINESS ACCESS	-SEMI-DIRECT ACCESS TO/FROM HWY 11 MAINTAINED AT S. MARY LAKE RD. -ACCESS TO STEPHENSON RD. 1 VIA NEW SERVICE ROAD -AVOIDS IMPACT TO BUSINESSES AT S. MARY LAKE ROAD -ONE BUSINESSES AFFECTED BY REDUCED ACCESS AT STEPHENSON RD 1	-IMPROVED ACCESS AT STEPHENSON RD 1 -DIRECT ACCESS TO HWY 11 AT S. MARY LAKE RD. IS REMOVED - INDIRECT ACCESS IS MAINTAINED VIA EXISTING HWY. 141 INTERCHANGE AND LOCAL ROADS -MANY BUSINESSES AFFECTED AT SOUTH MARY LAKE ROAD
ENVIRONMENTAL	-NUMEROUS SMALL STREAM CROSSINGS -INTERCHANGE IMPACTS ON EXISTING POND AND BEAVER DAMS	-LOCALIZED IMPACT AT INTERCHANGE -NEW SERVICE ROAD HAS NUMEROUS SMALL STREAM CROSSINGS
TRAFFIC - % increase veh -km - % increase veh -mins - total increase - operational cost	3 5 \$ 584,000 /YR SUPERIOR OPTION	4 5 \$ 757,000 /YR INFERIOR OPTION
CAPITAL COST	\$ 23.4 M	\$ 16.8 M
REMARKS	ADEQUATELY SERVES EXISTING TRAFFIC PATTERNS AND BUSINESSES	-INCLUDES MAJOR RECONSTRUCTION OF STEPHENSON ROAD 1 -INTERCHANGE LOCATED AT APPROXIMATE MID-POINT BETWEEN HIGH FALLS RD AND HWY 141

■ PREFERRED OPTION



## 53.7

## Segment 7: Highway 141 to Muskoka Road No. 3 (South of Huntsville)

The options considered in Segment 7 are to provide interchanges at Allensville Road and Ferguson Road and a flyover at Lindgren Road (See Plate Nos. 7 & 8) or to place an interchange at Stephenson Road 12 and a service road from Lindgren Road to Muskoka Road No. 3, along the east side of Highway 11 (See Plate Nos. 16 & 17). The analysis for this segment is shown in Table 5.8.

A key issue within this segment is the access provided to the Lindgren Road East community. The preferred scheme presented at the first set of Public Information Centres was not well received by area residents and businesses. This scheme included the flyover and a service road connection west of Highway 11 to Bickley Country Drive. Access to Highway 11 would be via the existing interchange at Muskoka Road No. 3.

The major concern was that only one exit was available to the local residents via the industrial subdivision at Lindgren Road West. The residents cited problems with tractor trailer traffic through the industrial site and the potential blockage of the road in terms of emergency vehicle access. As a result, a supplementary analysis was carried out to specifically address access to the Lindgren Road community. The additional analysis is discussed later in this section.

The Esso/Grandma Lee Service Centre is located on Highway 11 within this segment. Existing access to and from Highway 11 will remain in place. Traffic will not be allowed to access the service centre from the adjacent service road.

The two optional network configurations are comparable in terms of geometric design considerations, property and environmental impacts. The capital cost for the two interchange option is greater than the one interchange concept. However, this cost is offset by the reduced annual operational costs and the improved access to the local businesses. Interchanges at Allensville Road and Ferguson Road also provide balanced interchange spacing for future land use and therefore this scheme is recommended for further analysis in the preliminary design phase.

## Lindgren Road - Additional Analysis

Four additional alternatives were added to the two Lindgren Road options presented at the first set of Public Information Centres (See Table 5-9). In each of the options, a service road connection from Lindgren Road West to Bickley Country Drive is necessary. The complete set of options considered were as follows:

TABLE 5.8

SEGMENT SEVEN: HIGHWAY 141 TO MUSKOKA ROAD 3  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR THE ULTIMATE FREEWAY DESIGN

ALTERNATIVE CRITERIA	INTERCHANGES AT ALLENSVILLE ROAD AND MADILL CHURCH/GRYFFIN LODGE ROAD	INTERCHANGE AT STEPHENSON RD. 12 AND FLYOVER AT LINDGREN ROAD
GEOMETRIC DESIGN	-ACCEPTABLE ALLENSVILLE ROAD INTERCHANGE GEOMETRY -ACCEPTABLE MADILL CHURCH/GRYFFIN LODGE RD. INTERCHANGE GEOMETRY	ACCEPTABLE INTERCHANGE GEOMETRY AT STEPHENSON ROAD 12
PROPERTY	-ALLENSVILLE RD. INTERCHANGE LOCATED ON UNDEVELOPED LANDS -POTENTIAL IMPACT TO ADJACENT PROPERTY AT MADILL CHURCH/GRYFFIN LODGE ROAD INTERCHANGE	POTENTIAL PROBLEMS WITH ADJACENT PROPERTY OWNER AT STEPHENSON RD. 12
BUSINESS ACCESS	-ACCESS MAINTAINED VIA NEW AND EXISTING SIDEROADS -IMPROVED ACCESS TO RETIREMENT HOME, ALLENSVILLE AND THE FERGUSON ROAD INDUSTRIAL AREA -REDUCED ACCESS CONVENIENCE TO MUSKOKA CONCRETE AND BROOKLIN CONCRETE	-ACCESS MAINTAINED VIA NEW AND EXISTING SIDEROADS -REDUCED DIRECT HIGHWAY ACCESS TO MUSKOKA CONCRETE, SUPERIOR PROPANE, CASHWAY AND THE MTO WORKS YARD
ENVIRONMENTAL	-NUMEROUS SMALL STREAM CROSSINGS AT ALLENSVILLE RD. INTERCHANGE (MARSHY AREA) -POTENTIAL ENVIRONMENTALLY SENSITIVE AREAS AT PENFOLD AND SPYDER LAKES	-SMALL STREAM CROSSINGS -POTENTIAL ENVIRONMENTALLY SENSITIVE AREAS AT PENFOLD AND SPYDER LAKES
TRAFFIC - % increase veh - km - % increase veh - mins - total increase - operational cost	4 8 \$ 225,000 /YR SUPERIOR OPTION	15 30 \$ 831,000 /YR INFERIOR OPTION
CAPITAL COST	\$ 17.6 M	\$ 14.9 M
REMARKS	PROVIDES BALANCED INTERCHANGE SPACING FOR FUTURE LAND USE	ACCESS TO STEPHENSON ROADS 8 AND 12 MAINTAINED BY SERVICE ROADS

☐ PREFERRED OPTION

**LINDGREN ROAD – ADDITIONAL ANALYSIS**  
**HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

\* Traffic times and distances were determined between selected traffic nodes  
\*\* Based on 30 year design life and 10% discount rate

- A) A flyover at Lindgren Road.
- B) A service road connection from Lindgren Road East to Muskoka Road No. 3 along the east side of Highway 11.
- C) A flyover at Lindgren Road and a continuous service road on the west side of Highway 11 from Ferguson Road to Muskoka Road No. 3.
- D) A southerly extension of Lindgren Road East to the proposed Ferguson Road interchange.
- E) A southerly extension of Lindgren Road East to the proposed Ferguson Road interchange and a flyover at Lindgren Road.
- F) Relocate the Ferguson Road interchange midway between Ferguson Road and Lindgren Road.

The analysis for the Lindgren Road alternatives is shown on Table 5.9.

Additional meetings were held with area residents, local businesses and Town officials to discuss the options for Lindgren Road access. Minutes of these meetings are appended to this report in Appendix II - Part 3.

Based on the analysis carried out by the project team, the recommended alternative presented at the meeting was Option "A". Other stakeholders preferred other options, including Options "B", "D", and "F". However, through informal discussions it became evident that Option "C" would be the best compromise solution for all parties involved.

This option provides a north and south access to the Lindgren Road area and will not adversely affect the character of the existing Lindgren Road East community. As a result, the flyover/west service road combination was carried forward for detailed study.

#### 5.3.8 Segment 8 - Muskoka Road No. 3 (South of Huntsville) to Muskoka Road No. 3 (North of Huntsville)

No alternatives were developed for this segment. A new interchange is proposed for Muskoka Road No. 3 at the north end of Huntsville. The justification and development of the interchange at this location is outlined in the Highway 11-Huntsville to Burk's Falls One Stage Environmental Assessment/Route Planning Study carried out under W.P. 82-81-00.

## 5.4

### PRELIMINARY DESIGN OPTIONS

#### 5.4.1 Criteria used for Preliminary Design Analysis

The criteria used to evaluate the preliminary design options fall within the following categories:

- Natural environment
- Socio-economic environment
- Engineering factors

The various criteria within each category is briefly discussed below:

##### Natural Environment

The preliminary design options were reviewed for potential impact to watercourses, woodlots and other known natural features. In the event of a conflict, the potential for effective mitigation measures were considered.

##### Socio-Economic Environment

The preliminary design options are evaluated in terms of their ability to provide adequate Highway 11 access for the area residents and businesses. The overall integration of access within the recommended network scheme, was also considered.

The impact to adjacent properties was a key factor in the determination of the interchange or flyover location and configuration. Furthermore, flexibility in staging and the need for detours to minimize disruption during construction were considered.

##### Engineering Factors

Preliminary design criteria were developed at a special meeting to co-ordinate the geometric standards for a number of planning studies currently underway within the Region. These standards for interchange configuration and the associated design speeds were used as standards to develop and evaluate the various preliminary design options.

### Interchange Configuration

The order of preference of the various standard interchange configurations is as follows:

- Parclo "A" (loops located in NW and SE quadrant)
- Parclo "A-B" (loops located in either NW and NE quadrant or SW and SE quadrant)
- Parclo "B" (loops located in SW and NE quadrant)
- Diamond

Parclo "A", "A-B" and "B" interchange configurations require a substantial amount of property for the ramp layouts. The diamond interchange configuration is used where property constraints exist or property values are high.

For both the inner and outer loop ramps, a larger radius is preferred to the absolute minimum radius. However, the minimum radius is acceptable where property or environmental constraints exist.

### Design Speeds

The preliminary design speed for each crossing road was selected based upon the proposed jurisdiction and use of the road. Design speeds for the crossing roads are as follows:

- |  |           |
|--|-----------|
| - Highway 11 (freeway standards)                           | : 120 kph |
| - Provincial Highways                                      | : 100 kph |
| - Major crossing roads (at interchanges) and service roads | : 80 kph  |
| - Minor crossing roads (at flyovers) and service roads     | : 60 kph  |

The skew of the proposed structure and the location of the abutment foundation were also considered in the evaluation of the preliminary design.

## 5.4.2 Interchanges

### Highway 169

There were no preliminary design options considered for the Highway 169 interchange. Detail design drawings for this interchange are presently complete. Further refinement of the detail design configuration at this time, was not warranted.

### Gravenhurst North

Previous work on W.P. 208-79-00 proposed a Parclo "A" interchange at this location. The configuration for this interchange was reviewed during the Preliminary Design phase of the study and evaluated against existing conditions and the preliminary design criteria.

The following factors were considered in the review of the interchange configurations:

- i) Impact upon the existing residents living east of Highway 11 along Taverner Road and Doe Lake Road and west of Highway 11 along Muskoka Road No. 41
- ii) The location of the existing TransCanada Pipe Line (TCPL) east of Highway 11
- iii) The existing W-N Ramp structure for the partial interchange cannot be utilized in the new configuration. Both the horizontal and vertical curvature are sub-standard for a crossing road alignment. However, the existing N-W ramp is utilized to avoid impact to the properties along Winhara Road
- iv) District Road Nos. 41 and 6 are connected to improve regional accessibility
- v) Current minimum and desirable ramp geometry for interchanges are considered in the design

Figures 5.1, 5.2 and 5.3 outline the three options considered at this location. The summary of the design considerations is as follows:

### Option "A" - WP 208-79-00 Layout:

Option "A" is a metric conversion of the previous imperial preliminary design layout prepared in WP 208-79-00. Both the inner loop radii are below the minimum acceptable radius of 55m. The new interchange connects Muskoka Road 41 directly with Doe Lake Road and the new bridge structure is located about 100m south of the existing W-N ramp structure. The existing N-W ramp is utilized by the design.

This option fits with the existing property constraints (private homes on Winhara Road and the existing cul-de-sac to the south) on the west side of Highway 11. On the east side of the highway, the ramps avoid additional

crossings of the Trans Canada Pipeline (TCPL), but the Doe Lake Road connection requires property from about 2-3 residential homes on Taverner Road.

#### Option "B" - Parclo "B" Layout:

As an alternative to the Parclo "A" layout, a Parclo "A-B" configuration was investigated. This is shown on Figure 5.2. West of Highway 11, this option is similar to Option "A" except that the inner loop radius is 65m. Otherwise, the two district roads are interconnected, the new structure is located south of the existing W-N structure and the existing N-W ramp is used in the design. East of Highway 11 is a parclo "B" layout, the Taverner Road realignment and the Doe Lake Road connection.

West of Highway 11, the larger (65m) inner loop radius of the ramp shifts the interchange further south than Option "A". This results in additional property acquisition to protect for a future W-S ramp. On the east side of Highway 11, the location of the parclo "B" loop results in four crossings of the TCPL. Taverner Road still requires realignment by this proposal and the residential homes on Taverner Road are still affected, except for the home on the north side at the cul-de-sac.

#### Option "C" - Recommended Scheme:

The preferred scheme is a parclo "A" layout similar to Option "A". The major difference from Option "A" is the 55m inner loop radius and the alignment of Muskoka Road 6, east of Highway 11. The R55m inner loop radius matches the minimum allowable loop radius standard. This minimum standard is used west of Highway 11 in order to salvage the roadbed of the existing N-W ramp and to minimize the property acquisition south of Muskoka Road 41 and west of Highway 11. Provision must also be made for a W-S parclo "A-4" ramp. East of Highway 11, the minimum inner loop radius is used to avoid additional crossings of the TCPL.

The Muskoka Road 6 alignment is set to minimize the property impact on the existing properties on Taverner Road. Where possible, the old road allowance between Concessions 4 and 5 is used for the road alignment. This results in some property acquisition from the Taverner, Penny and Downes properties. The design requires the purchase of the Curtis property and land for widening of the old road allowance from the Dinsmore property.

Therefore, the preferred preliminary design option for the Gravenhurst north interchange is Option "C".

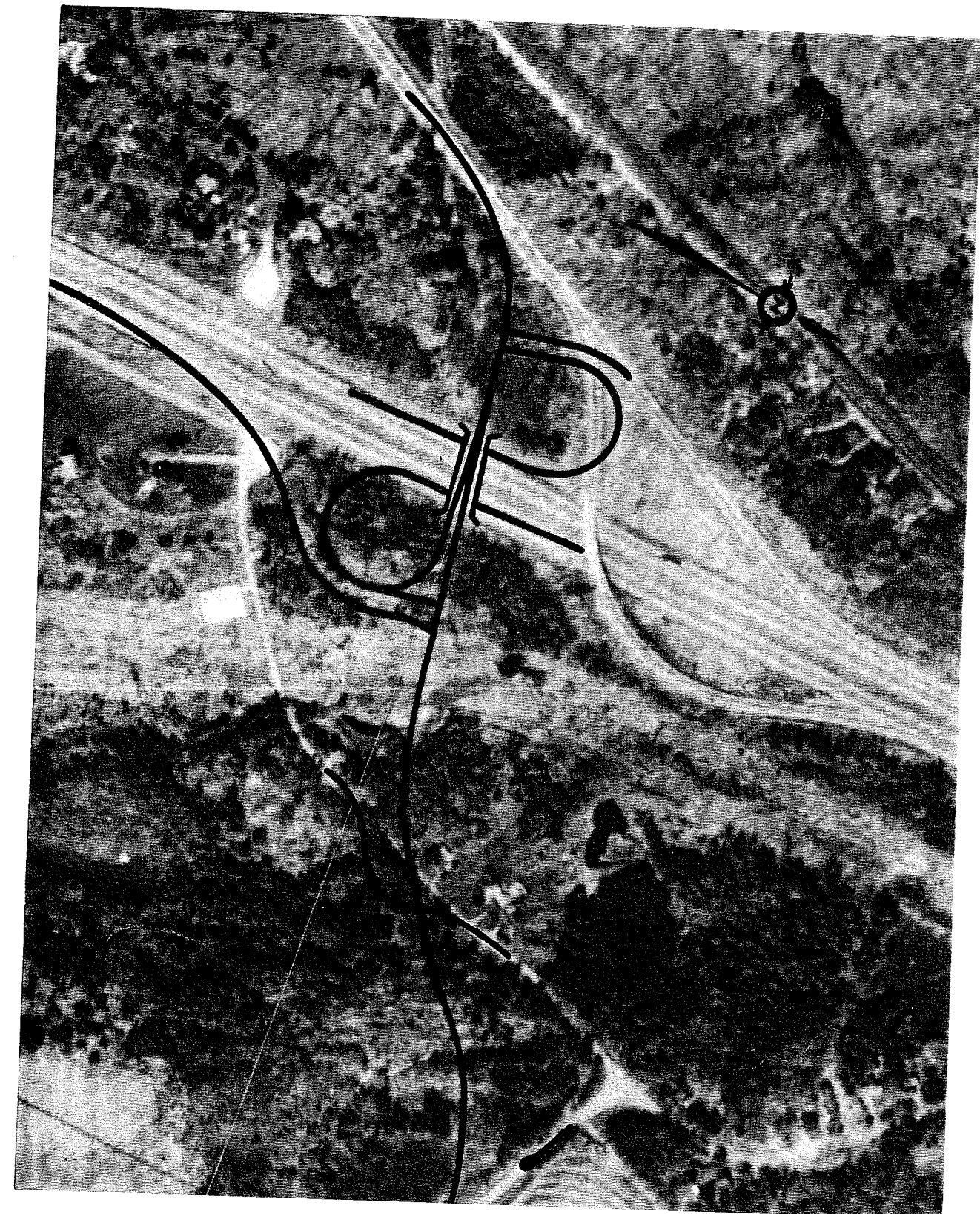


FIGURE 5.1 GRAVENHURST NORTH - OPTION "A"



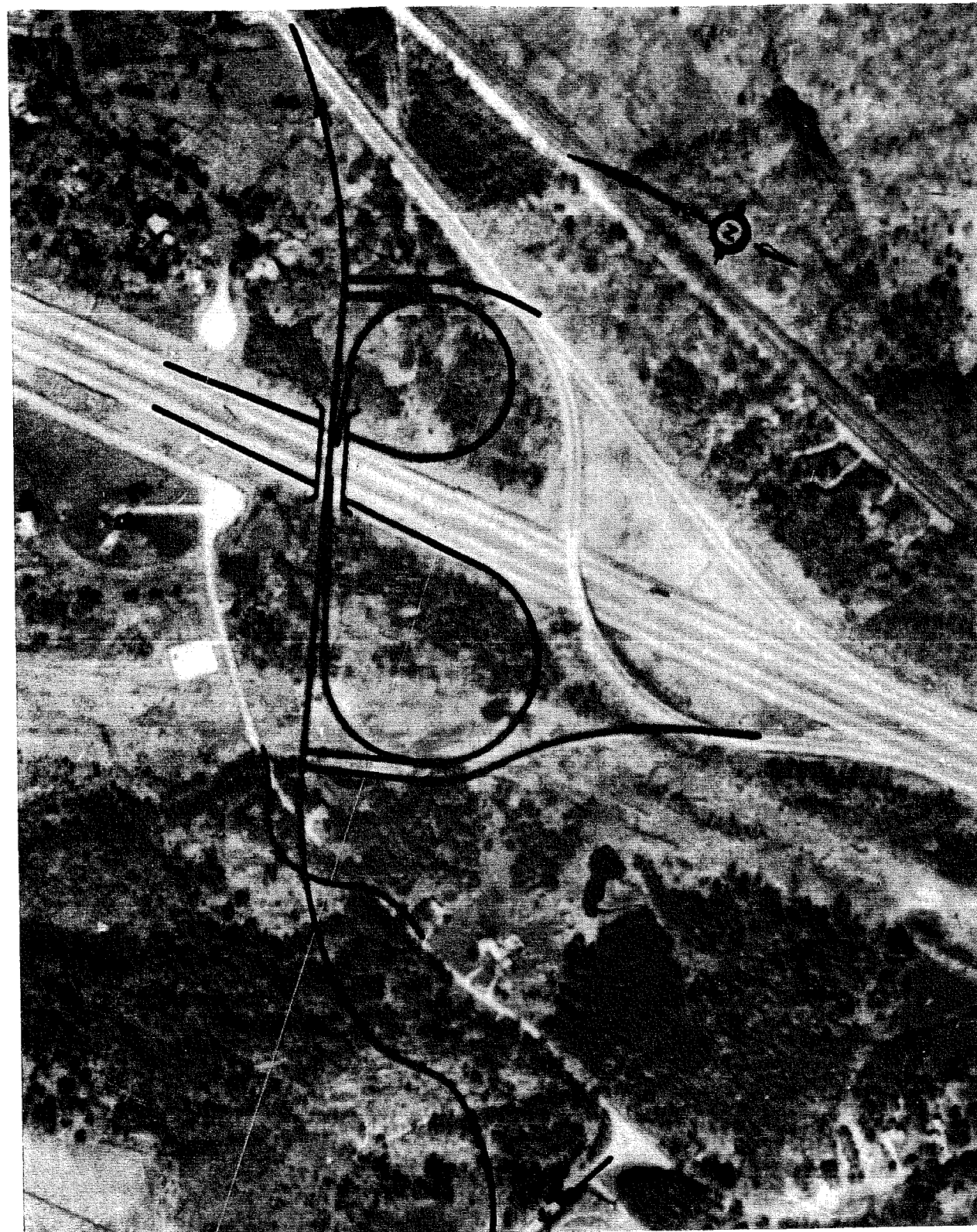


FIGURE 5.2 GRAVENHURST NORTH - OPTION B

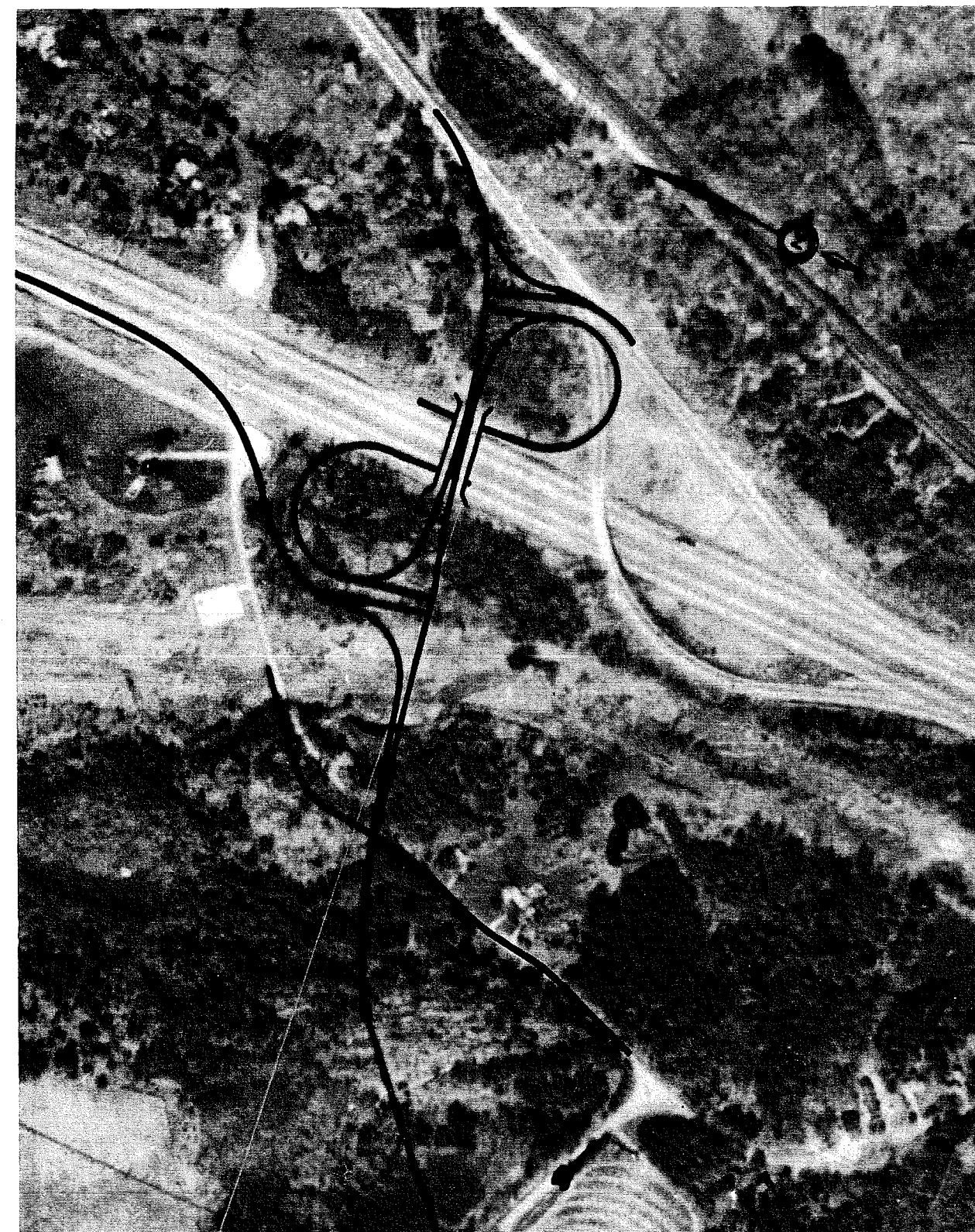


FIGURE 5.3 GRAVENHURST NORTH - OPTION C

#### Muskoka Road No. 37

The proposed interchange for Muskoka Road No. 37 is presently under detail design (W.P. 61-86-00) concurrent with the preliminary design on this project. Therefore, no options were considered for the configuration of the interchange. Any further refinement of the design is undertaken in the detail design.

#### High Falls Road

Figures 5.4 and 5.5 outline the preliminary design options considered for the interchange at this location. In developing the interchange options, a number of factors were considered.

The proximity of the Highway 117 interchange presents a potential weaving problem between the existing Ramp 117 E/W - 11N and Ramp 11S - E/W to High Falls Road. In order facilitate signage and weaving, a separation of 100m between the two ramp tapers is desirable. This minimum separation is appropriate for weaving as traffic volumes are low.

The existing land use is also a factor in locating the interchange. The Highway 11 crossing road is placed to minimize impact to the existing residential community on Holiday Park Drive (east of Highway 11) and the Bruckmuller property, west of Highway 11. Adequate access to the existing MNR facility and the Bracebridge Resource Management Centre is provided.

The existing natural features are considered in the development and evaluation of preliminary design options. Speed change lane widenings of northbound Highway 11 for the S-EW ramp at the new High Falls Road must consider minor infilling of the Muskoka River. This work requires mitigation and control to prevent sediment from entering the watercourse. The infilling of the river is avoided if the interchange is moved further north, however, the topography is more rugged to the north with increasing ground elevations resulting in substantial rock excavation, reduced convenience of access to the MNR facility, High Falls Road and Holiday Park Drive and results in steep grades on the Highway 11 crossing road.

The Highway 11 crossing road alignment (new High Falls Road) must be located to accommodate both the interim and ultimate land use requirements.

In the interim, the crossing road matches into the existing High Falls Road west of Highway 11 just east of tributary stream to the Muskoka River. This avoids reconstruction of the culvert and minimizes impact to the watercourse.

In the ultimate condition, the crossing road location is set to form part of the

Bracebridge West by-pass. Preliminary routes for the by-pass indicate that the junction with Highway 11 would be north of the existing High Falls Road Intersection. Therefore, placement of the interchange to the north allows flexibility for the route location of the by-pass. Potential conflicts with an existing radio tower and buildings on the Bruckmuller property are avoided.

#### Option "A" - Parclo "A-B" Layout:

The first option investigated for this interchange was a parclo "A-B" layout. This layout mirrors the existing parclo "A-B" layout at Highway 117.

Advantages of this scheme include minimal change to the access to Holiday Park Drive at the south limit of the community and the proximity of the interchange to the MNR facility. However, many disadvantages of this scheme were determined as follows:

- the layout proposal does not provide an alternative access to the BRMC on the east side of Highway 11
- the parclo "A-B" layout is less desirable than a parclo "A" layout
- MNR expressed concern regarding expansion of their facility north of their existing site and this option may restrict future expansion
- the EW-S and N-EW ramps conflict with the existing radio tower facility
- the steep grade section of High Falls Road is not by-passed and the interchange location is not consistent with the future Bracebridge West by-pass facility
- The new High Falls Road alignment passes directly in front of the Bruckmuller home



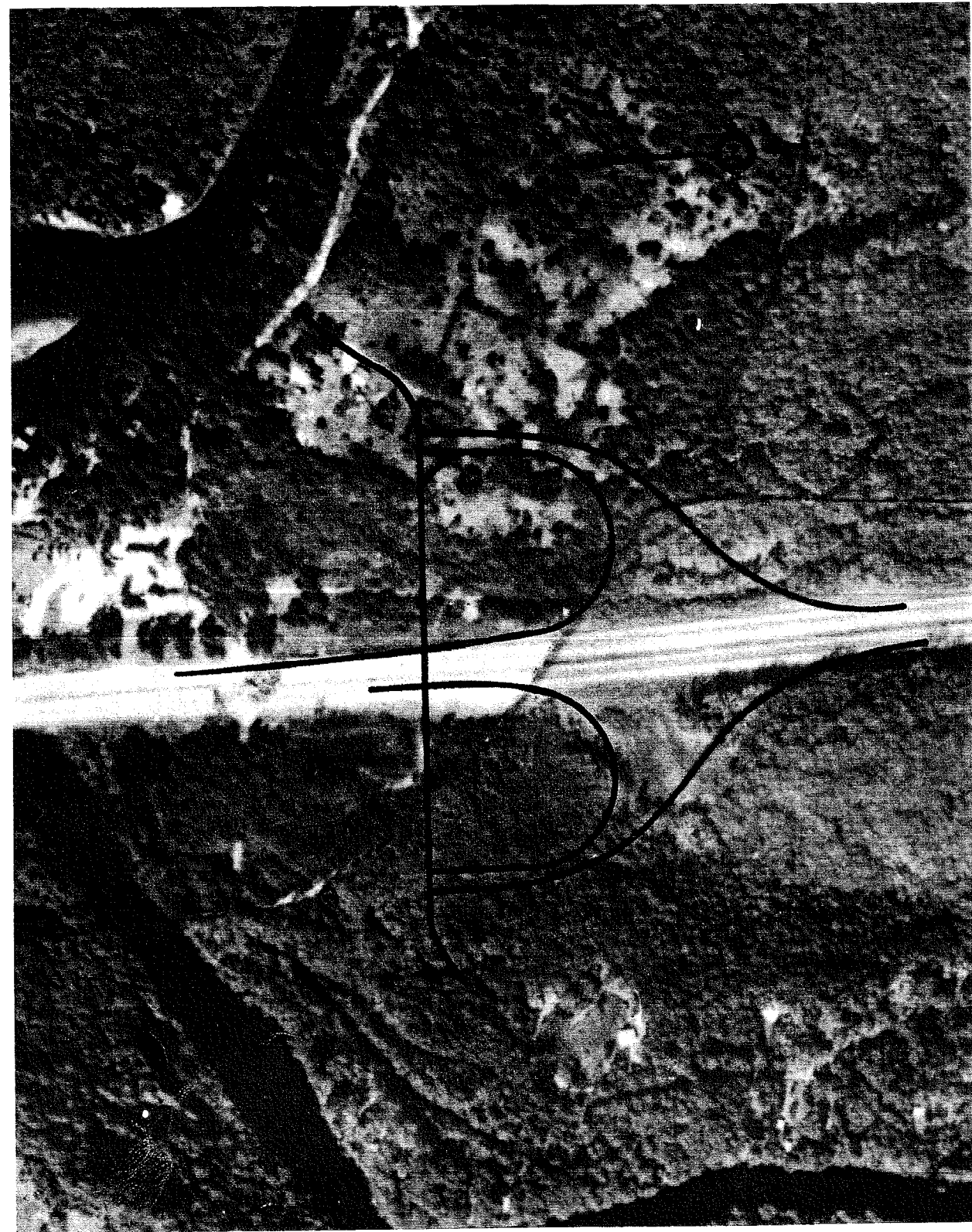


FIGURE 5.4 HIGH FALLS ROAD - OPTION A

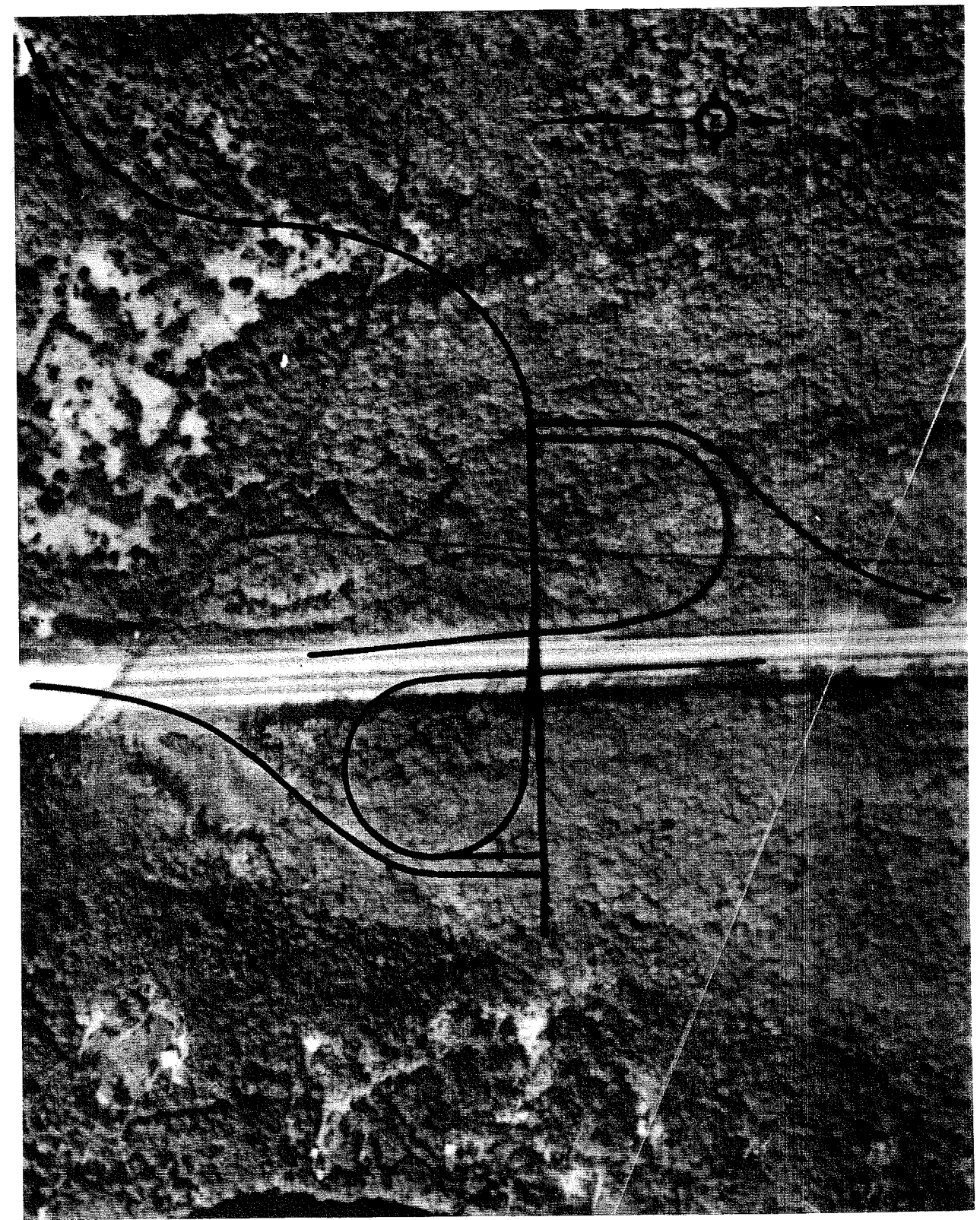


FIGURE 5.5 HIGH FALLS ROAD - OPTION B



- weaving and signage difficulties exist on Highway 11 due to the close interchange spacing.

#### Option "B" - Parclo "A" Layout:

This option is a Parclo "A" interchange layout located north of the existing High Falls Road interchange location. The interchange design avoids many of the concerns of Option "A" as follows:

- access is provided to the BRMC via the access road as shown
- a preferred parclo "A" layout is used
- the interchange is moved further north resulting in less impact on the MNR facility and the layout allows for future expansion along the new access road
- conflict with the radio tower and the Bruckmuller home is avoided
- the steep grade section of existing High Falls Road is by-passed
- weaving and signage difficulties on Highway 11 are minimized

Other issues in the layout of the interchange considered in the analysis were:

- access to Holiday Park Drive from the interchange is through a vacant lot
- a new access road is constructed to the BRMC. This replaces the existing access on Highway 11 north of this site. The access is for the recreational uses, maintenance vehicles and the occasional logging truck
- the grade of the High Falls Road connection is 8%. However, with construction of the by-pass, this grade would be reduced

Option "B" is the preferred preliminary design option for this interchange.

#### South Mary Lake Road

The interchange at this location is situated south of the existing intersection to avoid impact on the commercial developments at Greer Road, the north side of South Mary Lake Road and at the south east corner of the Highway 11 intersection (Wychwood Plaza). The lands to the south are undeveloped and

offer reasonable topography for the interchange site.

The CN Rail line west of Highway 11 is a constraint in developing the interchange. A skewed crossing of the railway tracks for Stephenson Road 4 results in potential sight distance problems and therefore is not advisable.

Figures 5.6 and 5.7 outline two options for the interchange configuration. In Option "A", Lone Pine Road loops to match Stephenson Road 4 and South Mary Lake Road loops into Greer Road. The Highway 11 crossing road tees into both roads east and west of the highway. In Option "B", Lone Pine Road connects directly into the crossing road. East of the highway, the crossing road connects directly into South Mary Lake Road. Stephenson Road No. 4 and Greer Road tee into this crossing road. In either case a Parclo "A" configuration is proposed.

The Option "B" design offers a continuous crossing road alignment and is complementary with the high traffic volume movements to/from South Mary Lake Road into Port Sydney. The direct connection to Lone Pine Road is consistent with the roads new function as a service road.

A connection from the interchange directly into Greer Road was investigated and is shown dashed on the Option "B" figure. This connection provides a direct access to area businesses from Highway 11. However, this connection reduces the existing parking area and the building setback of the Wychwood Plaza. Preliminary investigations indicate that a tight horizontal curvature is required to avoid conflict between the road and the existing buildings. As a result, further consideration of this connection was abandoned. Access to Greer Road is accommodated from the existing South Mary Lake Road, as shown in Option "B".

Option "B" is the preferred interchange configuration at this location.

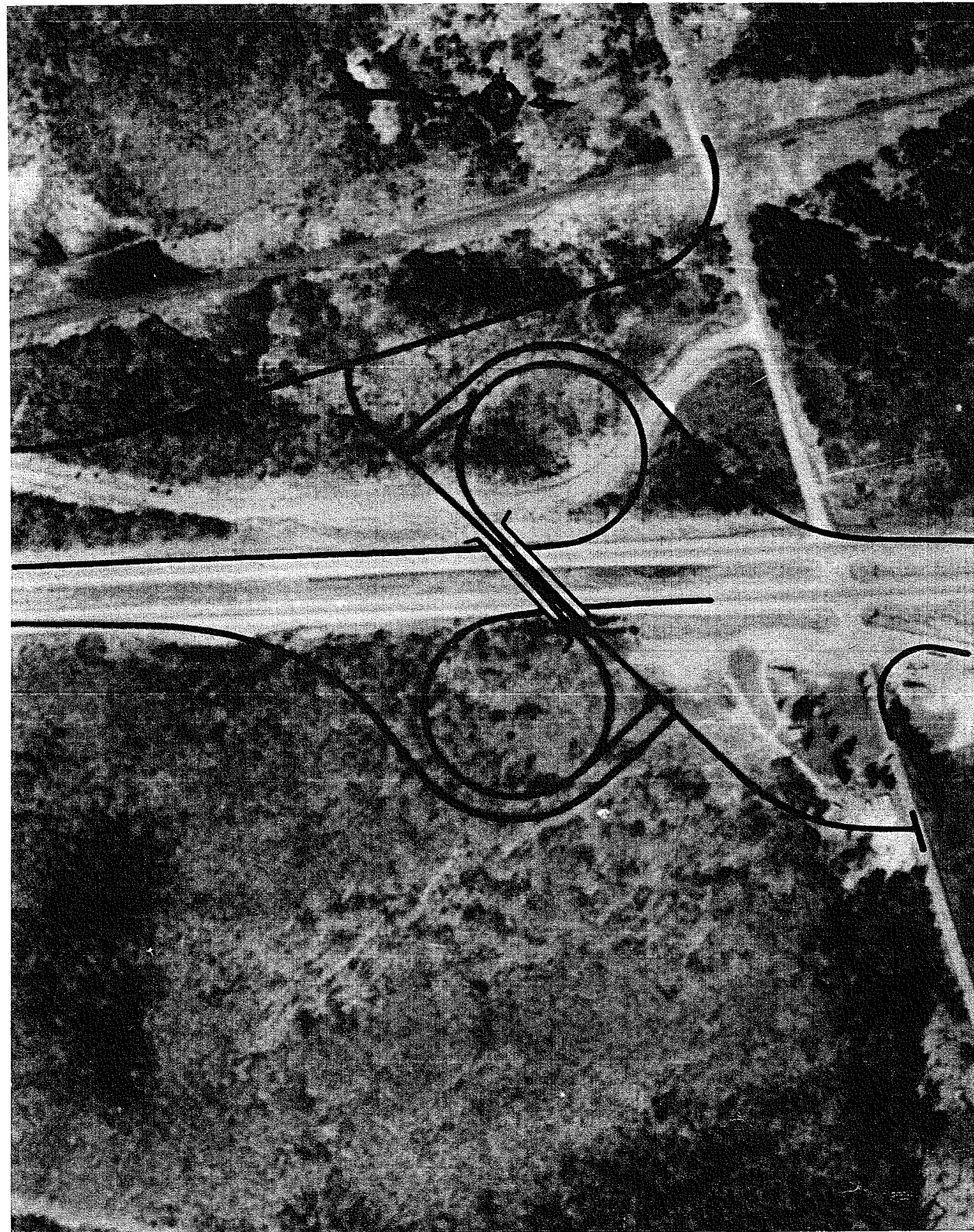


FIGURE 5.6 SOUTH MARY LAKE ROAD - OPTION A

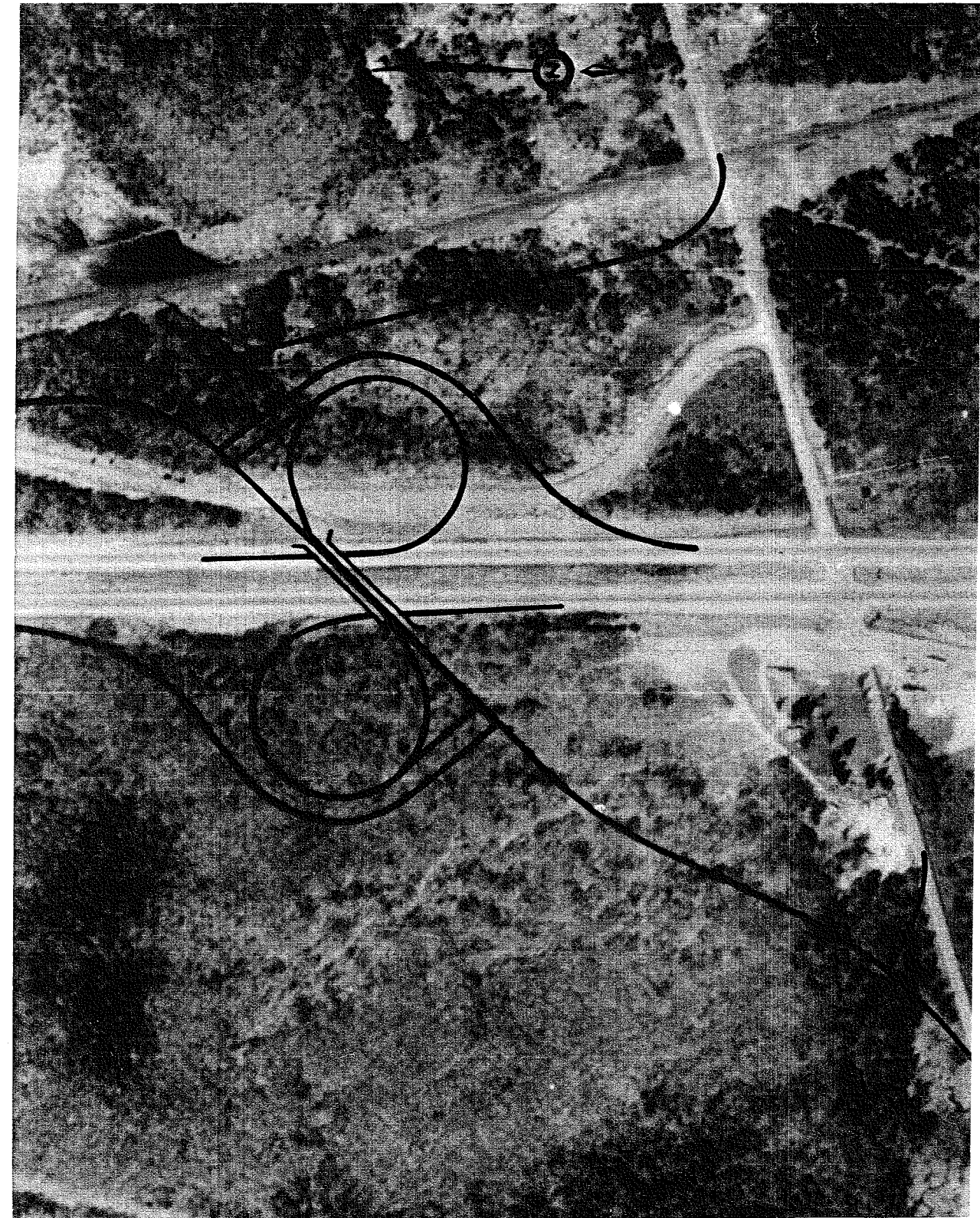


FIGURE 5.7 SOUTH MARY LAKE ROAD - OPTION B

### Highway 141

The preliminary design options for the interchange at Highway 141 are modified from the previous preliminary design Parclo "A" configuration proposed in W.P. 149-73-01. The initial layout and the alternative are shown on Figures 5.8 and 5.9.

In developing the options the following factors were considered;

- i) Minimize the property impact in the northwest and southwest quadrants
- ii) Utilize the property previously acquired
- iii) Ensure adequate sight distance for the ramp terminals through the crossing road underpass
- iv) Apply the current metric ramp design standards for the interchange

The preliminary design work investigated use of 75m inner loop radii at this interchange location. West of Highway 11, tight property constraints dictate that the desirable radius is not feasible and the minimum loop radius (55m) is proposed. On the east side of the highway, much of the land in the southeast quadrant is undeveloped. Therefore, the desirable R75m loop is proposed at this location.

#### Option "A" - Curvelinear Crossing Road Alignment

Option "A" is the direct metric conversion of the previous preliminary design layout. Significant design features are as follows:

- minimum 55m loop radius is used in both the N-W and S-E quadrants
- the alignment of the Highway 141 and Muskoka Road 10 connection is curvelinear through the Highway 11 underpass location

- the crossing road layout is skewed to Highway 11 and generally follows the natural topography to underpass Highway 11

The Highway 141 and Muskoka Road 10 curvelinear layout restricts the stopping sight distance below the highway structure. Also, the N-EW and EW-S road terminals are located on the inside of the horizontal curve. The ramp terminal location and the stopping sight distance deficiencies result in a less than desirable interchange layout.

#### Option "B" - Revised Highway 11 Alignment

Option "B" is also a Parclo "A" layout but the alignment of Highway 141 below Highway 11 is revised. Basically, Highway 141 is tangential opposite the N-EW and EW-S ramp terminal. This improves the operation of the intersection. Also, the S-EW and EW-N ramp terminal is on the outside of the horizontal curve, a desirable geometric design feature. The only other significant concern is the stopping sight distance for westbound traffic on Muskoka Road 10 / Highway 141 below Highway 11. Additional rock cut and a wider structure span or open abutments, may be necessary to maintain intersection sight distance to the west ramp terminal. A 75m inner loop radius is proposed in the southeast quadrant.

Option "B" is the preferred preliminary design alternative.



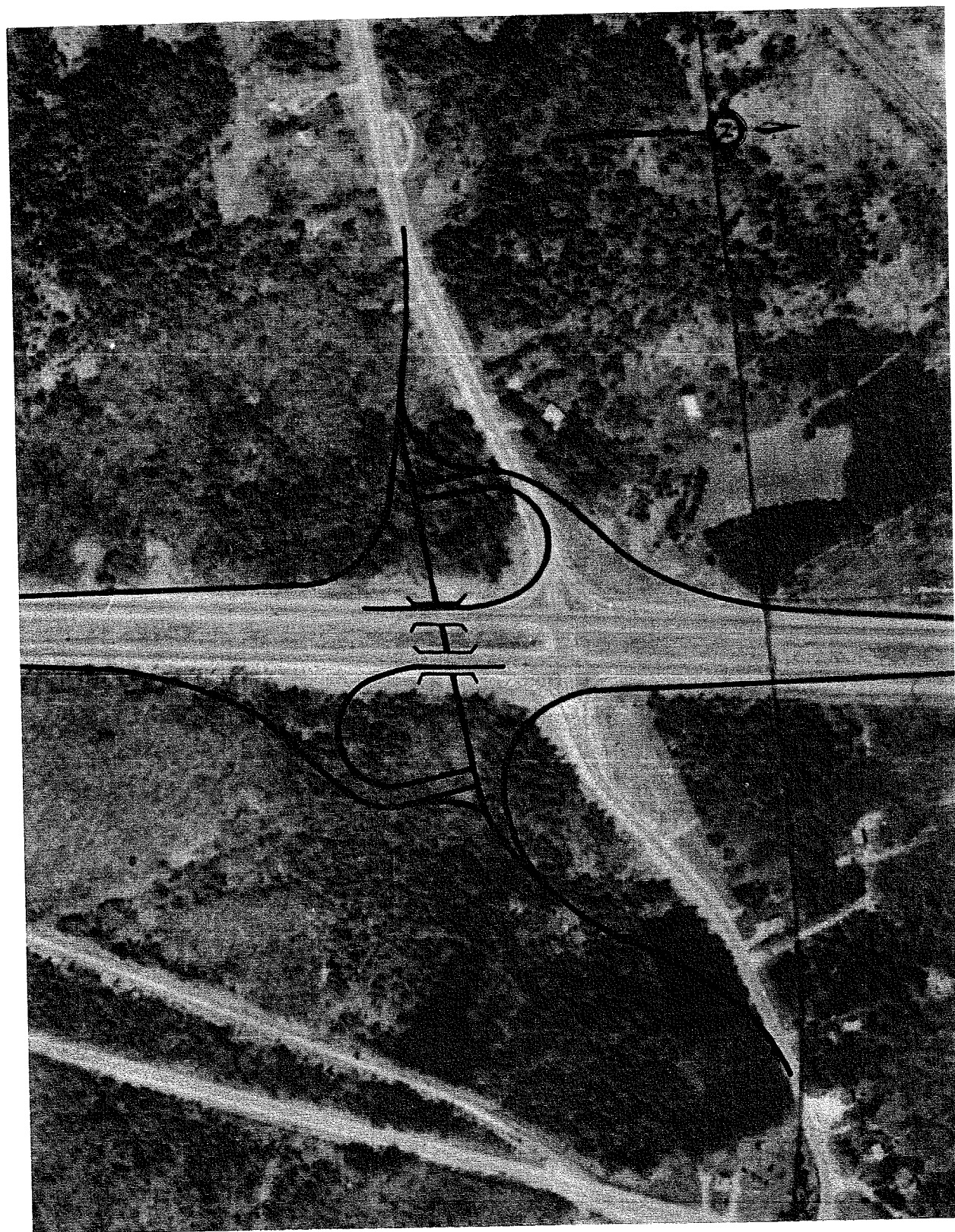


FIGURE 5.8 HIGHWAY 141 - OPTION A

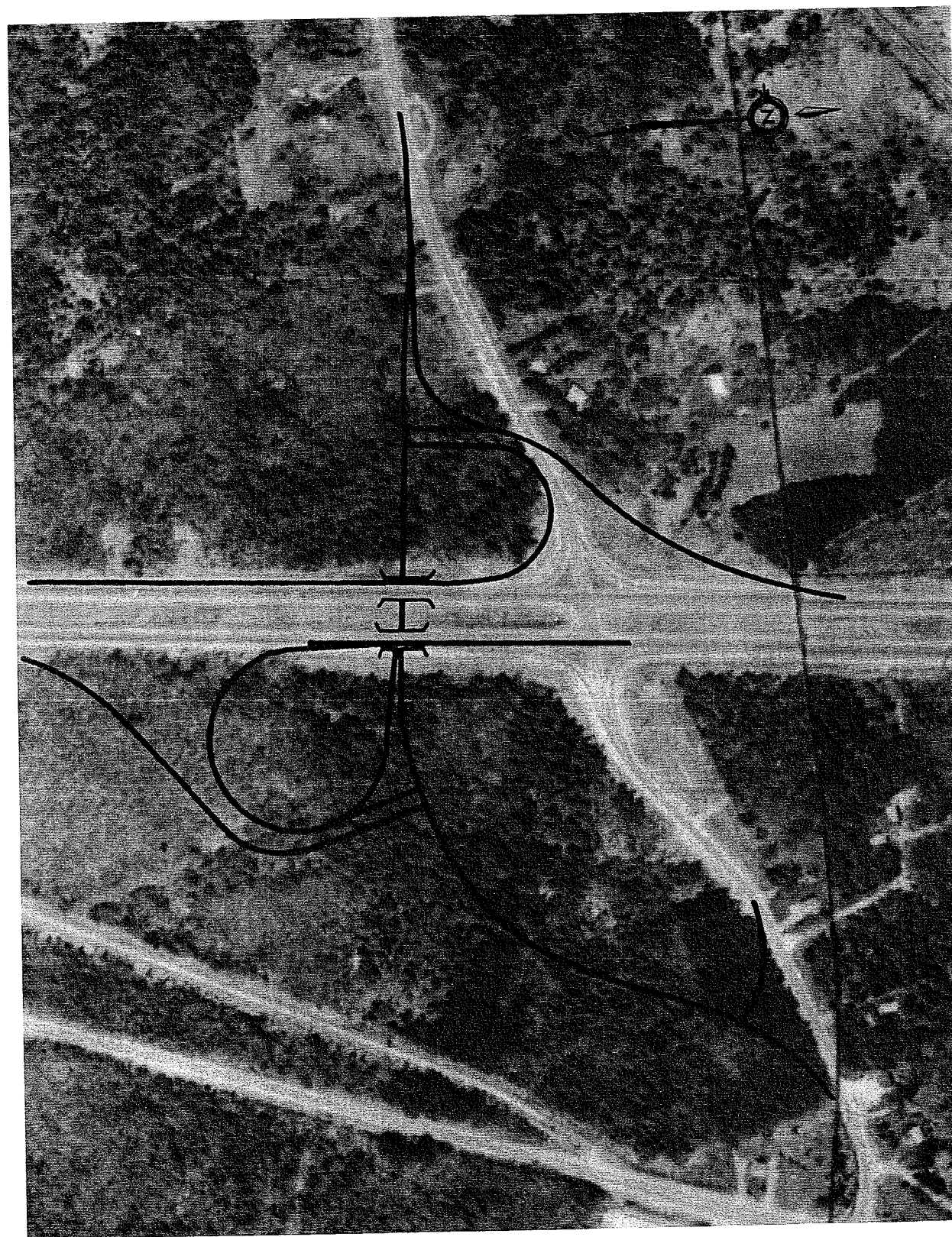


FIGURE 5.9 HIGHWAY 141 - OPTION B

#### Allensville Road

Three preliminary design options were investigated for the interchange at this location as outlined on Figures 5.10, 5.11 and 5.12.

The factors considered in the evaluation of these options are as follows:

- i) Potential impact to Bullen's Creek and the unnamed tributary to Spider Lake
- ii) Crossing of the TransCanada Pipe Line
- iii) Structure foundation requirements in marshy areas
- iv) Impact to existing residents along Allensville Road and the retirement home on Rowanwood Road
- v) Construction staging
- vi) Provision of a through crossing road movement between Allensville Road and Rowanwood Road

In Option "A", the interchange is located south of the existing intersection. The configuration is a Parclo "A" layout in the southeast quadrant and a "button hook" arrangement in the northwest quadrant. The design allows for through moves along the crossing road. However, the impact on the Bullen's Creek and the use of a skewed structure are the major deficiencies of this option. The existing residents on Allensville Road are unaffected.

Option "B" is a Parclo "B" configuration located at the existing intersection. This configuration requires realignment of Bullen's Creek and reconstruction of existing sections of Rowanwood and Allensville Road, thereby affecting the adjacent residential properties. Disadvantages of this option include problems associated with construction staging and the impact on the TransCanada Pipe Line.

In Option "C", the interchange is located north of the existing intersection in a marshy area. The configuration is a Parclo "A-B" with the "B" loop in the north-east quadrant. A through move of the crossing road is not provided. The northerly extension of Rowanwood Road is aligned to avoid crossing Bullen's Creek and the EW-N ramp is set to avoid an extension of the existing culvert at the unnamed tributary. The interchange crosses the TransCanada Pipe Line at two locations. These crossings cannot be avoided but it exist in fill areas and will not reduce the cover over the pipeline.

The existing culvert north of the proposed crossing for Option "C" experienced noticeable settlement in the past. There was concern regarding the structure foundations at the Option "C" site because of the marsh conditions. In September, 1991 the MTO undertook foundation tests at the proposed Option "C" abutment locations. A Preliminary Foundation Investigation Report concluded that a structure could be constructed at this location utilizing piles for a foundation.

Other advantages for Option "C" include minimal impact to the existing residents and the flexibility for construction staging. As a result Option "C" is the preferred preliminary design option.



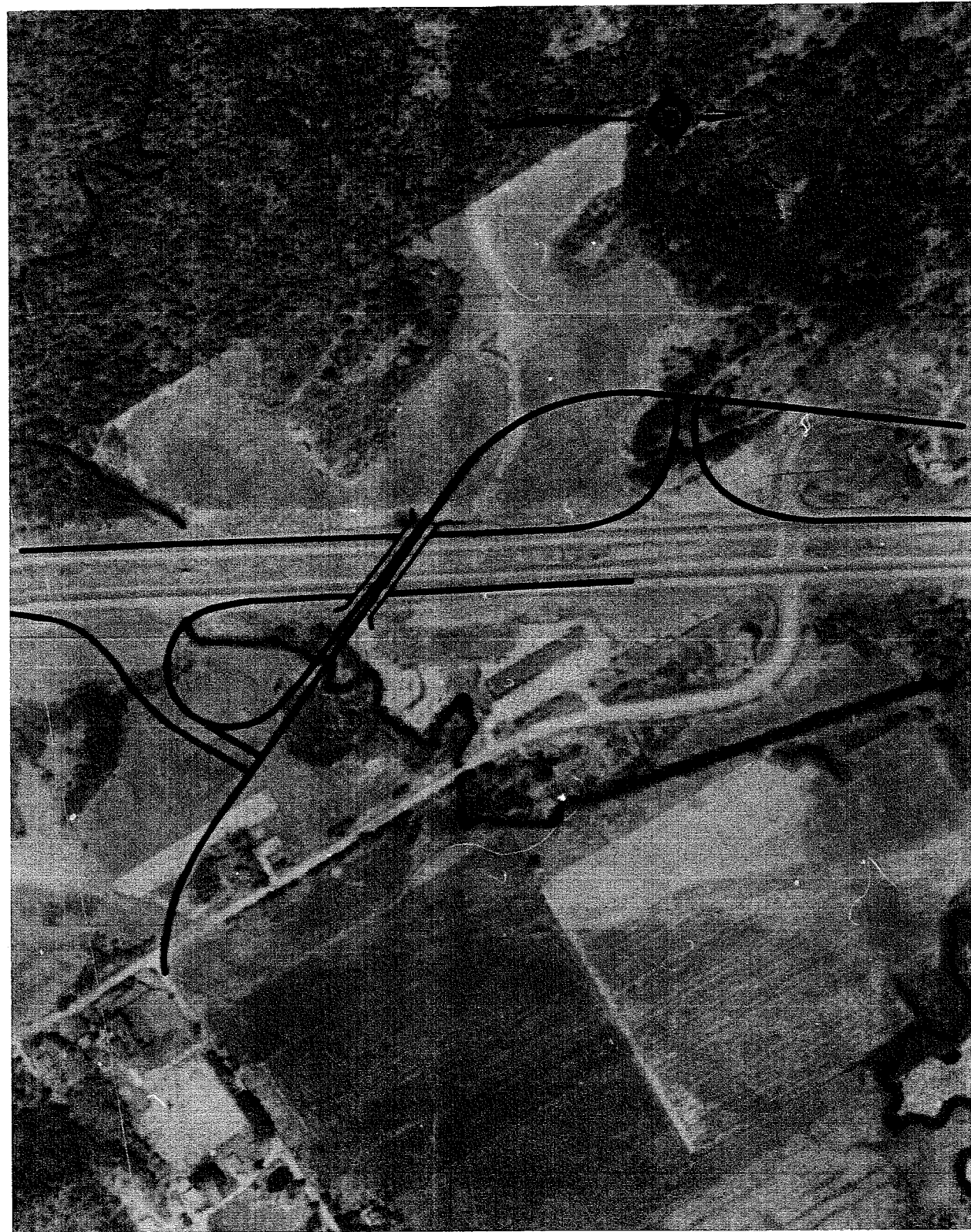


FIGURE 5.10 ALLENSVILLE ROAD - OPTION A

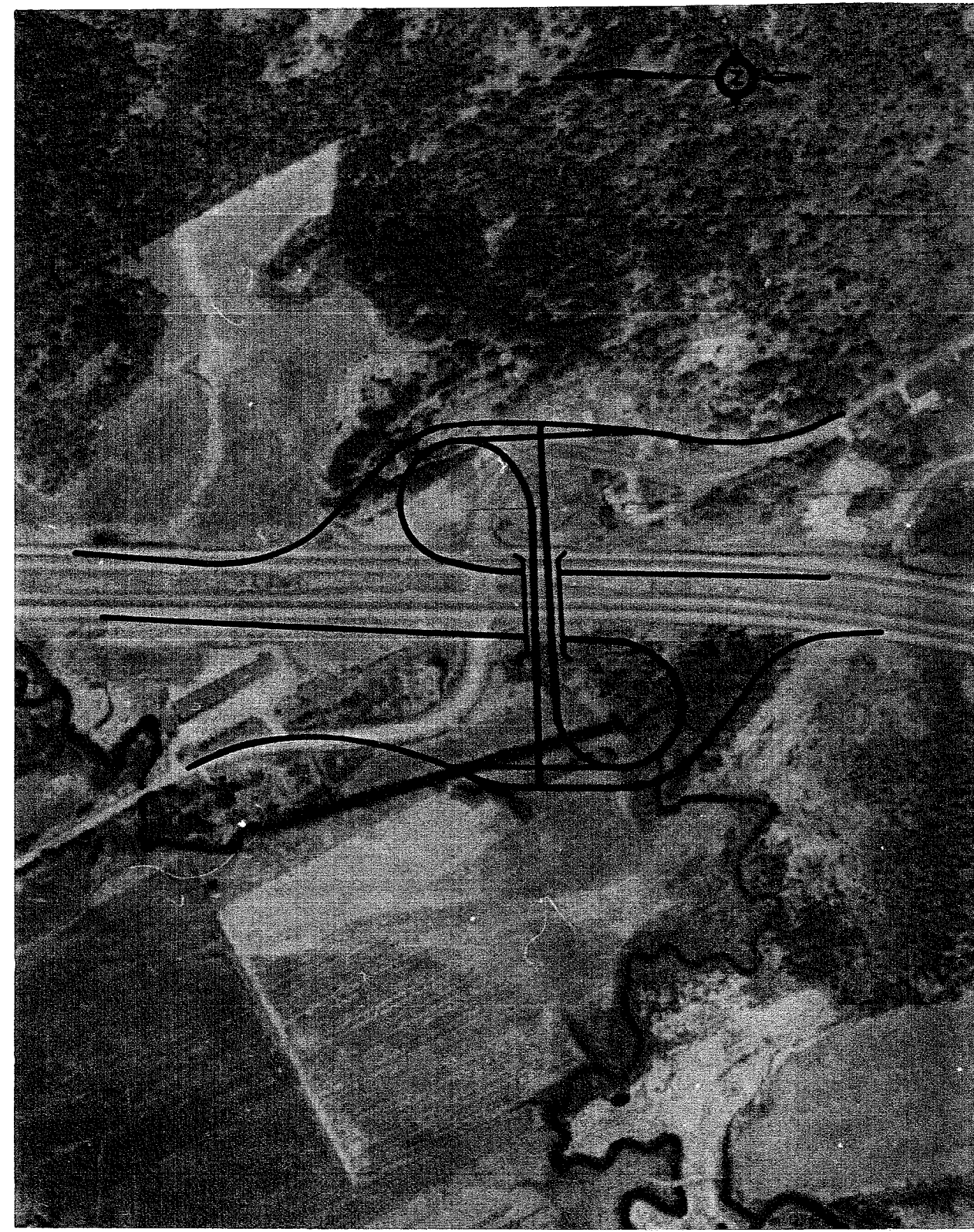
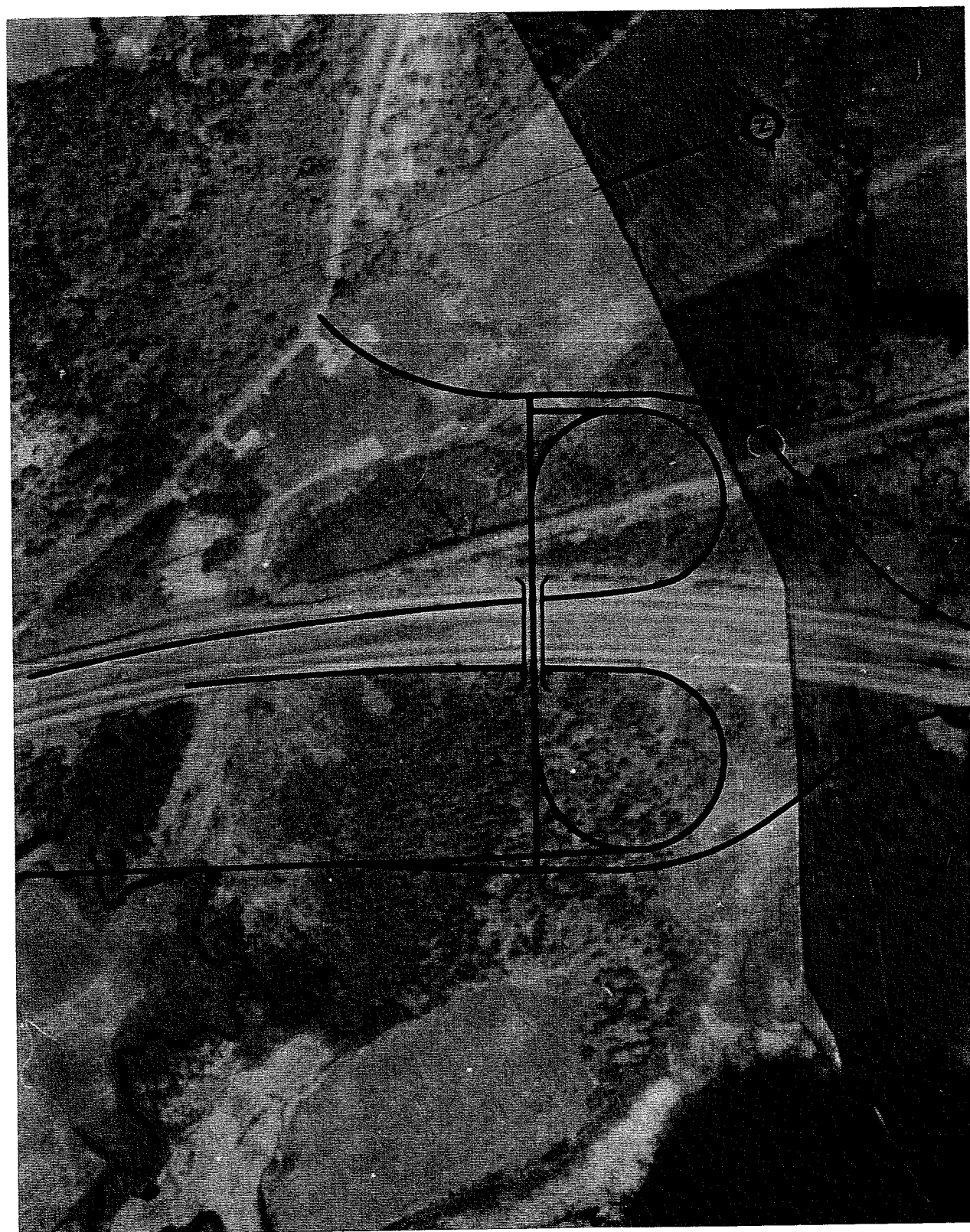


FIGURE 5.11 ALLENSVILLE ROAD - OPTION B





**FIGURE 5.12 ALLENSVILLE ROAD - OPTION C**

#### **Madill Church Road / Gryffin Lodge Road**

Two options were investigated for the interchange at Gryffin Lodge Road as outlined in Figures 5.13 and 5.14. In both cases, the interchange is located in the vicinity of the existing intersection and the ramp layouts are the same. A diamond layout is utilized on the west side and a Parclo "B" configuration is proposed on the east side.

The proximity of area businesses and residents west of Highway 11 restricts the availability of property for loop ramps and therefore the diamond layout is proposed. East of Highway 11, the skew of Gryffin Lodge Road requires that a Parclo "B" configuration be employed. The main difference between the two options is the layout of the crossing road and the treatment at Ferguson Road and Madill Church Road.

#### **Option "A"**

The layout in Option "A" is a diamond ramp layout on the west side and a Parclo "B" layout on the east side of Highway 11. The Highway 11 crossing road tees into the Madill Church Road / Ferguson Road on the west side and connects directly into Gryffin Lodge Road on the east side. The crossing road alignment is skewed to Highway 11 to facilitate the connection to Gryffin Lodge Road and a 90m Parclo "B" ramp is used on the east side.

#### **Option "B"**

The Option "B" layout is similar to Option "A" except that the Highway 11 crossing road connects directly into Ferguson Road and tees into Gryffin Lodge Road. The diamond and Parclo "B" ramp layouts remain unchanged. This layout more adequately addresses the main traffic movements at this location as a direct connection is made to Ferguson Road and the Lindgren Road service road connection. This services the businesses along Ferguson Road and ties into the businesses south of Huntsville. The through move to the east along Gryffin Lodge Road is not a priority as it only connects to a sparsely populated cottage community.

#### **Muskoka Road No. 3 (north of Huntsville)**

The preliminary design options for this interchange are discussed in the Highway 11 - Huntsville to Burk's Falls One Stage Environmental Assessment / Route Planning Study (W.P. 82-81-00). This study does not investigate or re-evaluate the options for an interchange at this location.

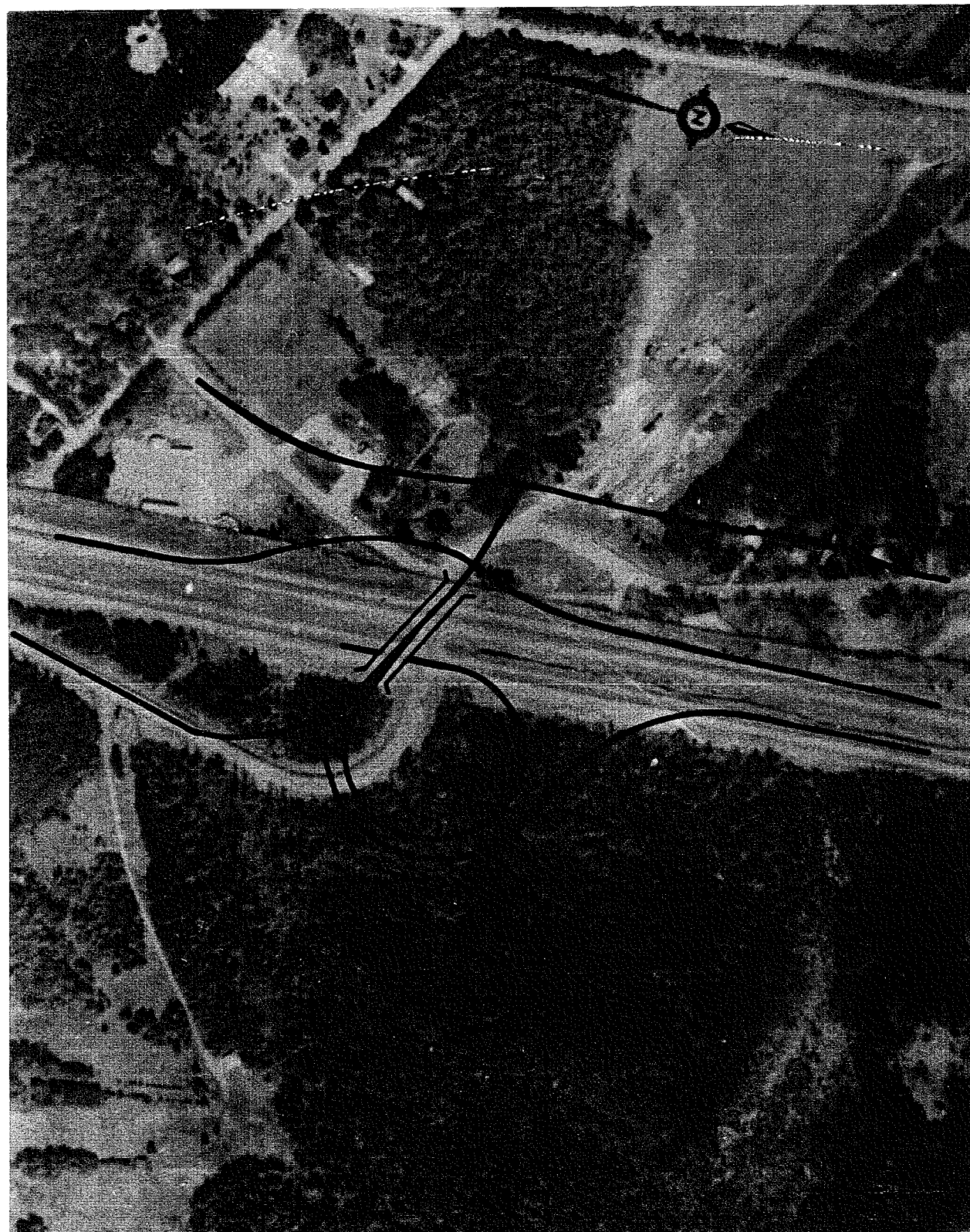


FIGURE 5.13 GRYFFIN LODGE ROAD - OPTION A



FIGURE 5.14 GRYFFIN LODGE ROAD - OPTION B



### 5.4.3 Flyovers

#### Pinedale Road / Hewitt Street

Figures 5.15, 5.16, 5.17 and 5.18 outline the preliminary design options which were considered for the flyover at this location. Most options locate the flyover south of the existing intersection to avoid impact to lakefront residents to the north. The location of the crossing road is set to minimize the grading impact to the existing driveway accesses immediately west of Highway 11. The road alignment places the bridge location at a rock outcrop. This facilitates the foundation of the east abutment of the flyover. This results in cost savings for the construction of the abutment foundation.

Preliminary study was carried out to assess the feasibility of a Highway 11 underpass at this location. An underpass avoids the visual intrusion associated with a flyover. However, the construction of an underpass requires substantial and extensive rock cut and results in problems associated with the drainage of stormwater from the road underpass. As a result, an underpass is not considered as a feasible alternative. This analysis is documented in Appendix II - Part 3 by correspondence to the Gull and Silver Lakes Residents Association.

Initially, no specific options for the flyover location were investigated. The optimal location was at the rock outcrop with a direct connection easterly to Hewitt Street. However, concern was expressed by local residents and the Town of Gravenhurst regarding the flyover location and the road alignment. The detailed analysis is in the appendix under correspondence with the Town of Gravenhurst and an overview is provided as follows:

#### Option "A" - Initial Alignment

The flyover is located at the rock outcrop south of the existing intersection. The flyover connects directly into Hewitt Street as shown on Figure 5-15. Concern was expressed by the affected property owners regarding impact on their vacant land that they have intentions for future development. The Town of Gravenhurst supported these concerns and also indicated concern regarding high operating speeds over the flyover ending in a low speed laneway, where the crossing road connects with Hewitt Street.

#### Option "B" - Hahne Farm / Hewitt Street Connection

A local resident concerned about the impact of the flyover on the property, offered this alternative. Hahne Farm Road connects directly into Hewitt Street and Pinedale Road tees into this new roadway. The flyover is skewed over

Highway 11 and a minimum R130 radius is used for the Hahne Farm / Hewitt Street connection.

Disadvantages of this scheme are many and are documented as follows:

- the curvilinear structure is costly to construct
- the tight R130 radius approaching the flyover is not desirable from a geometric design point of view
- east of Highway 11, the road embankment for the flyover requires acquisition of land from the Brown, Jacel, Charlton and Christmann properties
- property is also required from McConnachie on the west side of Highway 11
- the road grade, east of Highway 11, adversely affects the driveway grades to the Jacel, Charlton and Christmann properties

On the basis of the above concerns, this scheme was not considered further.

#### Option "C" - Hewitt Street Tee

This option is similar to Option "A" except that the flyover of Highway 11 connects into Hewitt Street by a tee intersection. Features of this option are:

- the tee intersection controls the speed of operation of vehicles from the flyover
- the tee connection is aligned to avoid headlight impact to the Christmann property
- the perpendicular crossing of the Brown land minimizes property acquisition
- high geometric design standards are maintained in the vicinity of the flyover

This option addresses the Town of Gravenhurst concerns and minimizes the impact on the Brown property. On this basis, it is a reasonable alternative to Option "A".

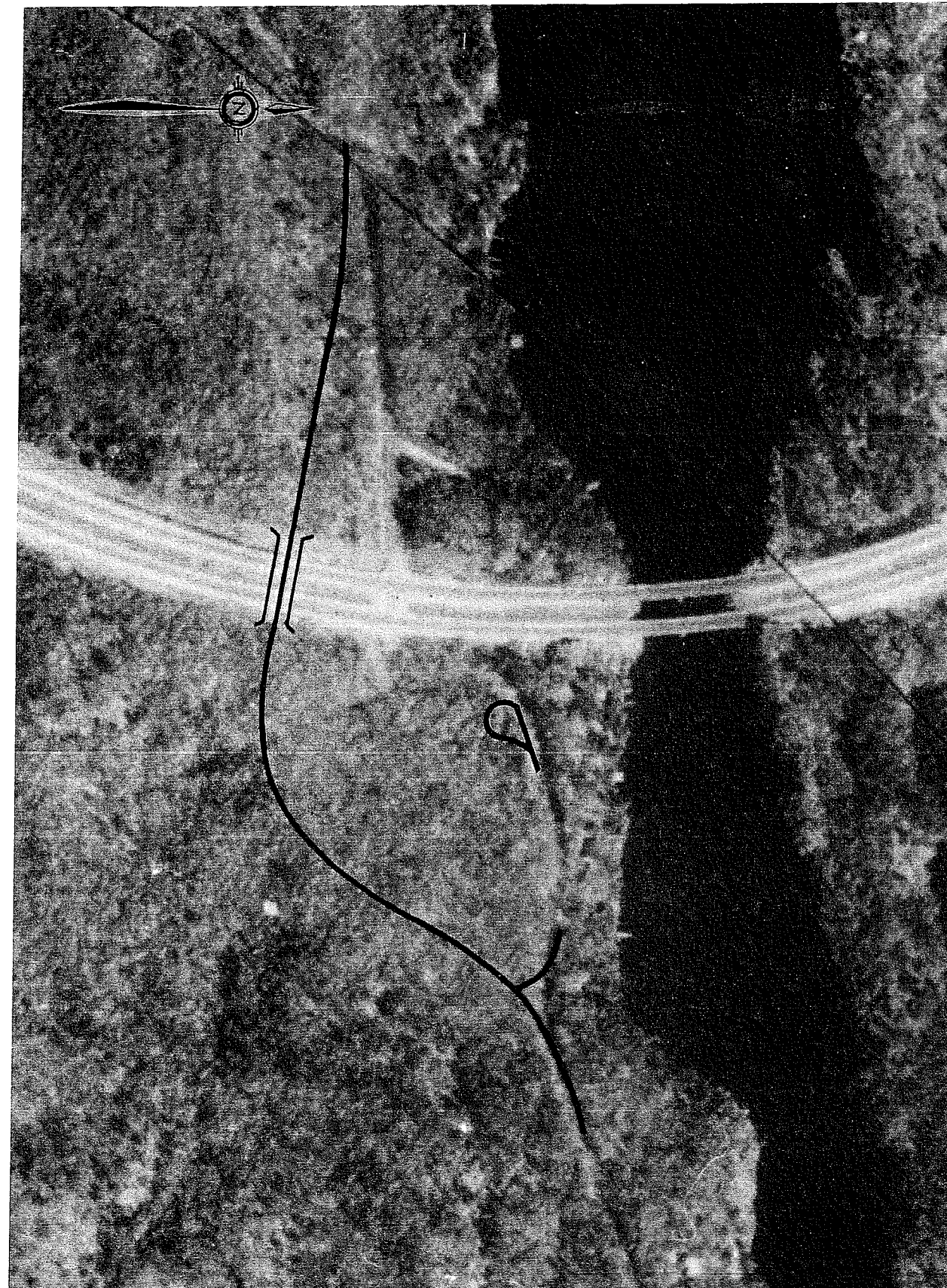


FIGURE 5.15 PINEDALE ROAD / HEWITT STREET - OPTION A

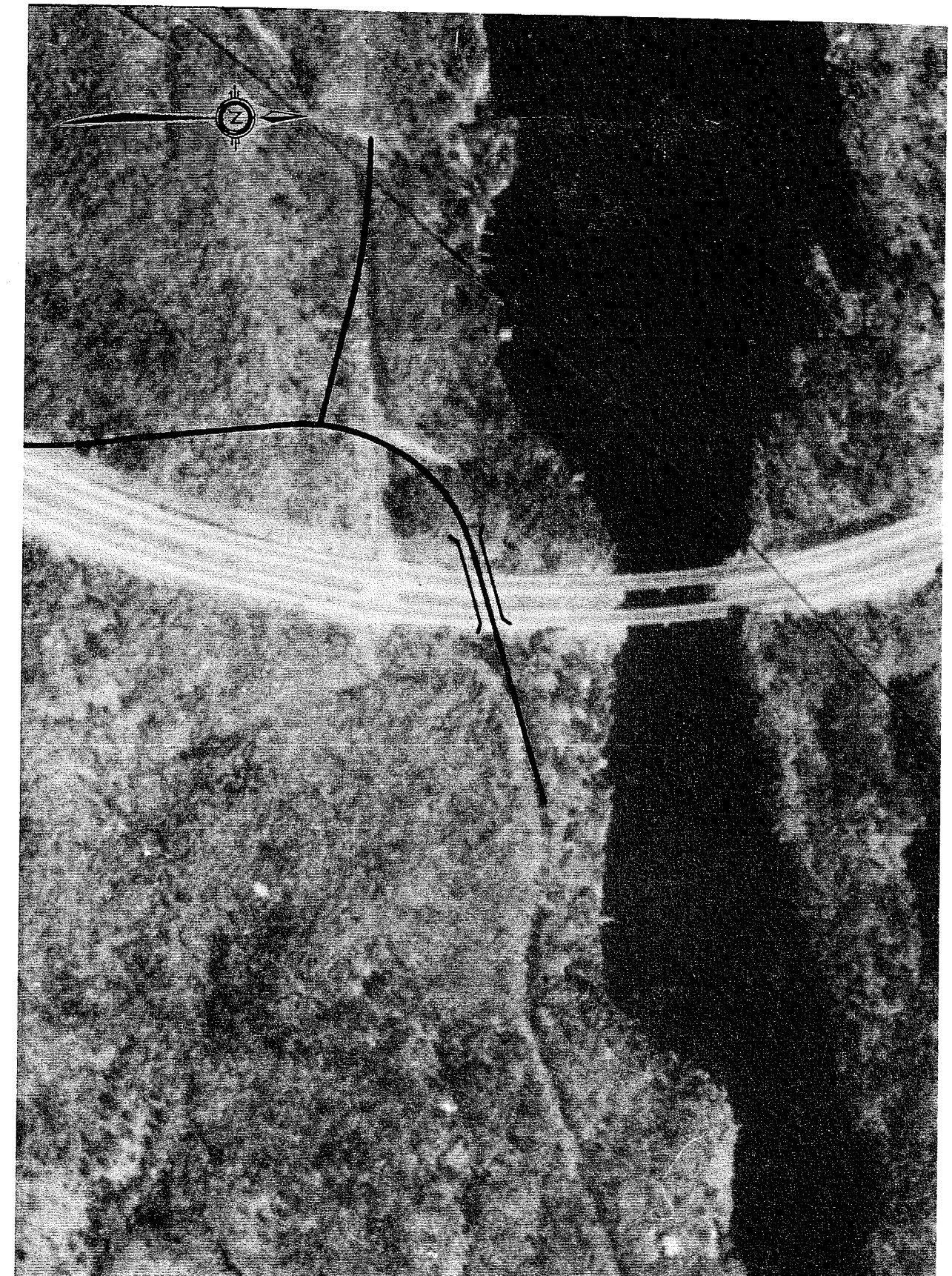


FIGURE 5.16 PINEDALE ROAD / HEWITT STREET - OPTION B



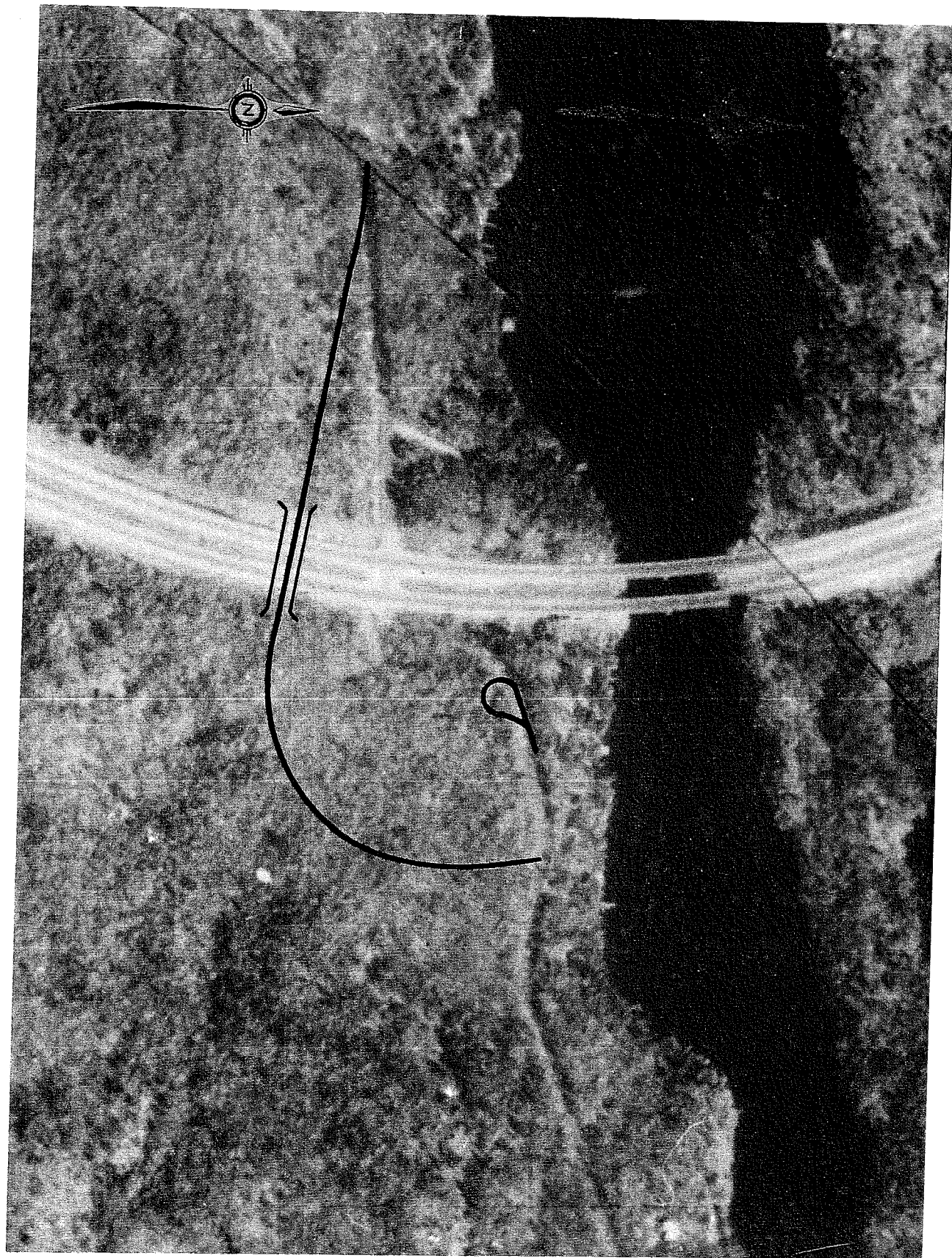


FIGURE 5.17 PINEDALE ROAD / HEWITT STREET - OPTION C

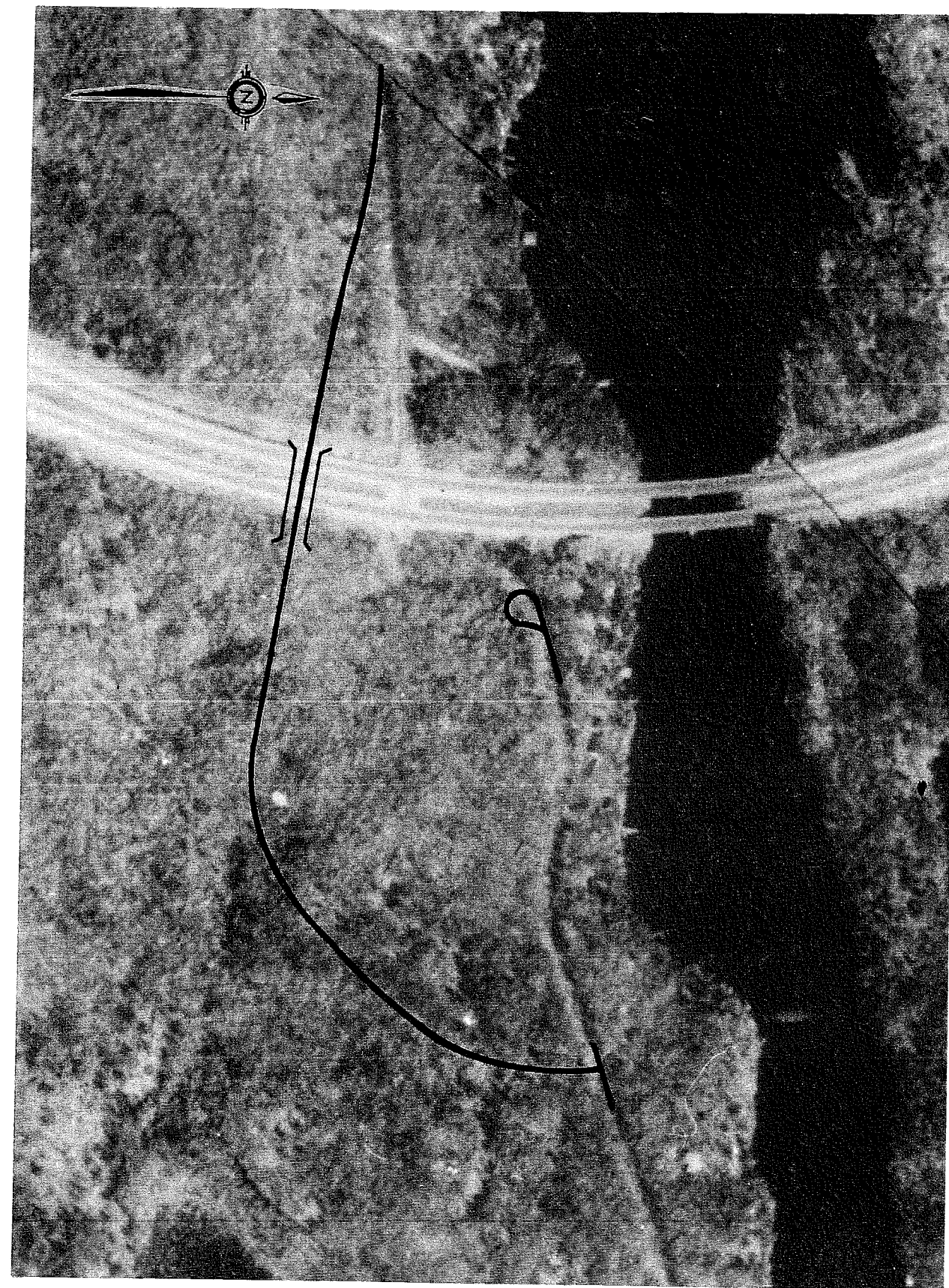


FIGURE 5.18 PINEDALE ROAD / HEWITT STREET - OPTION D

#### Option "D"

This option, was also proposed by an adjacent landowner, was considered in our study. The flyover location is the same as used in Option "A" and "C". However, the Hewitt Street connection extends to the east and south of the Brown property, to connect into Hewitt Street east of the Brown property. This option was eliminated from consideration due to rugged terrain at the east limit and due to the high cost of the Hewitt Street connection.

The preferred alignment for the Hewitt Street connection is Option "C" the tee-intersection with the exiting Hewitt Street. It is the shortest alignment and therefore the least expensive to construct and maintain. It also allows flexibility for future development of the Brown property.

#### All Pine Cabins Road

The development of the preliminary design for the flyover at this location did not present any options. Locating the flyover south of the existing intersection was not pursued as the crossing road conflicts with the existing All Pine Cabins site on the east side of Highway 11. Locating the flyover north of the existing intersection is preferred as the property is undeveloped and allows for flexibility in the staging of the construction.

The alignment of the crossing road west of Highway 11 follows an existing trail westerly towards Lone Pine Road. To the east, the flyover road matches into the existing road allowance between Concessions 10 and 11 of Macaulay Township. This allows for future development along the Muskoka River.

#### Lindgren Road

Initially, two network alternatives were proposed for access to Lindgren Road. These options, previously reviewed under the concept study, were a Lindgren Road flyover or a service road connection on the east side of Highway 11. Input received at the first public information centre demonstrated that the recommended option, a Lindgren Road flyover with a connection to Bickley Country Drive, was not acceptable to area residents and businesses. This prompted special meetings with the Lindgren Road residents and businesses. Details of this analysis are outlined previously in this section and the minutes of the meeting are in the Appendix. On the basis of these meetings, a compromise regarding the Lindgren Road access was agreed upon.

As a result of the supplementary meetings with Lindgren Road area residents and businesses, a number of factors were considered for the development of the preliminary design for the flyover / service road configuration at this location.

They include the following:

- i) Minimize the reconstruction on Lindgren Road East
- ii) Utilize as much of old Highway 11 as possible for the new west service road and connection to Ferguson Road
- iii) Limit the impact of the west service road grade on adjacent properties
- iv) Develop the west service road alignment to minimize conflict with the service centre operation
- v) Investigate the possibility of locating the Lindgren Road structure north of the existing intersection

Figures 5.19 and 5.20 outline the preliminary design options considered for the flyover at this location. Option "A" locates the flyover at the existing intersection, while Option "B" locates the flyover north of the existing intersection, behind the existing business.

Both options satisfy the first four conditions previously outlined. However, Option "B" has the following advantages over Option "A":

- i) Locating the structure north of the existing intersection allows for flexibility in construction staging
- ii) The existing rock outcrops on either side of Highway 11, at the proposed structure location, result in cost savings in the construction of the abutment foundations
- iii) Locating the flyover north of the existing intersection avoids obstruction of the visibility of the Granite Point Homes sales office, for northbound vehicles

As a result, Option "B" is the preferred preliminary design option for the flyover at this location.



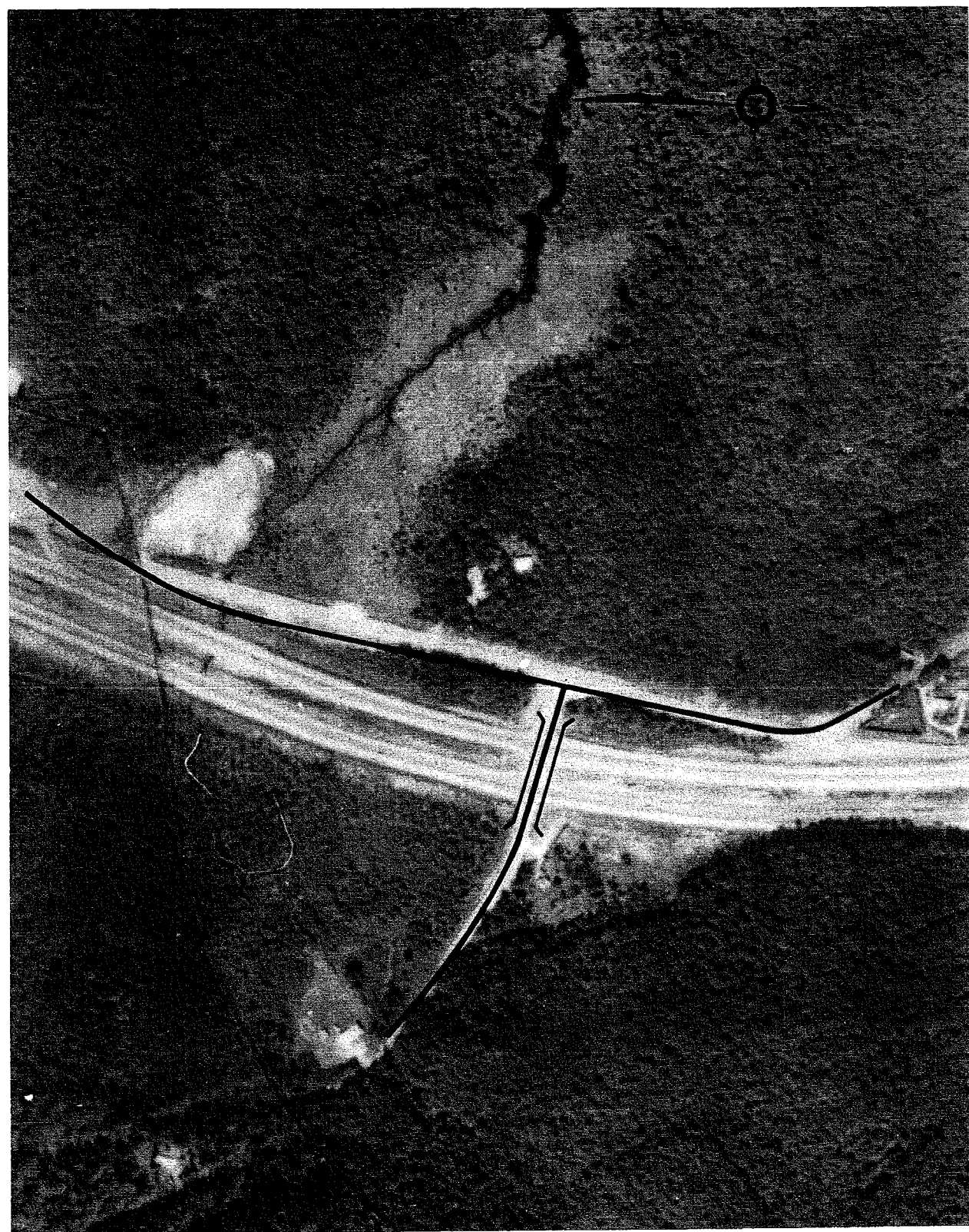


FIGURE 5.19 LINDGREN ROAD - OPTION A



FIGURE 5.20 LINDGREN ROAD - OPTION B

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**CHAPTER 6**

**SELECTED PRELIMINARY DESIGN**

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6.0 SELECTED PRELIMINARY DESIGN

6.1 Design Standards

6.1.1 Design Criteria

The Design Criteria for this study are outlined on p. 6-2.

Design Speeds

The following design speeds were used to establish the crossing road alignment and the exit/entrance ramp requirements for the interchanges;

Road	Design Speed	Assumed Posted Speed
Highway 11	120 kph	100 kph
King's Highway (other than Highway 11)	100 kph	80 kph
* Township/District Road (where adjoining road section is 80 kph)	80 kph	60 kph
Township/District Roads (with limiting physical constraints)	60 kph	50 kph

\* also design speed for service road alignment control

Inner Loop Ramps

The acceptable (minimum) and desirable (preferred) radius for inner and outer loop ramps are outlined below;

Ramp Configuration	Desirable Radius	Acceptable Radius
Parclo A - inner loop	75 m	50 m
Parclo B - inner loop	90 m	70 m
Outer loop ramps	250 m	130 m

Local constraints including topography, drainage, property, etc. may require a loop radius at the lower end of the range.

Cross Section

The proposed cross sections for the various crossing and service roads are outlined in Figure 6.1. Typically, the proposed pavement width is 6.5m (2 lanes at 3.25m) except for Highway 141, where a 7.0m pavement width is proposed (2 lanes at 3.5m). The proposed shoulder width for new roads is dependant upon the average annual daily traffic (AADT). A shoulder with of 1.0m is used for roads with an AADT less than 1000. A 2.0m shoulder is used if the AADT is greater than 1000.

In the vicinity of interchanges, it is recommended that a 2.5m shoulder is used for the crossing road.

Structures

The proposed structure sections and elevations are outlined in Figures 6.2 and 6.3. The minimum structure cross section is 7.0m for the crossing road pavement (2 lanes @ 3.5m) and a 2.0m shoulder on each side.

The structure span is dependant upon two factors: the width of the Highway 11 median and the location of the future six lane widening of Highway 11. The Highway 11 median width is 22.86m at Pinedale Road / Hewitt Street and the Gravenhurst North interchange and 15.24m at the High Falls Road interchange. All other structure locations occur where the Highway 11 median width is 30.48m. At the High Falls Road interchange, the future six lane widening is outside of the outside lane. Therefore, to provide for this future work, an additional 3.75m is added to the standard 10.0m clearance between the edge of pavement and the abutment. At all other locations, the standard 10.0m clearance is proposed.

6.1.2 Interim and Ultimate Conditions

The interchange alignments are designed to allow for standard exit or entrance ramp channelization at the crossing road. In some cases, the projected ramp volumes do not warrant a channelized treatment and a simple open-throat intersection is proposed as an interim condition. Nonetheless, the ramp geometry and property requirements are calculated assuming channelized exit/entrance ramp conditions. This allows for the desired standard in the ultimate condition.

The bridge span of the interchange and flyover alignments is designed to accommodate the future six laning of Highway 11. In all cases, except for High Falls Road, the additional lanes are accommodated within the median resulting in no impact on the ramp alignment and bullnose location. At High

## DESIGN CRITERIA

WORK PROJECT NO. 341-87-00 DIST NO. 11 HWY NO. 11 TYPE OF PROJECT Ultimate freeway design

LOCATION from Highway 169 (Gravenhurst) to Muskoka Road 3 (Huntsville) LENGTH 55 km

LIMIT FROM STA PLAN TO STA PLAN

CROSSING ROADS AND SERVICE ROADS			
ITEM	DESIGN STANDARD		
Highway classification	RAU 100	RAU 80	RAU 60
Design speed	100 km/hr	80 km/hr	60 km/hr
Minimum stopping sight distance	185m	135 m	85 m
Equivalent "K" factor: sag crest	45	30	18
	70	35	15
Maximum grade	6 - 8 %	6 - 8 %	6 - 12 %
Minimum radius	420 m	250 m	130 m
Pavement width	2 @ 3.5 m (a)	2 @ 3.25 m (a)	2 @ 3.25 m (a)
Shoulder width	2.5	(b)	(b)
Shoulder rounding	0.5 m	0.5 m	0.5 m
Minimum R.O.W. width	30 m	30 m	30 m
Posted speed	80 km/hr	80 kph / 60 km/hr	60 km/hr
Miscellaneous	(c)	(d)	(e)

NOTES: a) Across the structures the pavement shall be 2 lanes at 3.5m with 2.0m shoulders.

b) The shoulder widths shall be as follows:

- i) for AADT less than 1000 : 1.0 m
- ii) for AADT greater than 1000 : 2.0 m
- iii) in the vicinity of interchanges : 2.5 m

c) The RAU 100 design criteria applies to the following road :  
- Highway 141

d) The RAU 80 design criteria applies to the following roads:

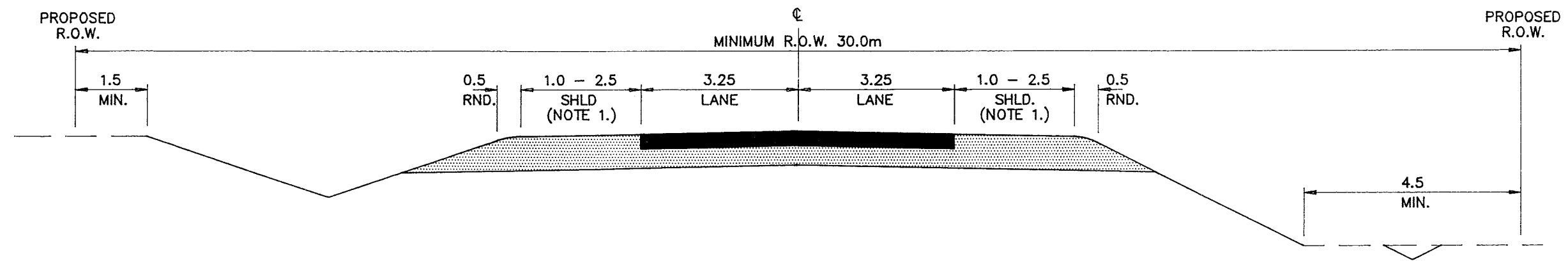
- Muskoka Road 41
- High Falls Road
- All Pine Cabins Road
- South Mary Lake Road
- Muskoka Road 10
- Allensville Road
- Ferguson Road connection
- Service roads

e) The RAU 60 design criteria applies to the following roads:

- Pinedale Road / Hewitt Street
- Holiday Park Drive
- Rowanwood Road
- Gryffin Lodge Road
- Ferguson Road \*
- Lindgren Road

\* Due to property constraints the proposed alignment for Ferguson Road does not meet the horizontal alignment requirements for the RAU 60 design criteria. A design speed of 50 km/hr is used.



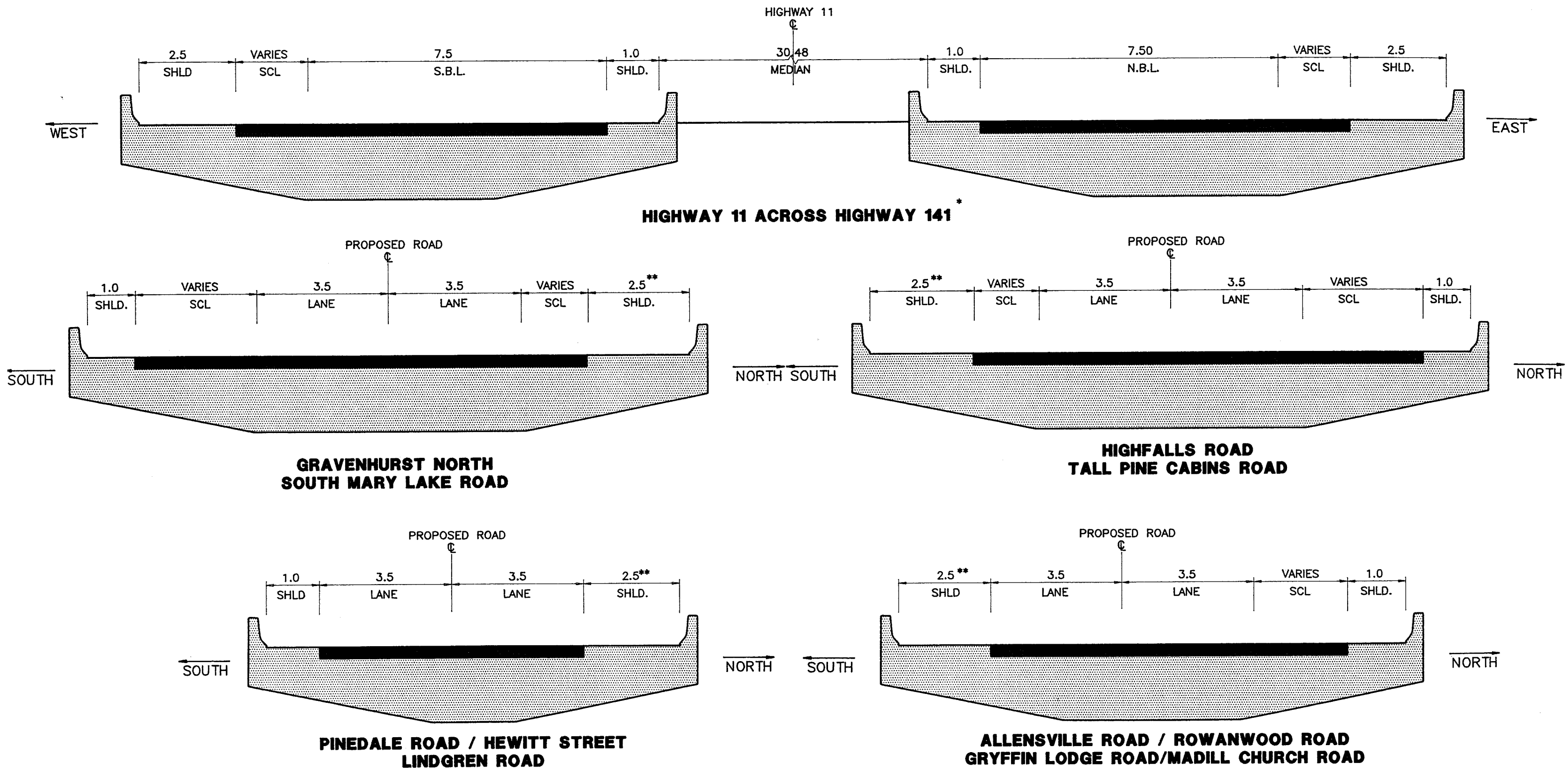


### CROSSING / SERVICE ROADS

#### NOTES:

1. SHOULDER WIDTH VARIES AS FOLLOWS
  - i.) 2.5m IN THE VICINITY OF THE INTERCHANGES/FLYOVERS
  - ii.) 2.0m IF A.A.D.T. IS GREATER THAN 1000
  - iii.) 1.0m IF A.A.D.T. IS LESS THAN 1000

### CROSSING / SERVICE ROAD TYPICAL CROSS SECTION FIG. 6.1

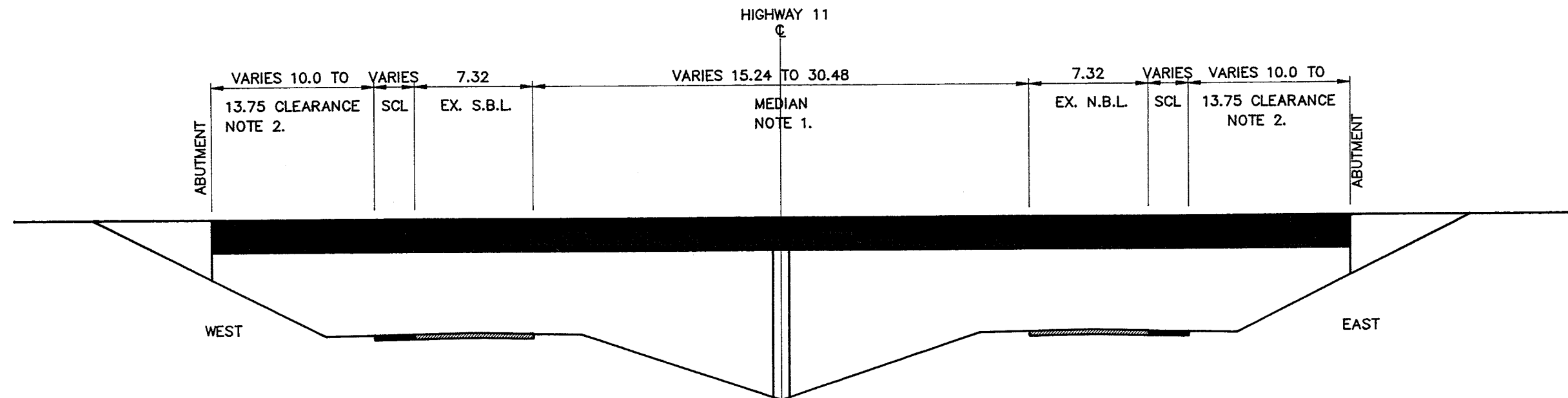


**BRIDGE STRUCTURE CROSS SECTIONS**  
**FIG. 6.2**

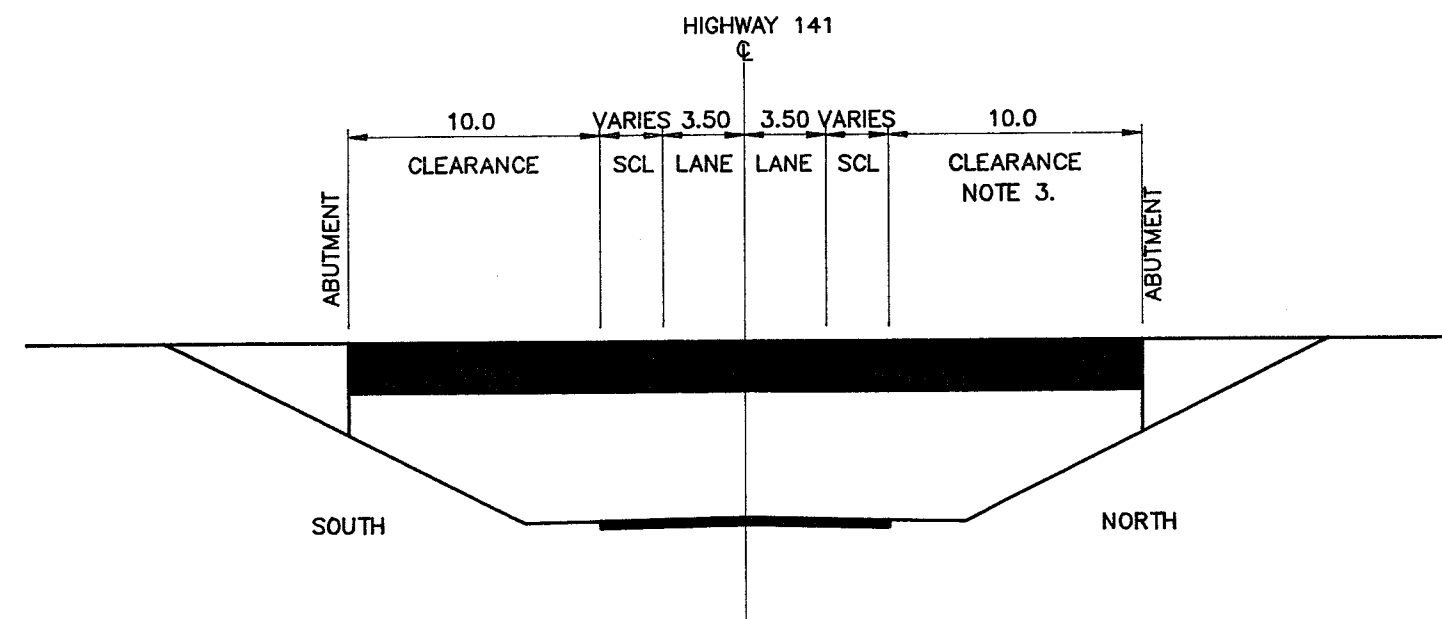
NOTES:

\* ABUTMENT SHALL BE DESIGNED TO ACCOMMODATE A SIX LANE HWY 11 SECTION.

\*\* SHOULDER IS DESIGNATED FOR FUTURE SIDEWALK PLACEMENT.



**CROSSING ROAD BRIDGE ELEVATION AT HIGHWAY 11**



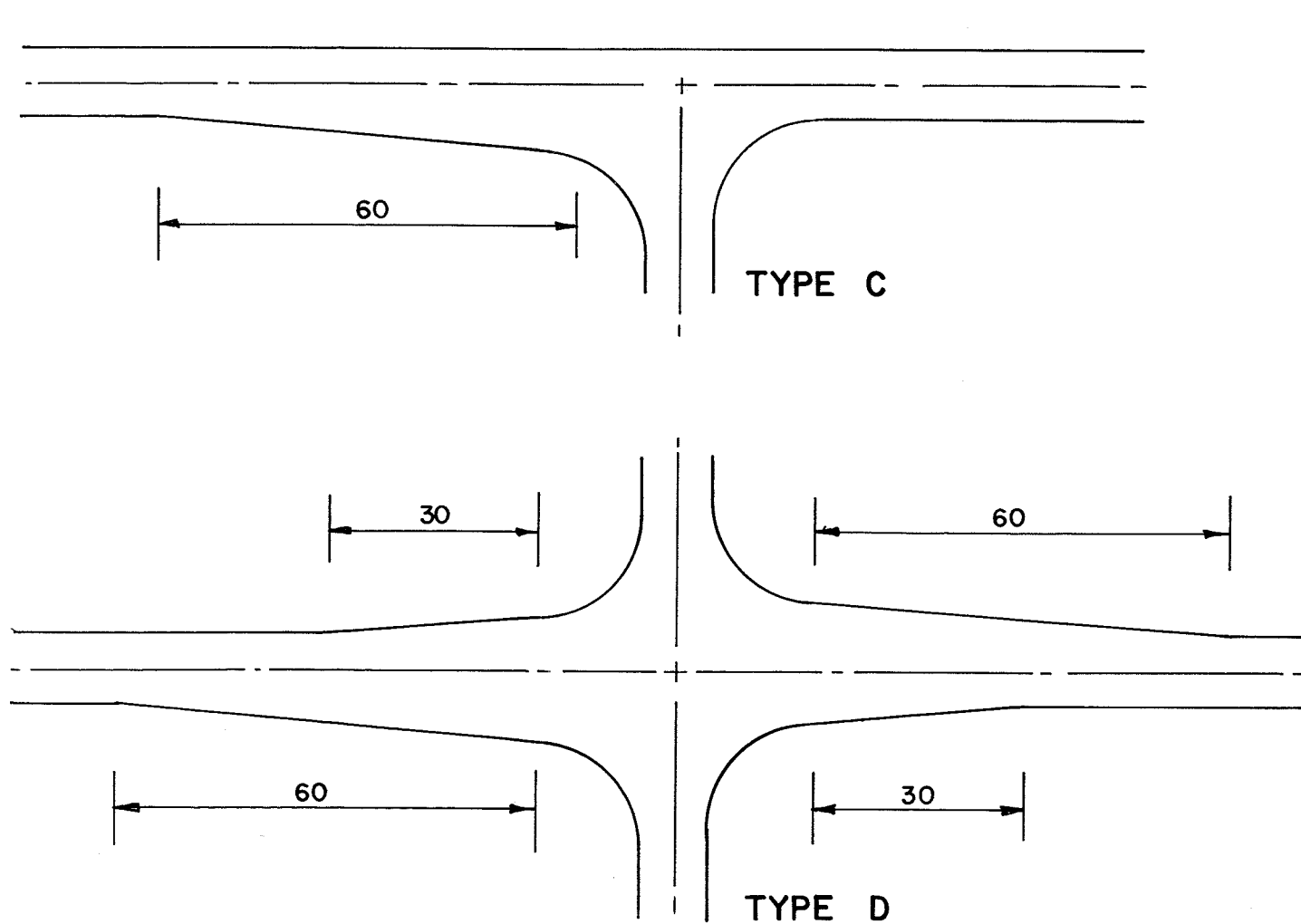
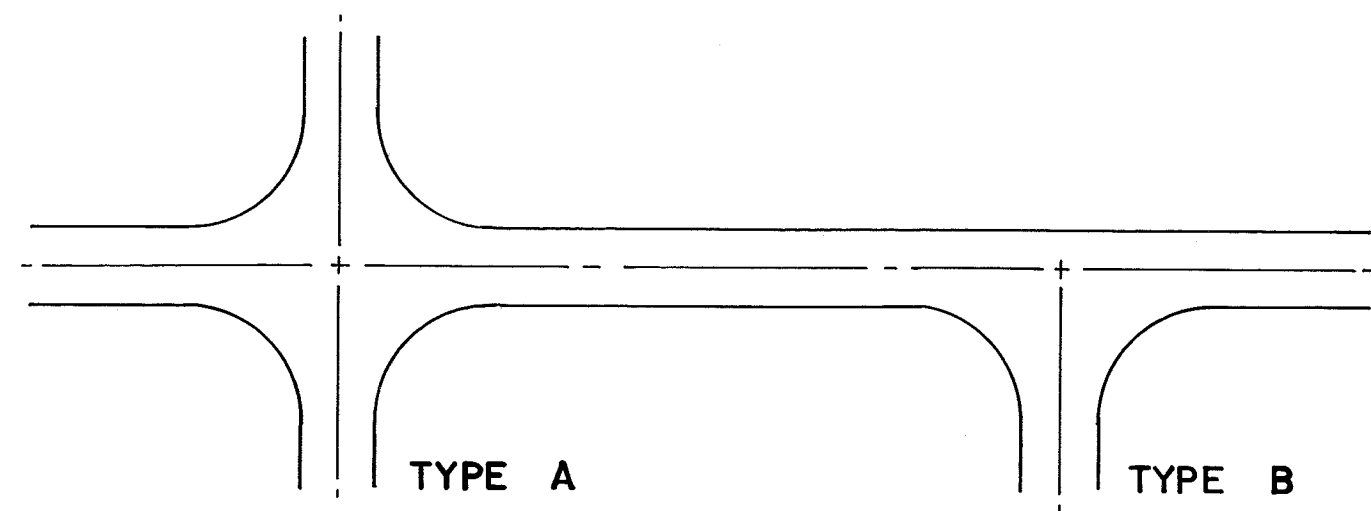
**HIGHWAY 11 BRIDGE ELEVATION AT HIGHWAY 141**

**NOTES:**

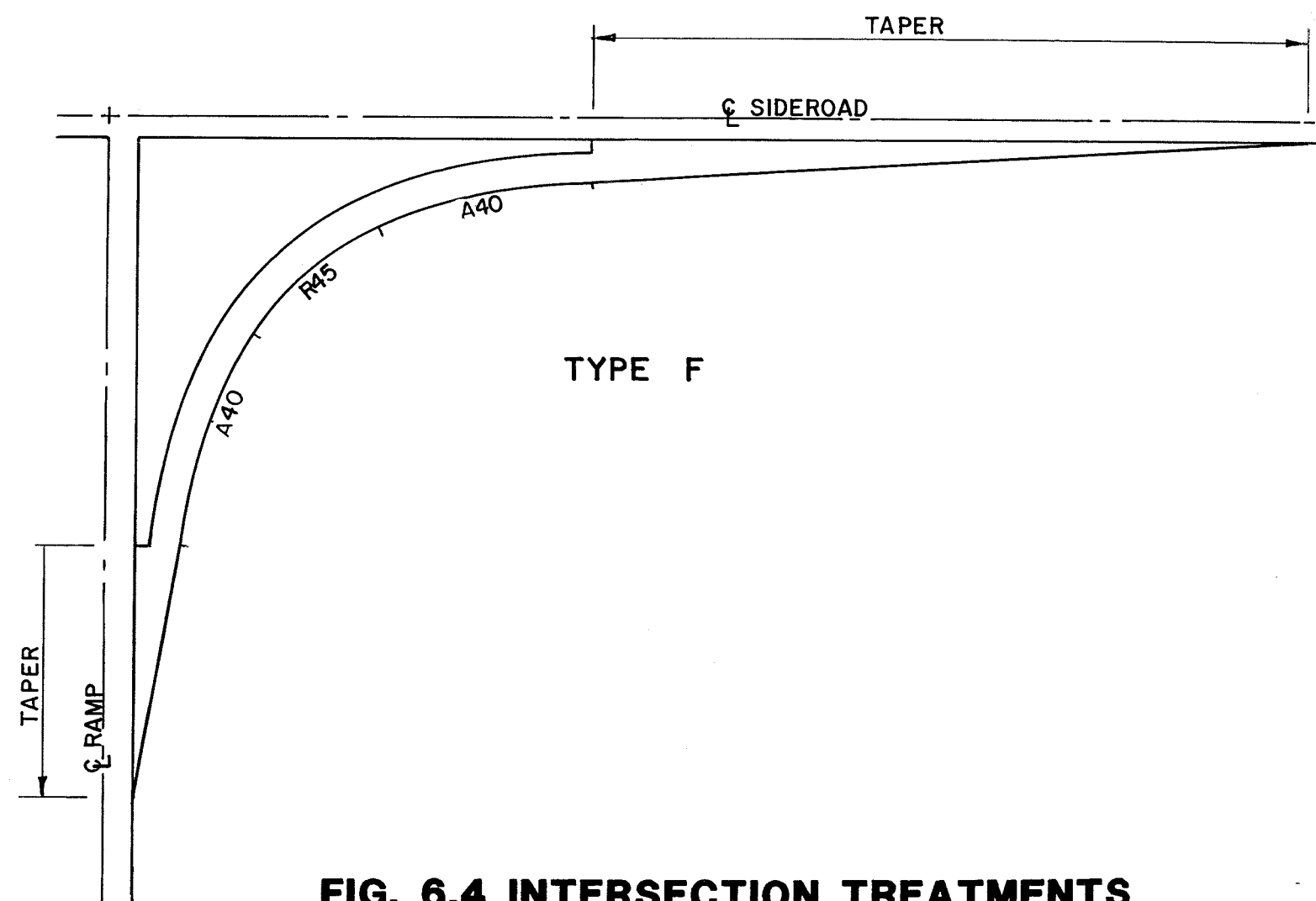
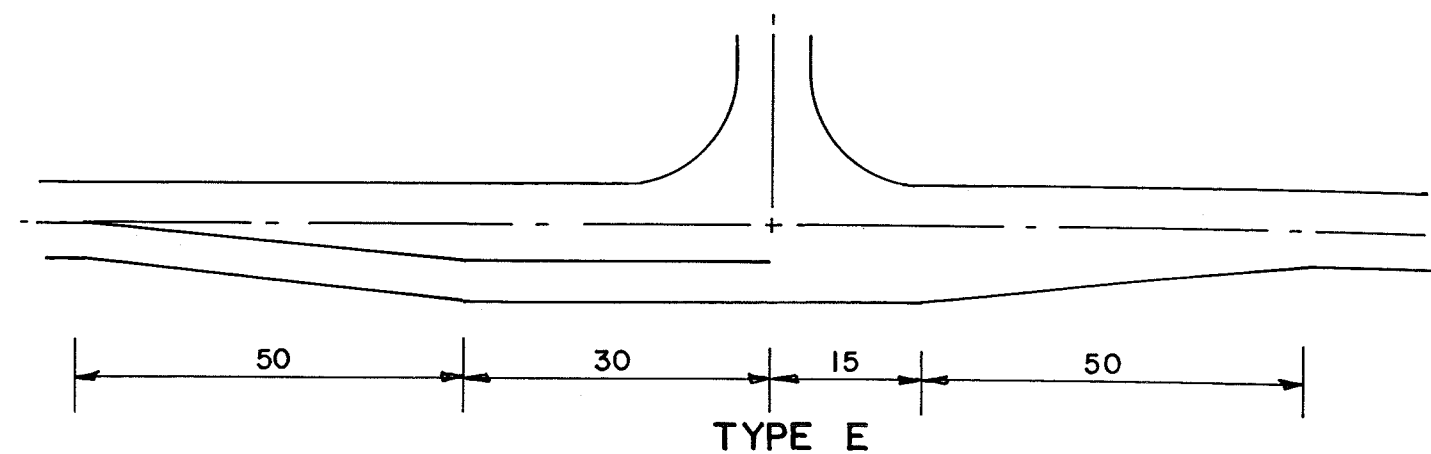
1. MEDIAN WIDTH IS 22.86m AT PINEDALE ROAD AND GRAVENHURST NORTH, 15.24 AT HIGHFALLS ROAD AND 30.48 AT TALL PINES ROAD, SOUTH MARY LAKE ROAD, ALLENSVILLE ROAD, MADILL CHURCH ROAD AND LINDREN ROAD.
2. CLEARANCE IS 13.75m AT HIGHFALLS ROAD TO ALLOW FOR FURTHER 6 LANING OF HIGHWAY 11 AT ALL OTHER LOCATIONS, CLEARANCE IS 10.0m
3. DUE TO THE RAMP GEOMETRY AND HIGHWAY 141 HORIZONTAL ALIGNMENT, ENSURE ADEQUATE SIGHT DISTANCE IS MAINTAINED FOR WESTBOUND TRAFFIC PASSING BELOW THE STRUCTURE TO THE WEST RAMP TERMINALS.

**BRIDGE ELEVATIONS  
FIG. 6.3**





(DIMENSIONS ARE IN METRES)



**FIG. 6.4 INTERSECTION TREATMENTS**

Falls Road, Highway 11 is widened to the outside. As a result, the ramp geometry is designed based upon the ultimate 6 lane section. The ramp alignment is set to match the existing four lane facility. The structure span at High Falls Road is designed to accommodate the ultimate six lane Highway 11.

Another consideration for future interchange requirements is the provision of a Parclo A-4 ramp. Future traffic volume at the ramp terminals may warrant a directional exit ramp to Highway 11. The designs and property requirements anticipate this requirement where the need for this ramp is foreseen.

### 6.1.3 Intersection Configuration

Figure 6.4 outlines the typical treatments considered at the various intersection locations. The intersection treatment is dependant upon the following factors:

- traffic volumes
- turning movements
- accident potential
- local physical constraints

The intersection treatments are summarized below;

#### Standard Open Throat Intersection (Type A or B)

This treatment is recommended for minor sideroad intersections with a major through road. Turn volumes are generally less than 20 vehicles per hour (vph) and therefore turn tapers and auxiliary lanes are not warranted. A type "A" treatment is for a full intersection and a type "B" treatment is for a tee intersection. Intersection radii are simple curves if truck volumes are low and a compound curve system if truck volumes are significant (over 5% of total traffic).

#### Open Throat with Auxiliary Lanes (Type C or D)

This treatment is recommended for intersections with higher operating speeds and greater turning volumes. The right turn taper facilitates the exit right turn movement from the main road and the recovery taper facilitates the entrance right turn from the sideroad. Both tapers also provide a limited slip around design for vehicles on the main road. Generally, left turn or right turn volumes in the order of 20 to 60 vph warrant this treatment. A type "C" treatment is for a tee intersection and a type "D" treatment is for a full intersection layout.

Also, simple or compound radii are used based upon truck volumes.

#### Left Turn Slip Around (Type E)

This treatment is recommended at tee-intersections where left turn lane warrants are met or the through traffic volume is high and would be delayed by turning traffic. This treatment is also used where the turning movement is on a curve or visibility otherwise is restricted.

#### Right Turn Channelization (Type F)

This treatment is recommended for intersections where the right turn volumes are close to or greater than 60 vph. Another warrant for this treatment is to facilitate the through movement across Highway 11. Typically, a R45 radius and A40 spirals are used. The ramp and sideroad taper is dependant upon the design speed of the ramp and crossing road. Where property constraints occur, the radius can be reduced to R30.

The proposed intersection configurations at each of the flyover and interchange locations must be reviewed during the Detail Design Phase. The intersection treatment would be based on the existing traffic conditions at the time of detail design.

### 6.1.4 Commercial Entrances

As a general policy, all existing service centres with direct access to Highway 11 will retain access to the highway. The overall need for the service centre will be reviewed in a follow up study. Access upgrading may be required due to increased highway volumes or growing exit/entrance movements. Access to both Highway 11 and the adjacent service road will not be permitted.

### 6.1.5 Highway Entrances

All highway entrances will be closed when Highway 11 is upgraded to a controlled access freeway standard. The existing at-grade entrance access to Highway 11 would remain until the entire highway is upgraded to a freeway standard provided that the ingress/egress conditions are safe.

### 6.1.6 Snowmobile Crossings

The Ontario Federation of Snowmobile Clubs (OFSC) and the various area snowmobile associations indicated a need for snowmobile crossings of Highway 11. Many of the existing crossings are at bridge or culvert locations. However, if the lake or stream is not frozen, these crossings cannot be used. Therefore,

alternative crossing locations were requested by the OFSC. These snowmobile crossings are suggested for location at the municipal road crossings of Highway 11.

Potential locations for snowmobile crossings were identified during the study. These crossing locations are as follows:

Pinedale Road / Hewitt Street flyover  
Muskoka Road 37 interchange  
High Falls Road interchange  
All Pine Cabins flyover  
South Mary Lake Road interchange  
Allensville / Rowanwood Road interchange  
Lindgren Road flyover

In all cases, these possible crossing sites are grade separations of municipal roads with Highway 11. During detail design, the Ministry will investigate the opportunities to allow snowmobile crossings at these locations. This may be limited to a policy statement allowing this type of usage at specified locations or it may involve wider shoulders on the bridge to facilitate the snowmobile crossings. MTO will review their policy on these issues in the detail design stage of each project, as recommended in this study.

#### 6.1.7 Emergency Vehicle Access

Emergency vehicle access must be maintained upon the implementation of fully controlled access freeway conditions. The key deficiency for emergency access occurs between the High Falls interchange and the South Mary Lake interchange. As a minimum, if no interchanges are constructed over this distance, at least one emergency vehicle turnaround, to MTO standards, is recommended for location in the Stephenson Road 1 vicinity. This facilitates emergency access from both the north and the south and the turnaround location is consistent with the existing agency emergency coverage responsibilities. Based upon future requirements, two additional turnarounds may be considered both north and south of Stephenson Road 1, midway to the adjacent interchange.

#### 6.1.8 Property Requirements

The existing right-of-way for Highway 11 is established from the current Highway 11 property plans. The property data beyond the Highway 11 R.O.W. in the vicinity of the match points with the existing roads are approximated from the Land Registry Office drawings and not based upon detailed legal property plans.

## 6.2 Description of Selected Preliminary Design

The recommend network plans are shown on Plate Nos. 1 to 9. The proposed interchange and flyover configurations are shown on Plate Nos. 19 to 41.

The recommended preliminary designs at the twelve locations and service road network providing access to these interchange sites are grouped into related and dependant work projects.

Each project consists of various components (ie. interchange, service road, road closure, etc...). The orderly construction of each component is vital in maintaining adequate access to Highway 11 before, during and after the project completion.

### 6.2.1 Highway 169 Interchange

The existing partial interchange at Highway 169 is reconstructed to provide a full moves Parclo A interchange as shown in Plate No. 19. The interchange configuration is based on the detail design work carried out under MTO project W.P. 30-79-01. The realignment of a section of Highway 11 from Highway 169 to south of Pinedale Road / Hewitt Street forms part of the interchange reconstruction. The proposed configuration is designed to accommodate a future extension of Highway 400 from Coldwater and to increase the radius of the "tight" horizontal curve on Highway 11, currently existing at this location.

This study does not propose any revisions to previous work. The environmental concerns related to the interchange layout will be addressed in a future Environmental Study Report, prepared prior to construction.

### 6.2.2 Pinedale Road / Hewitt Street Flyover and Hahne Farm Service Road

The recommended proposal for this project is based upon the following design features:

- i) Construction of a flyover south of the existing intersection
- ii) Realignment of Hewitt Street and Pinedale Road across the flyover
- iii) Construction of a service road along the west side of Highway 11 from Pinedale Road to the Highway 169 interchange, utilizing Hahne Farm subdivision road and a portion of the existing Highway 11 southbound lanes



- iv) Closure of the Pinedale Road / Hewitt Street at-grade intersection at Highway 11

The overall project requirements are shown on Plate No. 1 of the recommended network plans. The flyover layout is shown in detail on Plate Nos. 22 and 23.

The main constraints upon the design were as follows:

- The existing residential community along the north side of Hewitt Street and Pinedale Road dictated that the flyover be located south of the existing intersection. Also, the grade of the existing driveway immediately west of Highway 11 restricted the location and profile grade of the crossing road
- The proposed Hahne Farm development restricted the location of the crossing road and the alignment of the service road west of Highway 11
- The realignment of Hewitt Street must minimize the impact to future development of the Brown property

These constraints dictated the design of the flyover / service road combination based upon the selection of the configuration in the Preliminary Design Phase. Significant flyover design features are as follows:

- The location of the flyover takes advantage of the existing topography. The profile of the crossing road is set to tie into the grade of the existing driveway immediately west of Highway 11
- The service road, west of Highway 11 utilizes the existing southbound lanes of Highway 11. These lanes will be abandoned upon the reconstruction of Highway 169. Two service road alignment scenarios exist dependant upon the phasing of the Hahne Farm development. Where the Hahne Farm road exists at the time of the flyover construction, Option "A" is the proposed service road alignment. Option "B" is the proposed service road alignment if the Hahne Farm Road is not yet constructed by the Town of Gravenhurst.
- The recommended flyover road alignment east of Highway 11 forms a tee-intersection with the existing Hewitt Street. The cul-de-sac west of this intersection remains under municipal jurisdiction and will permit the winter maintenance of this road.

Both the service road and the flyover must be operational before Hewitt Street and Pinedale Road are closed at Highway 11. The construction of the service road is dependant upon the completion of the Highway 11 realignment associated with the Highway 169 interchange. Therefore, the Pinedale Road / Hewitt Street flyover project must be constructed after the completion of the Highway 169 interchange reconstruction. There may be some consideration to combine these two projects together in order to minimize the environmental impact and traffic disruption and to benefit from the potential financial advantages of a larger contract.

6.2.3 Gravenhurst North Interchange and Airport Service Road

The recommended proposal for this project is based upon the following design factors:

- i) Reconstruction and reconfiguration of the existing partial interchange at Muskoka Road No. 41 to provide a full moves Parclo A interchange connecting Muskoka Road 41 to Muskoka Road No. 6
- ii) Construction of a service road along the east side of Highway 11 from the Gravenhurst north interchange to Highway 118, utilizing the proposed roadway through the Muskoka Airport industrial development
- iii) The upgrading of the portion of existing Taverner Road which forms part of the service road to the Muskoka Airport
- iv) The following at-grade intersections at Highway 11 are closed:
  - Doe Lake Road
  - Jones Road
  - Reay Road
  - Airport Road

The overall project requirements are shown on Plates 1 and 2 of the recommended network plans. The interchange layout is shown in detail on Plate Nos. 24 and 25.

The main constraints upon the design were as follows:

- Existing property and residential communities restricted the interchange location west of Highway 11. Also, salvage of the existing N-W ramp roadbed constrained the location of the interchange. On this basis, the minimum inner loop radius was used on the west side of the highway
- East of Highway 11, the existing residential community on Taverner Road dictated the alignment of District Road 6 east of Highway 11. Also, the TransCanada Pipe Line location required the use of the minimum inner loop radius to avoid multiple crossings of the utility

These constraints dictated the design of the interchange subsequent to the selection of the Parclo A layout in the Preliminary Design Phase. Significant interchange design features are as follows:

- The Muskoka Road 6 alignment uses the existing road allowance between Concession 4 and 5
- Due to high turn volumes, right turn channelization and left turn slip arounds are recommended at the ramp terminals
- Property must be protected for future Parclo A-4 ramps in the S-W and N-E quadrants
- The cul-de-sac at the south end of Taverner Road is reconfigured due to the S-EW ramp alignment
- Old Muskoka Road 6 is dead ended at the drive-in and access is maintained off the airport service road (Old Doe Lake Road)
- The old section of Taverner Road north of the new Muskoka Road 6 is upgraded to service road standards
- Approval from the National Energy Board is required for the TCPL crossing
- Location of the Clarke and Downes homes must be confirmed in detail design as locations shown on the plans are approximate
- The cul-de-sac west of Highway 11 requires reconfiguration with the construction of the W-S Parclo A-4 ramp

The airport service road runs parallel to Highway 11 along the east side of the highway from the Gravenhurst north interchange to Highway 118. North of Reay Road, the service road curves away from Highway 11 to align with the proposed Muskoka Airport development. The service road profile north of the airport, beyond the runway threshold, must be depressed to avoid conflict with the transitional and longitudinal approach slopes of the runway.

Access from the Skyways Motel / Shell Service Centre will be maintained to Highway 11. Entrance/exit tapers may require upgrading based upon the service centre and Highway 11 traffic volumes. The long term service centre requirement will be addressed in the overall service centre study on Highway 11 between Orillia and North Bay. As outlined previously, access to both Highway 11 and the airport service road will not be permitted.

Both the interchange and airport service road must be operational before the at-grade intersections are closed.

#### 6.2.4 Muskoka Road No. 37 Interchange

The property for the proposed interchange at this location is acquired and the project is presently in the Detail Design Phase (W.P. 61-86-00). This study does not recommend any revision to Parclo A-B configuration as shown in Plate No. 20.

An Environmental Study Report to address the environmental concerns related to the interchange will be prepared prior to construction.

#### 6.2.5 Highway 11 between Muskoka Road No. 37 and High Falls

The only existing at-grade intersection along Highway 11 between Muskoka Road No. 37 and High Falls Road is Kirk Line. The recommended network plans for this section are shown on Plate Nos. 3 and 4.

Due to the relatively low volumes at Kirk Line, it is recommended that the road be closed at Highway 11. The existing network of roads on either side of Highway 11 provide adequate access to the existing Taylor Road interchange. However, in order to provide year round access to residents and businesses along Kirk Line West, reconstruction at Cedar Lane is required. The realignment of Kirk Line West must be completed prior to the road closure on the west side. Kirk Line East may be closed at any time as Rosewarne Drive provides year round access to Highway 11 via the Taylor Road interchange.

#### 6.2.6 High Falls Road Interchange

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a Parclo A interchange north of the existing intersection
- ii) Realignment of High Falls Road and Holiday Park Drive across Highway 11
- iii) Construction of an access road along the west side of Highway 11 to provide access to the MNR facility, the power dam and the Bruckmuller residence. High Falls Road is dead-ended at Bruckmuller entrance and the existing substandard section of High Falls Road is closed.
- iv) Relocation of the BRMC entrance to Holiday Park Drive and the construction of a gravel access road connecting to the inner trail network of the BRMC
- v) Closure of the at-grade intersection at High Falls Road / Holiday Park Drive

The High Falls Road interchange layout is shown in detail on Plate Nos. 28, 29 and 30.

The main constraints upon the design were as follows:

- Provide adequate access to the MNR facility, the BRMC and the Holiday Park Drive community, yet minimize potential impacts. Also, the interchange must ultimately serve as the north terminus for the Bracebridge West by-pass, yet allow for an interim connection to High Falls Road.
- The existing Highway 117 E-N entrance ramp taper sets the southerly limit of the interchange location, while the rugged rising terrain is a constraint to the north
- In order to minimize impacts to the tributary to the Muskoka River, the existing structure across the watercourse is set as the match point for the westerly limit of High Falls Road connection

These constraints dictated the design of the interchange subsequent to the selection of the Parclo A layout in the Preliminary Design Phase. Significant interchange design features are as follows:

- The ramp alignments are calculated for a future 6-lane Highway 11 section. Compound curves are used to match into the existing 4-lane section
- Full channelization and a left turn slip around is recommended at the ramp terminal, on the east side of Highway 11 as the proposed gradient of the crossing road may affect the operational characteristics of the intersection
- The structure must be constructed to accommodate the future ramp speed change lanes and the future Highway 11 widening to 6-lanes. The existing median width dictates that widening must occur on the outside and therefore a longer bridge span is required
- Property must be protected for a future Parclo A-4 ramp in the NE quadrant
- The Holiday Park Drive connection provides access to the Holiday Park Drive community through presently undeveloped lands. Future development may dictate that alternative access be considered. The gravel road access to the BRMC could be realigned to connect with the north end of the residential subdivision
- The parking lot for the BRMC must be relocated alongside the gravel access road to replace the existing facility relocated from Highway 11 where access is closed
- The rugged terrain throughout this area requires that stopping sight distance be confirmed at the ramp terminals during the detail design phase
- The preliminary profile grades for the crossing road alignment, although acceptable, can be improved during the detail design phase if the Bracebridge by-pass is constructed or if an alternate access to the Holiday Park Drive community is considered
- Due to the existing Highway 11 upgrade, the speed change lane for the EW-N ramp is lengthened to compensate for the reduced vehicle performance on the grade



The interchange and crossing road realignment must be completed before the at-grade intersection at High Falls Road and Holiday Park Drive is closed.

The new entrance and parking facility for the BRMC must be operational before the existing BRMC entrance is closed.

#### 6.2.7 All Pine Cabins Road Flyover and Connection to Lone Pine Road

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a flyover north of the existing intersection
- ii) Construction of All Pine Cabins Road from east of Highway 11 to Lone Pine Road
- iii) Construction of an access road west of Highway 11 to service the adjacent properties
- iv) Closure of the existing at-grade intersection at the unnamed road allowance between Concession Nos. 10 and 11

The overall project requirements are shown on Plate No. 5 of the recommended network plans. The All Pine Cabins Road flyover layout is shown in detail on Plate Nos. 26 and 27.

The main constraints upon the design were as follows:

- Minimize the impact to the existing properties and therefore, locate the flyover north of the existing intersection. Also, align the Tall Pine Cabins Road to avoid the Wiebe residence at the intersection with Lone Pine Road

These constraints dictated the design of the flyover/service road combination subsequent to the Preliminary Design Phase. Significant flyover design features are as follows:

- Align the crossing road to match the existing road allowance east of Highway 11 in anticipation of further development along the Muskoka River

- Current traffic volumes do not warrant an interchange at this location, however, it is recommended that provisions for an ultimate interchange configuration be considered during the detail design phase. Substantial future development at this location or at Stephenson Road No. 1 will require a re-evaluation of the study recommendation prior to the detail design phase
- When the flyover is constructed, the bridge cross section, profile and span should be designed to accommodate an interchange at this location

The flyover and the new crossing road must be operational before the at-grade intersection is closed.

#### 6.2.8 South Mary Lake Road Interchange and Service Road South to Stephenson Road No. 1

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a Parclo A interchange south of South Mary Lake Road
- ii) Realignment and connection of Lone Pine Road and South Mary Lake Road across Highway 11
- iii) Construction of a service road along the east side of Highway 11 from South Mary Lake Road to the River Valley Estates subdivision located immediately north of Stephenson Road No. 1
- iv) Realignment of Stephenson Road No. 1 from east of Highway 11 to the River Valley Estates subdivision
- v) Upgrading of Stephenson Road No. 1 from west of Highway 11 to Lone Pine Road
- vi) Road closures at Stephenson Road Nos. 1 and 2 at Highway 11

The recommended interchange layout is outlined on Plate Nos. 31, 32 and 33 and the overall network proposals are shown on Plate No. 6.

The main constraints upon the design were as follows:

- The existing development along South Mary Lake Road and Greer Road dictates that the interchange be located south of the existing intersection
- The proximity of the railway to the west of Highway 11 and the requirement for a connection to Stephenson Road No. 4 requires that a minimum inner loop radius be used in the north west quadrant

These constraints dictated the design of the interchange subsequent to the selection of the Parclo A layout in the Preliminary Design Phase. Significant interchange design features are as follows:

- The crossing road is aligned to avoid grading impact or property acquisition at the existing Wychwood Plaza development at Highway 11
- Due to the high turn volumes to Port Sydney, full channelization for the S-E and E-S ramps are recommended
- Left turn slip arounds are used at the ramp terminals and at Stephenson Road No. 4 to improve the operational characteristics of the intersections
- Stephenson Road No. 4 is dead-ended at Highway 11 and access is provided via the new connection to Lone Pine Road
- The existing South Mary Lake Road is closed at Highway 11 and access to area business is provided via a new road connection to the realigned South Mary Lake Road. The Greer Road connection is aligned opposite the proposed service road south to Stephenson Road No. 2.

The new service road south to Stephenson Road No. 1 is parallel to Highway 11 for the section immediately south of South Mary Lake Road to Stephenson Road No. 2. South from this point to Stephenson Road No. 1, the service road utilizes the existing road allowance between Lots 15 and 16 and connects to the River Valley Estates subdivision. The roadway through the subdivision and the realignment of Stephenson Road No. 1 east of Highway 11 complete the service road work. The Stephenson Road No. 1 realignment is required to improve the road profile to acceptable year round standards.

Stephenson Road No. 1 west of Highway 11 is upgraded to provide year round access to Lone Pine Road. Lone Pine Road functions as a service road along the west side of Highway 11 connecting to the South Mary Lake Road interchange upon the closure of the at-grade intersections at Stephenson Road Nos. 1 and 2.

As discussed in Section 6.2.7, the study recommendations for Tall Pine Cabins Road and Stephenson Road No. 1 must be re-evaluated if there is substantial future development in this area. One alternative is a new interchange located at Stephenson Road No. 1, if the future traffic warrant this consideration.

The interchange, service road and the Stephenson Road No. 1 improvements must be completed before the at-grade intersection at Stephenson Road Nos. 1 and 2 are closed.

#### 6.2.9 Highway 141 Interchange

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a Parclo A interchange located south of the existing intersection
- ii) Realignment of Highway 141 and District Road No. 10 through the interchange
- iii) Closure of the existing Highway 141 and District Road No. 10 at Highway 11

The Highway 141 interchange is shown in detail on Plate Nos. 34 and 35. The main constraints upon the design were as follows:

- The existing natural topography at the crossing road location dictates that Highway 141 cross below Highway 11
- Existing property and a residential dwelling to the west of Highway 11 restricts the crossing road alignment and the inner loop ramp radius in the north west quadrant
- Access to the "old" sections of Highway 141 and District Road No. 10 must be maintained

These constraints dictated the design of the interchange subsequent to the selection of the Parclo A layout in the Preliminary Design Phase. Significant interchange design features are as follows:

- Full ramp channelization is provided for the N-W and W-N ramps
- Property must be protected for future Parclo A-4 ramps located in the SW and NE quadrants
- Left turn slip arounds are recommended at the ramp terminals to improve the operational characteristics of the intersections
- The structure span must accommodate the tapers for the ultimate E-N ramp
- The existing section of Highway 141 will terminate at the interchange ramp. A cul-de-sac will be provided and the road will be transferred to the municipality. Likewise, a cul-de-sac will be provided at the termination of District Road No. 10
- Stopping sight distance at the ramp terminals must be confirmed during the detail design phase. Additional bridge span or rock cut is a consideration for improving the sight distances

The interchange must be operational before the at-grade intersection is closed.

#### 6.2.10 Allensville Road / Rowanwood Road Interchange and Service Road to Stephenson Road No. 8

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a Parclo A-B interchange north of the existing intersection
- ii) Construction of a service road from the new interchange along the east side of Highway 11 to Stephenson Road No. 8. This service road utilizes upgraded portions of existing Rowanwood Road and Stephenson Road No. 8
- iii) Road closures for Stephenson Road No. 8 at Highway 11
- iv) Closure of the MTO picnic area located north of the interchange

The recommended interchange layout is shown on Plate Nos. 36 and 37 and the overall network proposals are outlined in Plate No. 7.

The main constraints upon the design are as follows:

- The existing development along Rowanwood and Allensville Road and the location of Bullen's Creek dictates that the interchange be located north of the intersection. Also, the alignment of the Rowanwood road extension must minimize impact to the creek
- The acute angle between Highway 11 and the existing Allensville Road / Rowanwood Road road allowance dictates the interchange/crossing road configuration
- The existing TransCanada Pipe Line location on the west side of Highway 11 restricts the inner loop radius to avoid multiple crossings of the utility. The Rowanwood Road extension must cross the utility on the east side of the highway
- The unnamed tributary to Spider Lake restricts the alignment of the EW-N ramp. The proposed ramp must parallel Highway 11 before the watercourse and utilize the existing concrete culvert to minimize the impact to the stream

These constraints dictated the design of the interchange subsequent to the selection of the Parclo A-B layout in the Preliminary Design Phase. Significant interchange design features are as follows:

- The structure arrangement must accommodate the tapers for the ultimate ramp channelization for the inner loops
- Property must be protected for the Parclo A-4 ramp in the southwest quadrant
- Left turn slip arounds are recommended at the tee-intersection for the ramp terminal and the connection to the Allensville Road cul-de-sac
- A right turn channelization is recommended at southwest quadrant of the crossing road intersection with Rowanwood Road to provide a "through" move for the eastbound traffic
- Approval from the National Energy Board is required for the TCPL crossings



The proposed service road connecting to this interchange is located along the east side of Highway 11. It utilizes the existing road allowance between Lot Nos. 25 and 26 (Rowanwood Road) and portions of existing Stephenson Road No. 8. The existing roadway must be upgraded to allow for year round use.

The existing intersections along Highway 11 at Stephenson Road No. 8 and Allensville Road / Rowanwood Road will be closed upon the completion of the interchange and construction of the east service road.

#### 6.2.11 Gryffin Lodge Road / Madill Church Road Interchange and Service Road to Stephenson Road 12

The recommended proposal for this project is based upon the following design factors:

- i) Construction of a Parclo B / diamond interchange immediately south of the existing intersection
- ii) Construction of a service road from the new interchange along the east side of Highway 11 to Stephenson Road No. 12
- iii) Closure of Stephenson Road No. 12 at Highway 11

The recommended layout for the interchange is shown on Plate Nos. 38 and 39 and the overall network proposals are outlined on Plate No. 8.

The main constraints upon the interchange design were as follows:

- The existing development west of the intersection restricted the interchange location
- The surrounding road pattern offers little flexibility in the selection of the ramp geometry
- The proximity of existing businesses on the west side dictates the use of a diamond ramp geometry
- Adequate access to Superior Propane and the Highway Motel must be maintained

These constraints dictated the design of the interchange subsequent to the selection of the Parclo B - diamond layout in the Preliminary Design Phase. Significant interchange design features were as follows:

- The crossing road design speed is lowered to 50 kph to allow for the direct connection into Ferguson Road on the west side of Highway 11
- The diamond ramp terminals are located to provide adequate stopping sight distance over the structure. The sight distances must be confirmed during the detail design phase
- A right turn channelization is recommended at the south west quadrant of the crossing road intersection with Gryffin Lodge Road to allow a "through" movement for eastbound traffic
- A continuous left turn slip around lane is recommended at the west ramp terminal and at the Madill Church Road intersection
- The Ferguson Road profile is set to allow for a reasonable entrance grade to the Highway Motel
- The Madill Church Road connection is aligned to minimize the property acquisition from the Imperial Oil property and avoid potential conflict with buried gasoline storage tanks. The tee-intersection with Ferguson Road is on the outside of the curve and set as far from the west ramp terminal as possible. This allows for greater operational efficiency at the ramp terminal and provides for adequate stopping sight distance

The proposed service road along the east side of Highway 11 requires upgrading of the existing section of Gryffin Lodge Road to year round standards and a new section of road southerly to Stephenson Road 12. This service road provides access to the cottage community along the north shore of Mary Lake. Residents on the west side of Highway 11 at Stephenson Road 12 access Highway 11 via Stephenson Road No. 14 to either the Allensville / Rowanwood Road interchange or the Madill Church Road / Gryffin Lodge Road interchange.

The interchange and the east service road must be operational before the at-grade intersection at Stephenson Road No. 12 is closed.

#### 6.2.12 Lindgren Road Flyover and Ferguson Road Connection

The recommended proposal at this location is based upon the following design factors:

- i) Construction of a flyover north of the existing intersection

- ii) Construction of a west service road from Ferguson Road to the existing Lindgren Road East
- iii) A realignment of Lindgren Road East across the flyover and intersecting with the west service road
- iv) Construction of the road connection between the existing Lindgren Road West and Bickley Country Drive
- v) Closure of Lindgren Road at Highway 11

The recommended layout for the flyover/service road combination is shown on Plate Nos. 40 and 41. The overall network proposal for this project is outlined on Plate No. 8.

The main constraints upon the flyover design were as follows:

- Impacts to the existing business located in the north-west quadrant and the proposed development along "Old" Highway 11 must be minimized
- The existing ESSO / Grandma Lee's service centre located south of the intersection must remain operational. On this basis, the Ferguson Road connection is aligned to minimize the grading impacts to the service centre
- Dual access (ie. from the north and south) to the Lindgren Road area must be maintained

The constraints dictated the design of the flyover / service road combination subsequent to the selection of the configuration in the Preliminary Design Phase. Significant flyover features were as follows:

- The flyover is located north of the existing intersection to take advantage of the existing topography. As a result, the view from the south of the existing model home site in the north-east quadrant is unaffected
- The Ferguson Road connection utilizes the "Old" Highway 11 R.O.W. The road profile immediately south of Lindgren Road is set to limit the grading impact to adjacent properties
- A left turn slip around is proposed at the crossing road tee-intersection with the west service road

- A simple open throat intersection with right turn tapers is proposed at Ferguson Road. The proposed skew angle for the intersection is the allowable minimum of 70°. This angle must be confirmed during the Detail Design Phase
- The proposed connection from existing Lindgren Road West to Bickley Country Drive utilizes the existing road allowance between the two roads

The flyover and service road connection must be operational before the at-grade intersection at Highway 11 is closed.

Access to the ESSO / Grandma Lee's service centre from Highway 11 will be maintained. Potential upgrading to the exit/entrance tapers is dependant upon future traffic volumes at this location. The long term service centre requirements for the Orillia-North Bay Highway 11 corridor will be addressed in a future services study. As outlined previously, access to both Highway 11 and the Ferguson Road connection will not be permitted.

#### 6.2.13

#### Muskoka Road 3 Interchange (north of Huntsville)

The proposal Parclo A interchange at this location is shown on Plate No. 21. The complete recommendations associated with this interchange are outlined in the Highway 11 - Huntsville to Burk's Falls One Stage Environmental Assessment / Route Planning Study (W.P. 82-81-00). This study does not make further recommendations to the selected design at this location.

### 6.3 Potential Environmental Impact

Section 4.0 of this report outlined the existing conditions in terms of natural, socio-economic and engineering environmental factors. This information is now applied to the recommended designs considering the public and agency concerns expressed throughout the study.

#### 6.3.1 Natural Environment

The implementation of the new flyovers, interchanges and service roads result in impact to the natural environment. The assessment of the various impacts and their mitigation is as follows:

##### Impact on Aquatic Life and Fish Habitat

The recommended plan has potential impacts on the existing fish habitat at several locations within the study area. This issue is significant based upon comments received from the Ministry of Natural Resources.

In most cases, only preliminary information on the watercourses and fish habitat was available from the Ministry of Natural Resources. Also, impacts are generally restricted to localized conditions, revisions to existing stream crossings and new crossings of minor creeks and intermittent streams. On this basis, it is recommended that the specific issues be dealt with at the time of detail design through the normal mitigation methods.

The Ministry is committed to minimizing the impacts to fisheries at each watercourse crossing. Fisheries investigation will occur at the time of detail design of the highway improvements and appropriate mitigation measures will be defined in the project environmental documentation.

##### Archaeological Resources

A detailed archaeological study was undertaken in conjunction with the work on the preliminary design. The study did not find any specific concerns or impact to archaeological resources. However, two issues were flagged for consideration in the detail design stage. These areas of concern include:

- Muskoka Cemetery at Airport Road
- Lake Algonquin shoreline

Work on the High Falls interchange area may require further archaeological investigations of the Lake Algonquin shoreline. Work for the airport service road must avoid impact to the Muskoka Cemetery.

Further study in these two areas during detail design of the respective projects will be considered. Environmental documentations will address any appropriate mitigation measures required. Also, ongoing construction monitoring will ensure that if archaeological remains are uncovered, appropriate notification is undertaken.

##### Erosion and Sedimentation Control

Erosion control is required at all construction sites and sedimentation into the receiving watercourses is controlled or eliminated. This is a normal requirement for projects in the proximity of watercourses. MTO is committed to the implementation of erosion and sedimentation control during construction of any of the project initiatives. Standard Ministry practice for control for sediments and erosion, at the time of construction, will be required for all construction work.

##### Jevins Lake

Concern was expressed regarding the impact of the Highway 11 realignment on Jevins Lake. These issues were addressed in part in the 1980 E.S.R. on W.P. 30-79-01. The impact of the road realignment on Jevins Lake will be revisited at the time of detail design for the Highway 11/169 interchange. Information, impacts and mitigation will be addressed in an E.S.R.

Another issue associated with Jevins Lake was the potholes located north and east of Highway 11. No impact is anticipated as these features are well off the existing and proposed highway alignment. Special provisions in construction contracts will also be utilized to protect these geological features from disturbance.

##### Bullens Creek

Concern was expressed regarding the impact of the Rowanwood / Allensville Road interchange upon Bullens Creek. The new interchange is located to minimize impact on the creek. This action, in conjunction with monitoring and erosion / sediment control measures, serve to mitigate any potential future problems.



### 6.3.2 Socio Economic Environment

Changes to the existing highway access conditions result in impact upon the existing socio-economic fabric of an area. A number of issues in this context are discussed as follows:

#### Additional Travel Time

Some existing properties which currently have direct sideroad access to Highway 11 will lose the access and be redirected to an adjacent interchange. This will result in increased travel times as a greater majority of the travel will be on lower tier roads and the layout of the road network may require out of the way travel (ie. travel north to an interchange to go south on Highway 11).

It is inevitable that the introduction of a full freeway system will cause these types of increased travel times for local property owners. However, study of the alternative road networks indicated that travel times and distances would not increase significantly. Therefore, on this basis, no major impacts to local property owners are expected. Also, the slightly increased travel time is offset by the increased safety and convenience of access to Highway 11.

#### Ministry Signing Policy

Many businesses expressed concern regarding directing highway traffic to their location. The change from the current situation to a freeway condition will result in more complex directions to businesses adjacent to sideroads without direct access to Highway 11. Currently, Ministry policy does not permit signing for business purposes within their controlled access highway designation limits.

A Ministry signing policy study is currently underway. The concerns expressed in this study will be forwarded to the committee investigating signing on highways and considered in the overall signing policy study.

### Economic Impacts Due to Access Revisions

Many local businesses were concerned about loss of business due to the changes to the Highway 11 access conditions. These concerns included:

- loss of highway visibility
- construction access
- indirect or out of the way access
- access closures resulting in lost business income
- property acquisition

In most cases, the loss of highway visibility is minimal. In a few localized situations, flyover locations or road / ramp embankments result in lost visibility from the highway. However, this lost visibility is generally countered by the fact that the business is located at an interchange location with higher traffic volumes and improved business conditions.

The concern regarding construction access is mitigated by ensuring that no main accesses to Highway 11 are closed during construction. Where possible, work is staged to maintain existing traffic during construction.

Indirect or out-of-the way access can be a problem. However, most existing businesses are located at major Highway 11 intersections where interchanges are proposed. The impact at these locations, such as at Gravenhurst north, South Mary Lake Road, Highway 141 and Madill Church Road, is minor. Other businesses are served by the new service road network paralleling Highway 11. In most cases, the increased travel time is marginal as the various local businesses are well served by the service road network.

Businesses serviced by new service roads are as follows:

Business / Area	Service Road
Muskoka Airport KOA Kampground	Airport service road
Fowler Construction Pilger Equipment & Sales	Rosewarne Drive
Muskoka Concrete	Greer Road to Highway 141 and Stephenson Road 8 to Rowanwood Road
Brooklyn Concrete	Stephenson Road 12 to Gryffin Lodge Road
Square "B" properties Lindgren Road West Industrial Area Lindal Cedar Homes Lindgren Pottery	Ferguson Road connection and Lindgren Road connection to Bickley Country Drive

Finally, some businesses are directly affected by the access changes. For some businesses access will be indirect and potentially undesirable. Businesses in this category include:

Muskoka Family Go Karts at Kirk Line  
Canuck Games at unnamed road allowance  
All Pines Cabins at unnamed road allowance  
Wegner Furniture at Stephenson Road 1

Businesses which are displaced by the proposed improvements would be compensated appropriately and will have the opportunity to relocate. The Ministry will not permit direct access for new commercial sites along this section of Highway 11. Businesses should consider relocation on adjoining sideroads.

The fact that no new commercial sites can establish along this section of Highway 11, combined with the anticipated traffic growth, including recreational traffic, will create a business environment whereby impacts to existing businesses are not expected to be significant in the longer term. In addition, the Ministry is currently evaluating signing options for businesses on highways such as this section of Highway 11.

The Ministry of Tourism and Recreation commented that tourist operators should be given advanced information about the project. The operators were involved in this study and are therefore aware of the project (many have been provided with copies of plans). The MTO will undertake to announce specific construction schedules as far ahead of time as possible.

Property Acquisition

Property acquisition is required at many of the interchange locations. Typically, the design of the interchange attempts to avoid built up areas and hence minimizes the outright purchase of private homes. However, some private home acquisition is required. The property acquisition requirements are shown on the recommended design plates.

In all property acquisition cases, the owners are entitled to normal rights under MTO's Property Acquisition Policies and, if necessary, under the Provincial Expropriation's Act. It is MTO policy to purchase properties needed for highway construction at market value. In instances where the owner indicates to the Ministry a "hardship case" caused as a result of the planning study, then the Ministry may proceed with immediate property acquisition on a willing seller / willing buyer basis. The Ministry will proceed with advance purchases and hardship purchases where appropriate under current legislation and policies. The Ministry will also endeavour to give property owners, whose land is required, as much lead time as possible in terms of acquisition dates.

A number of properties and businesses are affected in terms of indirect access conditions. These businesses will only be directly affected at the time of closure of the existing Highway 11 access, at some time in the future. The properties in this category would include the Muskoka Family Go Karts, Canuck Games, All Pines Cabins and Wegner Furniture.

Noise

Noise levels along this section of Highway 11 are not expected to increase with the implementation of the recommended interchanges and flyovers. However, slight increases in noise levels can be anticipated as the traffic volumes along Highway 11 increase.

6.3.3 Engineering Environment

In terms of engineering factors, concerns were expressed in terms of impact of the new interchanges upon the existing well and sewerage systems in the adjacent areas. Impact to well systems may be more of an issue than impact to existing sewer systems.

Prior to construction of the various projects, the Ministry will undertake a potable well assessment program. This will identify wells within the areas adjacent to the road improvements and document the well quantity and quality.

6.4 COMMITMENTS TO FUTURE WORK

During Detail Design and prior to proceeding with specific construction contracts, the Ministry will undertake appropriate environmental planning procedures. As a result of this planning, required documentation ranging in scope from an Environmental Study Report to Class 'C' environmental assessment files will be prepared.

Table 6.1 summarizes the concerns and commitments to future work made by the Ministry of Transportation as a result of this study.

TABLE 6.1

**SUMMARY OF CONCERNS / RESOLUTION / COMMITMENT TO FUTURE WORK  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
<b>1.0 GENERAL</b>					
1.1 Provision for a highway food/fuel service centre in the Huntsville vicinity	-Town of Huntsville	- Not part of this study but the ESSO/Grandma Lee's facility will continue to have Hwy 11 access for the immediate future	6.1.4	X	
1.2 Potential for uncovering of archaeological resources	-Ministry of Culture & Communications	- Study carried out by Settlement Surveys Ltd. which concluded that the potential archaeological impact is minimal - MCC to be notified immediately if archaeological remains are uncovered during construction	4.3 6.3.1	X	X
1.3 Potential interference with wells / sewage disposal systems	-Ministry of the Environment -Muskoka - Parry Sound Health Unit	- Adjacent well locations to be identified during detail design - MTO standard well assessment procedures to be implemented	6.3.3 6.3.3		X X
1.4 Potential sedimentation impacts to receiving watercourses	-Ministry of the Environment	- MTO standard erosion and siltation controls to be implemented during construction	6.3.1		X
1.5 Potential increased travel time due to changes and driver confusion during construction	-Ministry of Tourism & Recreation	- Detours to be signed according to the manual of Uniform Traffic Control Devices	6.3.2		X
1.6 Signing along highway corridor	-Ministry of Tourism & Recreation -Local area businesses	- The ongoing MTO signing policy study will address business signing issues	6.3.2		X
1.7 Potential increased travel times for emergency vehicles due to removal of existing at-grade intersections	-Huntsville District Ambulance Service	- Emergency turn around to be considered in the vicinity of Stephenson Road 1 to reduce response times due to the divided highway layout - Remaining areas are serviced adequately by the interchange and service road network	6.1.7	X	X
1.8 Provision for snowmobile crossings	-Ontario Federation of Snowmobile Club	- Snowmobile crossings will be considered in the design of future interchanges and flyovers in areas of high snowmobile traffic	6.1.6		X



TABLE 6.1

**SUMMARY OF CONCERNS / RESOLUTION / COMMITMENT TO FUTURE WORK  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
1.9 Retain the existing school bus transportation network	-Muskoka Board of Education	- Access provided to all existing properties along Highway 11. Only minor route alterations would be required by the proposed improvements	6.2.1 to 6.2.13	X	
1.10 Assess safety of rail crossings due to traffic increases	-CN Rail	- No new railway crossings are proposed		X	
1.11 Potential business impacts due to revised access conditions	-Local businesses	- Highway 11 access provided to all existing properties via the service road, interchange and flyover network - Access will be maintained to all businesses during construction	6.3.2 6.3.2	X X	
1.12 Concern regarding the maintenance of the Highway 11 corridor in terms of litter and debris	-Individual	- Not part of this study. This comment was forwarded to District Office for consideration		X	
<b>2.0 HIGHWAY 169 INTERCHANGE AND HAHNE FARM SERVICE ROAD</b>					
2.1 Existing limited access to Town is a concern	-Town of Gravenhurst -Gravenhurst Board of Trade	- New interchange proposal provides full access at Highway 11/169	5.2.1	X	
2.2 Impact to Jevins Lake due to the revised Highway 11 alignment proposed in W.P. 30-79-01 (salt runoff into the lake and impact to plant species (tuckahoe)	-District of Muskoka -Muskoka Heritage Areas Program -Ministry of Natural Resources	- Environmental issues to be addressed during detail design and an Environmental Study Report will be prepared at that time and address salt runoff into the lake and the impact upon the rare plant species	6.3.1		X
2.3 Concern regarding the impact on the potholes located north of Jevins Lake	-District of Muskoka -Ministry of Culture & Communications -Muskoka Heritage Areas Program	- A site archaeological assessment was undertaken including an investigation of the potholes. No impacts are anticipated as the potholes are outside of the potential construction impact area. - Contract special provisions to be written to protect the potholes from construction activities	6.3.1	X	X
2.4 Impact of interchange on two streams	-Ministry of Natural Resources	- Stream and fisheries impacts to be addressed in a future ESR	6.3.1		X

TABLE 6.1

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HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
<b>3.0 PINEDALE ROAD / HEWITT STREET FLYOVER</b>					
3.1 The town requested use of the abandoned section of Highway 11 SBL for use as a local industrial road	-Town of Gravenhurst	- The Hahne Farm service road, west of Highway 11, is designed to use the Old Highway 11 SBL roadbed and to fit within the plan of subdivision for the adjacent subdivision development	6.2.2	X	
3.2 Concern expressed over access to Hewitt Street and the visual aesthetics of the flyover	-Gull & Silver Lakes Residents Association	- The existing level access is not consistent with an ultimate freeway design, due to safety and traffic flow - An investigation of a tunnel versus the flyover options favoured the flyover - Access to Highway 11 is maintained via the Hahne Farm Road and the flyover	5.3.2	X X X	
3.3 Concerns regarding traffic noise on the Gull Lake narrows bridge, pollution of the lake by highway runoff and the residents association requested consideration to relocate Highway 11 east of Gull Lake	-Gull & Silver Lakes Residents Association	- Previous study concluded that noise was caused by vibration of structure, therefore, sound barriers would not reduce noise - MTO drainage policy excludes use of pumps and storage tanks due to high maintenance, cost and space requirements. The existing highway drainage cannot be collected in water holding tanks as suggested. - Rerouting of Highway 11 is outside of the scope of this study	5.3.2  Appendix Appendix	X  X X	
3.4 Concern was expressed regarding winter maintenance and snow plowing	-Gull & Silver Lakes Residents Association	- Winter maintenance is the responsibility of the Town of Gravenhurst. The new design provides for turnaround areas for municipal snow plows	5.3.2	X	
3.5 Concerns were expressed including: - minimize expropriation of property - no parking to be permitted on the ramps or the flyover - minimize tree removals - the rural character of Hewitt Street is to be maintained	-Gull & Silver Lakes Residents Association -Individual	- The study of Hewitt Street access alternatives attempted to minimize property acquisition - Parking on the flyover will not be permitted by the Ministry - The road alignment to Hewitt Street minimizes the removal of trees - The road cross section over the flyover is designed to tighten up and match the existing Hewitt Street cross section	5.3.2	X  X X	X

TABLE 6.1

**SUMMARY OF CONCERNS / RESOLUTION / COMMITMENT TO FUTURE WORK  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
<b>4.0 GRAVENHURST NORTH INTERCHANGE AND AIRPORT SERVICE ROAD</b>					
4.1 Concern regarding the directional nature of the existing interchange	-Gravenhurst Board of Trade -Town of Gravenhurst -Ontario Provincial Police	- The new interchange will provide full access in all directions	6.2.1	X	
4.2 Concern regarding access to existing and proposed developments and the Town of Gravenhurst Public Works Yard	-Town of Gravenhurst -Individuals	- Access to Highway 11 is provided via the new interchange, along Winhara Road and along the new airport service road between Doe Lake Road and Highway 118	6.2.1	X	
4.3 Access and visibility of the Skyways Motel and the Shell service centre	-Ministry of Tourism & Recreation -Local business	- Direct access to Hwy 11 for the motel/service centre is not altered - Visibility of the existing establishment is unchanged	6.1.4	X X	
4.4 Concern regarding the airport development and its integration into the future service road network	-Town of Gravenhurst	- Service road aligned to incorporate the proposed subdivision road	6.2.3	X	
4.5 Potential tourist attraction and rest stop near Highway 118 for a 45th parallel landmark	-Town of Bracebridge	- Access for the facility would be from Highway 118		X	
4.6 Possible future water and sewer crossing in Hwy 118 area	-District of Muskoka	- Future detail design work will account for any new services			X
4.7 Potential impact upon the Muskoka Cemetery and associated archaeological resources	-Ministry of Culture & Communications	- Archaeological assessment carried out and no impacts were identified - Special provisions in the construction contract will protect resources not presently identified	4.3 6.3.1	X	X
4.8 Muskoka Airport glide path clearance conflicts with the service road elevation	-Transport Canada	- Road profile depressed to avoid conflict with airport operations - No approval in principle received from Transport Canada. Approval to be obtained during detail design	6.2.3	X	X

TABLE 6.1

**SUMMARY OF CONCERNS / RESOLUTION / COMMITMENT TO FUTURE WORK  
HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
4.9 A full interchange is desired at the Muskoka Airport for promotion of the industrial area expansion	-Gravenhurst Board of Trade	<ul style="list-style-type: none"> <li>Investigations concluded that the optimal interchange location is at Muskoka Road 41 and 6</li> <li>The airport is well serviced by the adjacent interchanges (Doe Lake Road &amp; Highway 118) and the new service road network</li> </ul>	5.3.2	X	
4.10 Connect Doe Lake Road and Reay Road east of Highway 11	-Gravenhurst Board of Trade	<ul style="list-style-type: none"> <li>The design incorporates this recommendation in the airport service road design</li> </ul>	6.2.3	X	
4.11 A number of alternative locations and configurations for the interchange in the Doe Lake Road vicinity were received for consideration	-Individual	<ul style="list-style-type: none"> <li>Investigations concluded that the alternatives proposed were inferior to the recommended interchange proposal</li> </ul>	5.4.1	X	
4.12 Emergency response times to Winhara Road, Reay Road and Muskoka Airport	-Gravenhurst Fire Dept.	<ul style="list-style-type: none"> <li>Access is provided via the Highway 118 interchange or via the Gravenhurst north interchange and the airport service road network</li> </ul>	6.1.7	X	
4.13 Impact to properties on Taverner Road	-Local residents	<ul style="list-style-type: none"> <li>Location of Muskoka Road 6 revised to minimize impact on existing homes</li> </ul>	5.4.1	X	
4.14 Impact of interchange and service road on three streams and wetland areas	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>Stream, wetland and fisheries impacts to be assessed and addressed in a future environmental documentation</li> </ul>	6.3.1		X
<b>5.0 MUSKOKA ROAD 37 INTERCHANGE</b>					
5.1 Need for a bypass south of Bracebridge	-Town of Bracebridge	<ul style="list-style-type: none"> <li>Consideration of a south Bracebridge bypass is outside of the scope of this study. Currently, Highway 118 serves this purpose</li> </ul>		X	
5.2 Concern regarding the impact of the interchange upon the adjacent residential areas both east and west of Highway 11	-Town of Bracebridge -Individual	<ul style="list-style-type: none"> <li>No property is required as property acquisition is complete</li> <li>Any other impacts (noise, aesthetics etc.) will be addressed in the ongoing ESR for the interchange work</li> </ul>	6.2.1	X	X



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HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
5.3 Concern regarding impact to the Sharpes Creek Valley Candidate Heritage Area and Area of Natural and Scientific Interest and the South Falls Candidate Heritage Site	-Muskoka Heritage Area Program -Ministry of Natural Resources	- The interchange location at Muskoka Road 37 rather than Fraserburg Road eliminates potential impact to the candidate heritage area - Muskoka Road 37 interchange is not expected to impact the South Falls Canyon. Detail design and the ESR will address any specific concerns	5.3.2  5.3.2	X	X
5.5 An overpass is required if Highway 11 access is not closed as increasing traffic volumes contribute to a dangerous situation	-Ontario Provincial Police	- Construction of the recommended interchange will resolve this situation	6.2.4	X	
<b>6.0 HIGHWAY 11 AND SIDEROADS BETWEEN M.R. 37 AND HIGH FALLS ROAD</b>					
6.1 Consideration for a full interchange at Fraserburg Road was suggested by the Town	-Town of Bracebridge -District of Muskoka -McKay Lake CA	- A detailed engineering, environmental and social evaluation of interchange alternatives recommended Muskoka Road 37 as the preferred location over the Fraserburg Road alternative	5.3.2 Appendix	X	
6.2 The Town and District requested the upgrading of Fraserburg Road between Highway 11 and Bracebridge Street	-Town of Bracebridge -District of Muskoka	- No Fraserburg Road upgrading recommended by this study. - The Ministry recognizes the substandard nature of the road and is investigating alternative subsidy options	5.3.2	X	X
6.3 Impacts to Sharpes Creek Valley Candidate Heritage Area and Area of Natural and Scientific Interest	-Muskoka Heritage Area Program -Ministry of Natural Resources	- No change is proposed at Fraserburg Road, therefore no impact is anticipated	5.3.2	X	
6.4 Property impacts at Fraserburg Road	-Individual	- No property impacts will occur as no changes are proposed	5.3.2	X	
6.5 Closure of Highway 11 access at Kirk Line results in winter assess constraints at Cedar Lane and Kirk Line due to the existing road grade	-Town of Bracebridge	- Kirk Line will be realigned and regraded prior to closure of access to Highway 11. Access to Cedar Lane will be maintained on a year round basis	6.2.5	X	
6.6 Concern regarding sight distance for merging traffic from the N-W ramp to westbound on Taylor Road	-District of Muskoka	- MTO District notified of the operational difficulties		X	

TABLE 6.1

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HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
<b>7.0 HIGH FALLS ROAD INTERCHANGE</b>					
7.1 Need for a bypass from Highway 11 to Highway 118 west of Bracebridge	-Town of Bracebridge	<ul style="list-style-type: none"> <li>Interchange designed to provide flexibility</li> <li>Future bypass study in progress</li> </ul>	6.2.1	X	X
7.2 Year round access to Holiday Park Drive properties	-Town of Bracebridge	<ul style="list-style-type: none"> <li>Access provided via interchange and a new connection to Holiday Park Drive</li> </ul>	6.2.6	X	
7.3 Potential for archaeological materials due to former Lake Algonquin shoreline	-Ministry of Culture & Communications	<ul style="list-style-type: none"> <li>Archaeological and cultural assessment found no resources</li> <li>Further archaeological work proposed during detail design in addition to monitoring of construction activity to ensure immediate notification if archaeological remains are encountered during construction</li> </ul>	4.3 6.3.1	X	X
7.4 Concern regarding impacts to MNR buildings and trailers and restrictions on future expansion to the facility	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>Full access is provided to High Falls Road and Highway 11 via the new interchange</li> <li>No relocation or reorientation of the existing MNR facility is required</li> <li>The interchange location does not restrict future expansion of the MNR facility</li> </ul>	6.2.6	X X X	
7.5 Access to BRMC lands west of Highway 11	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>New access to BRMC lands will be provided off the relocated High Falls Road</li> </ul>	6.2.6	X	
7.6 Access to the BRMC on the east side of Highway 11 must be considered to replace the existing parking facility and access for recreational uses	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>A new access is provided to the BRMC from Holiday Park Dr. A parking area and a gravel access to the internal trail system for recreational uses and the occasional logging or maintenance vehicle</li> <li>Site details of parking/access to be reviewed in detail design</li> </ul>	6.2.6	X	X
7.7 Concern regarding the access location to Holiday Park Drive, headlight intrusion upon the existing properties, steep road grades and property acquisition requirements	-Holiday Park Drive residents	<ul style="list-style-type: none"> <li>Alternative access to the north end of the community is considered. Requested input from the community regarding the preferred access locations. Both alternatives to be reviewed in detail design</li> </ul>	6.2.6		X

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ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
7.8 Impact to stream crossing High Falls Road and to north branch of Muskoka River due to embankment widening	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>- New High Falls Road connection matches the existing road alignment east of the stream thereby avoiding impact</li> <li>- Minor infill of river due to ramp S.C.L. can be managed by control of construction operations. Methods to be addressed in future environmental documentation</li> </ul>	6.2.6	X	X
<b>8.0 TALL PINES CABINS FLYOVER AND CONNECTION TO LONE PINE ROAD</b>					
8.1 Concern regarding the loss of direct access to Highway 11 and the impact upon property values, business viability and future development potential	-Local residents -Local businesses	<ul style="list-style-type: none"> <li>- Access to the site is provided from Lone Pine Road via the new road connection</li> <li>- Flyover to be constructed to interchange standards in order not to preclude an interchange at this location, depending upon future development</li> </ul>	6.2.7	X	X
8.2 Property owner impact at Lone Pine Road	-Local residents	<ul style="list-style-type: none"> <li>- Connection to Lone Pine Road Realigned to avoid existing home</li> </ul>	6.2.7	X	
<b>9.0 SOUTH MARY LAKE ROAD INTERCHANGE AND SERVICE ROAD SOUTH TO STEPHENSON ROAD 1</b>					
9.1 Roadbed condition of Stephenson Road 1 west of Highway 11	-Town of Bracebridge	<ul style="list-style-type: none"> <li>- Stephenson Road 1 west of Highway 11 to be upgraded to year round use</li> </ul>	6.2.8	X	
9.2 Steep grade and bridge load restrictions preclude year round use of Stephenson Road 1 east of Highway 11	-Town of Bracebridge -Town of Huntsville -2 individuals	<ul style="list-style-type: none"> <li>- Provide a new road connection to Highway 11 from the subdivision road to avoid the steep grade of Stephenson Road 1.</li> <li>- The Town will investigate upgrading of the Muskoka River bridge</li> </ul>	6.2.8	X	X
9.3 Impact of new service road on a number of small coldwater creeks	-Ministry of Natural Resources	<ul style="list-style-type: none"> <li>- Stream and fisheries impacts to be evaluated and addressed in a future environmental documentation</li> </ul>	6.3.1		X
9.4 Upgrade Lone Pine Road to a higher standard	-Town of Huntsville	<ul style="list-style-type: none"> <li>- No significant truck traffic is anticipated. The existing road condition is adequate for the intended usage</li> </ul>	6.2.8	X	

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HIGHWAY 11: PRELIMINARY DESIGN STUDY FOR AN ULTIMATE FREEWAY DESIGN**

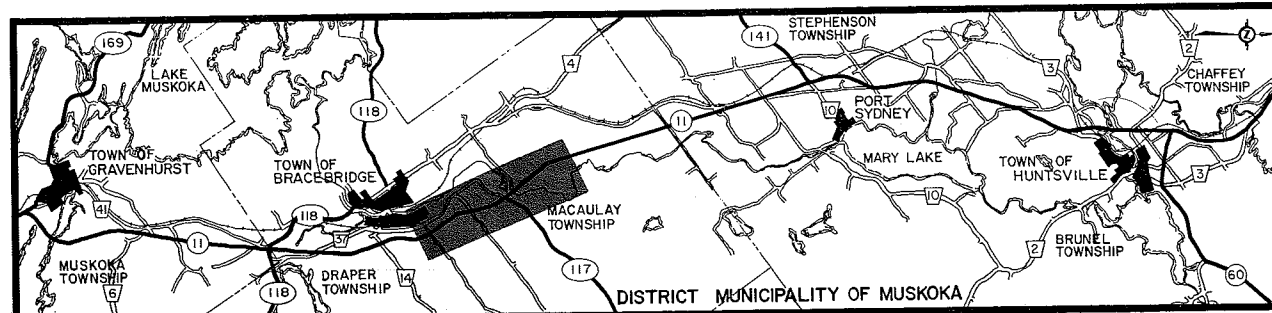
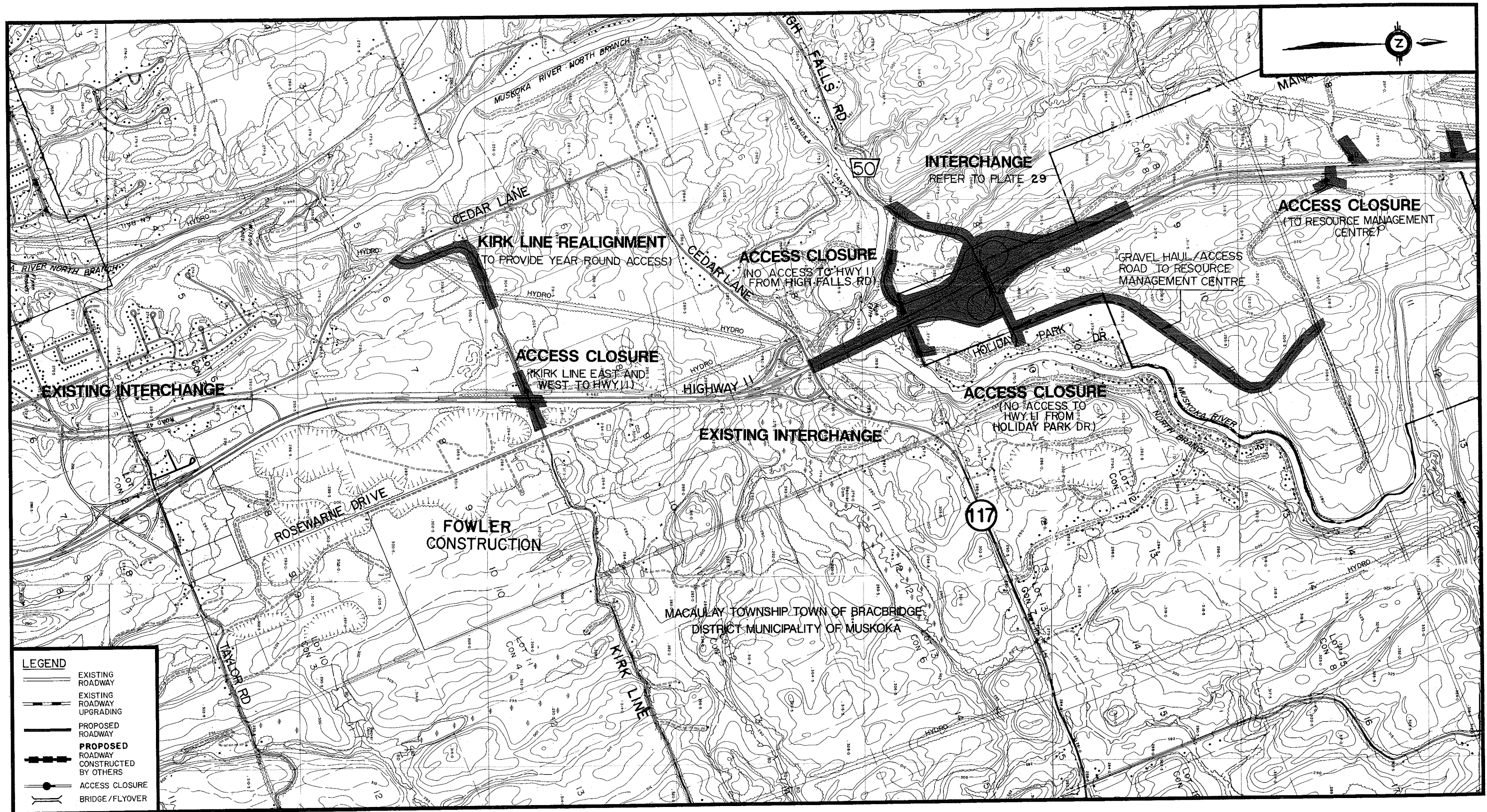
ISSUES	EXPRESSED BY	RESOLUTION	REPORT REFERENCE SECTION	RESOLVED BY	
				Present Study	Future Work
9.5 Impact to businesses east of Highway 11 at South Mary Lake Road	-Local businesses -Individuals	- Access to the local businesses maintained from the new interchange via a road connection to Greer Road	6.3.2	X	
9.6 Impact to business at Stephenson Road 1 west of Highway 11	-Local businesses	- Stephenson Road 1 upgraded to year round use. Access maintained via Lone Pine Road and South Mary Lake interchange. - A future interchange at Stephenson Road 1 is not precluded	6.3.2 6.2.8	X	X
<b>10.0 HIGHWAY 141 INTERCHANGE</b>					
10.1 District Road 10 through Port Sydney offers little opportunity for widening	-District of Muskoka	- No widening proposed. Provision of an interchange at South Mary Lake Road directs traffic to bypass Port Sydney		X	
10.2 Highway 141 and District Road 10 are major routes utilized by fire and emergency vehicles	-Huntsville Fire Dept.	- New Highway 141 interchange provides full access in all directions - Access will be maintained during construction	6.2.9	X	X
10.3 Existing hazardous Highway 11 crossing condition when snow is piled in the median – current maintenance procedures do not solve the problem	-Ontario Provincial Police	- The new interchange will resolve this concern by eliminating the at-grade crossing - Maintenance concern forwarded to the MTO District office		X X	
<b>11.0 ALLENSVILLE ROAD/ROWANWOOD ROAD INTERCHANGE AND SERVICE ROAD TO STEPHENSON ROAD 8</b>					
11.1 Potential impact to Bullens Creek	-Ministry of Natural Resources	- Proposed interchange located north to avoid impact to the stream - Aquatic/fisheries resource to be reviewed during detail design	6.3.1	X	X
11.2 Impact to an adjacent property including property acquisition and relocation of new facilities	-Business at Stephenson Road 8	- The service road alignment was revised to avoid conflict with the business operations	6.3.2	X	
11.3 Impact of new service road on a number of streams	-Ministry of Natural Resources	- Stream and fisheries impacts to be evaluated	6.3.1		X



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				Present Study	Future Work
<b>12.0 GRYFFIN LODGE ROAD/MADILL CHURCH ROAD INTERCHANGE AND SERVICE ROAD TO STEPHENSON ROAD 12</b>					
12.1 Potential impact to two minor creek crossings of the new service road	-Ministry of Natural Resources	- Aquatic/fisheries resource to be assessed during detail design	6.3.1		X
12.2 Property impact, access and visibility at the Highway Motel	-Ministry of Tourism & Recreation -Local business	- Potential property swap with surplus lands to the west - Access is maintained via the new interchange	6.3.2	X	X
<b>13.0 LINDGREN ROAD FLYOVER AND FERGUSON ROAD CONNECTION</b>					
13.1 Provide a connecting road through industrial park from Lindgren Road West to Bickley Country Drive	-Town of Huntsville	- New road connection provided	6.2.12	X	
13.2 Access to Huntsville and emergency vehicle access	-Lindgren Road residents	- Review of six alternatives. Consensus on the Lindgren Road flyover scheme as proposed	5.3.2 Appendix	X	
13.3 Access for the general public to business on Lindgren Road	-Local businesses	- To be addressed by MTO signing policy study	6.3.2		X
13.4 Visibility, property requirements and access to new development on the west side of Highway 11	-Local businesses	- Service road alignment and property requirements co-ordinated with the developer		X	
<b>14.0 MUSKOKA ROAD 3 INTERCHANGE</b>					
14.1 Impact to Big East River Candidate Heritage Area	-District of Muskoka	- New interchange proposal is under a full environmental assessment as part of the adjacent study, W.P. 82-81-00		X	



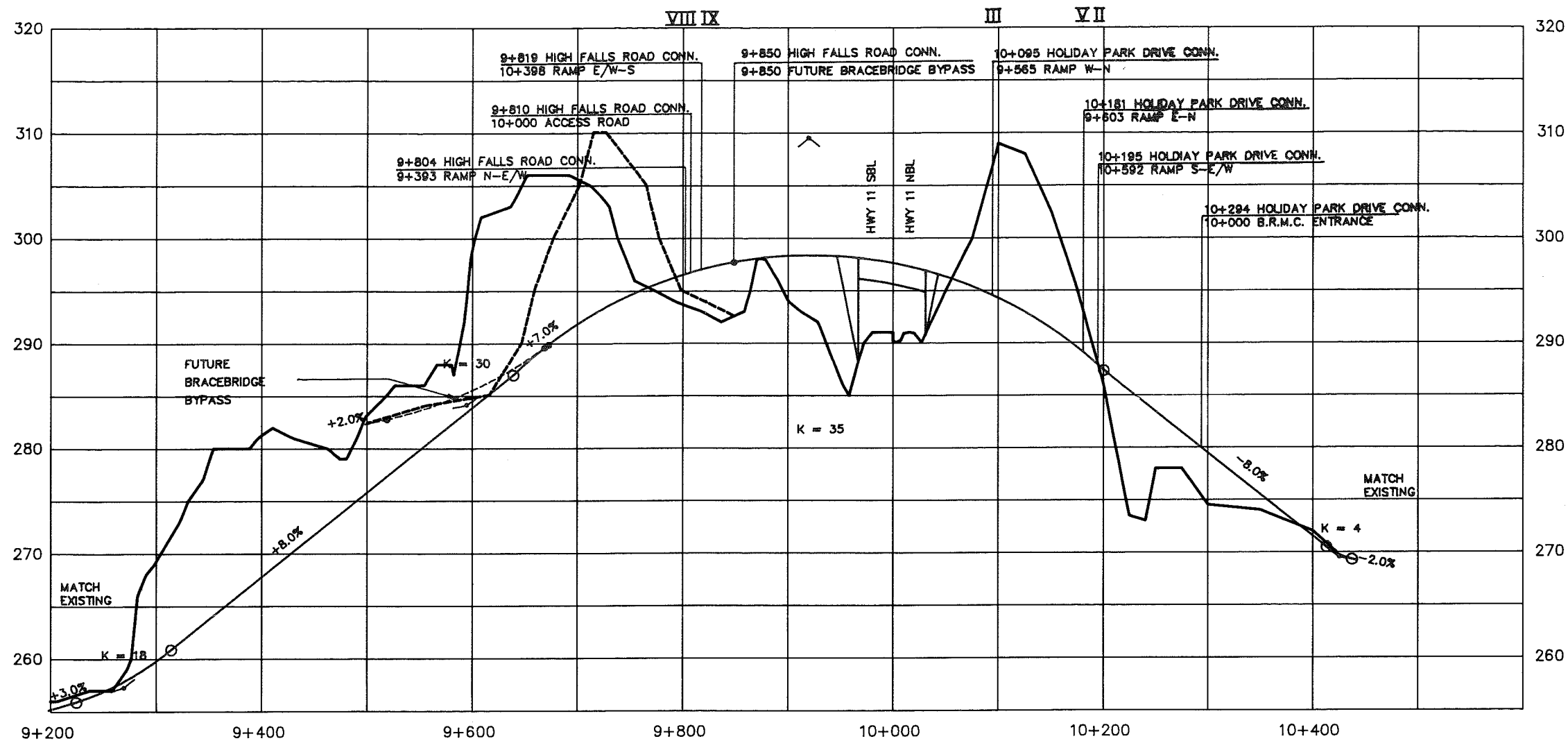
# RECOMMENDED NETWORK

FROM  
TAYLOR RD.

TO  
BRACEBRIDGE RESOURCE  
MANAGEMENT CENTRE

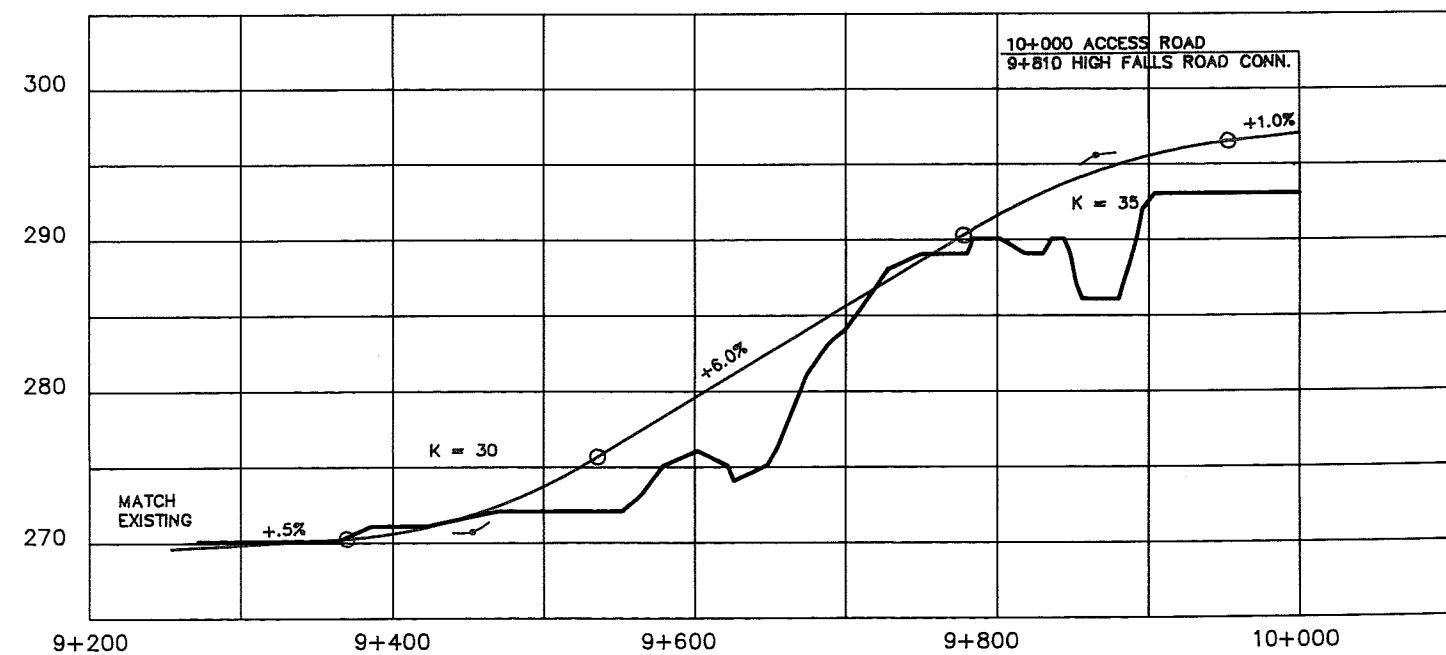
PLATE  
4

SCALE  
300 200 100 0 100 200 300



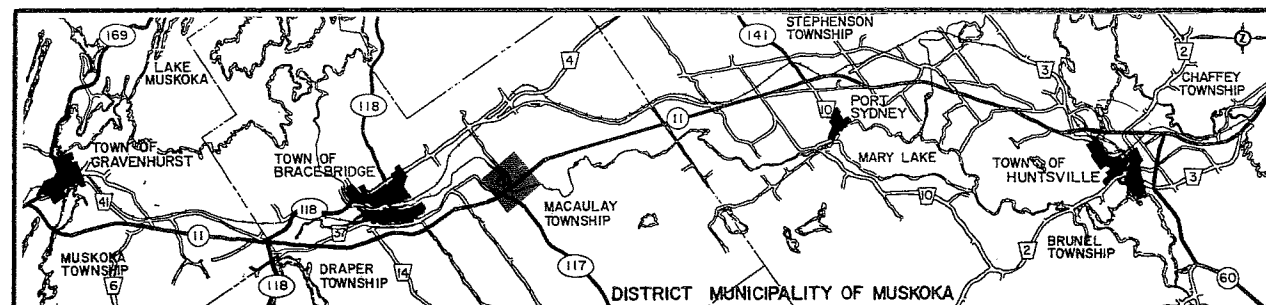
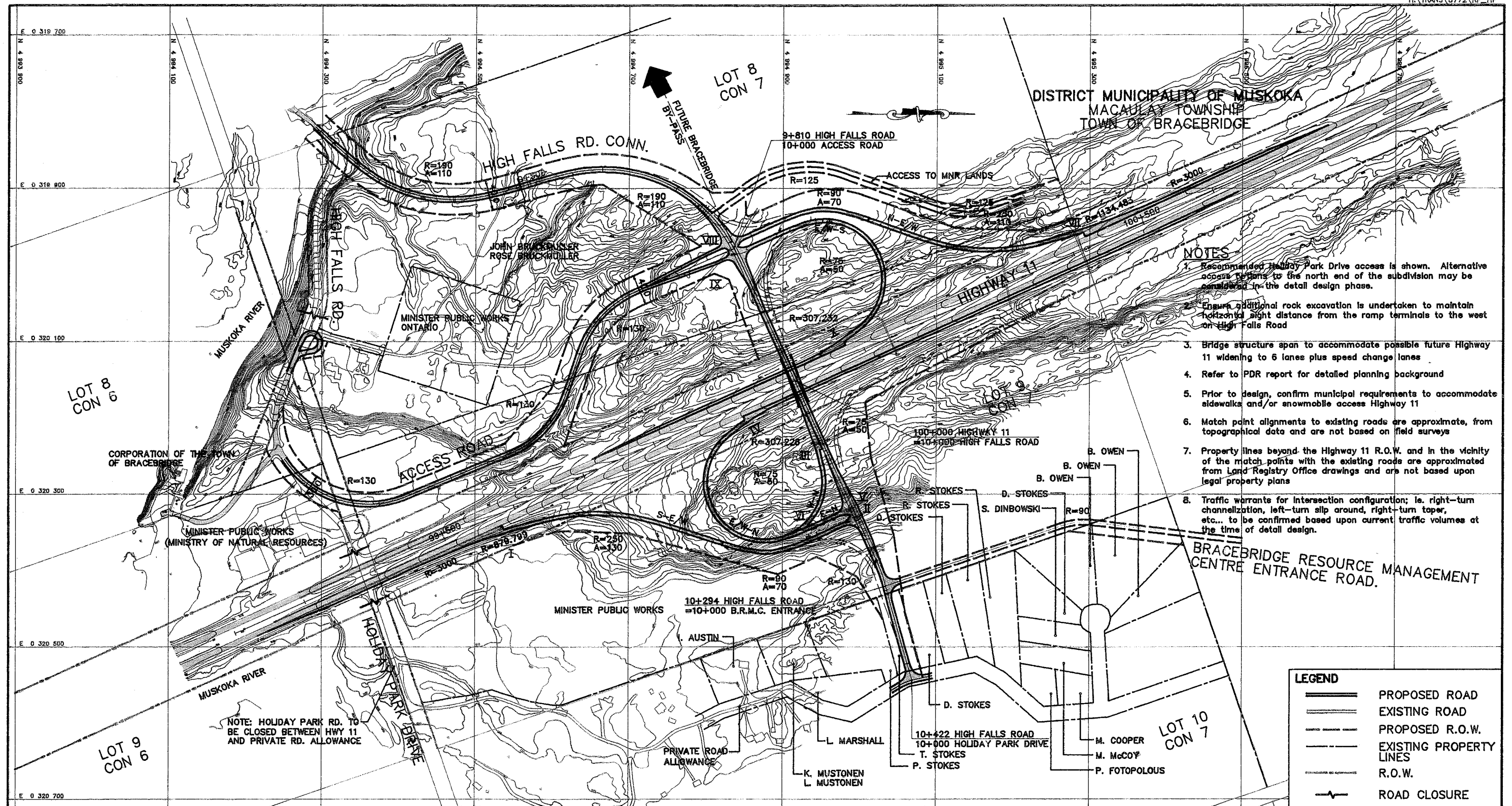
HIGH FALLS ROAD CONNECTION

HOLIDAY PARK DRIVE CONNECTION



ACCESS ROAD





## RECOMMENDED CONFIGURATION

### HIGH FALLS ROAD INTERCHANGE

PLATE

**29**

SCALE

50