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**APPENDIX M**  
**NOISE MEMO**

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**Ministry of Transportation  
Southwestern Region**

**W.P. 408-88-00**

**Highway 7 - Kitchener to Guelph**

**Amendment to the Environmental Assessment**

**NOISE ASSESSMENT REPORT**



**October 2002**

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## 1. INTRODUCTION

As part of the Environmental Assessment for Highway 7 from Kitchener to Guelph, a noise analysis was carried out to determine the potential noise impacts of the proposed highway.

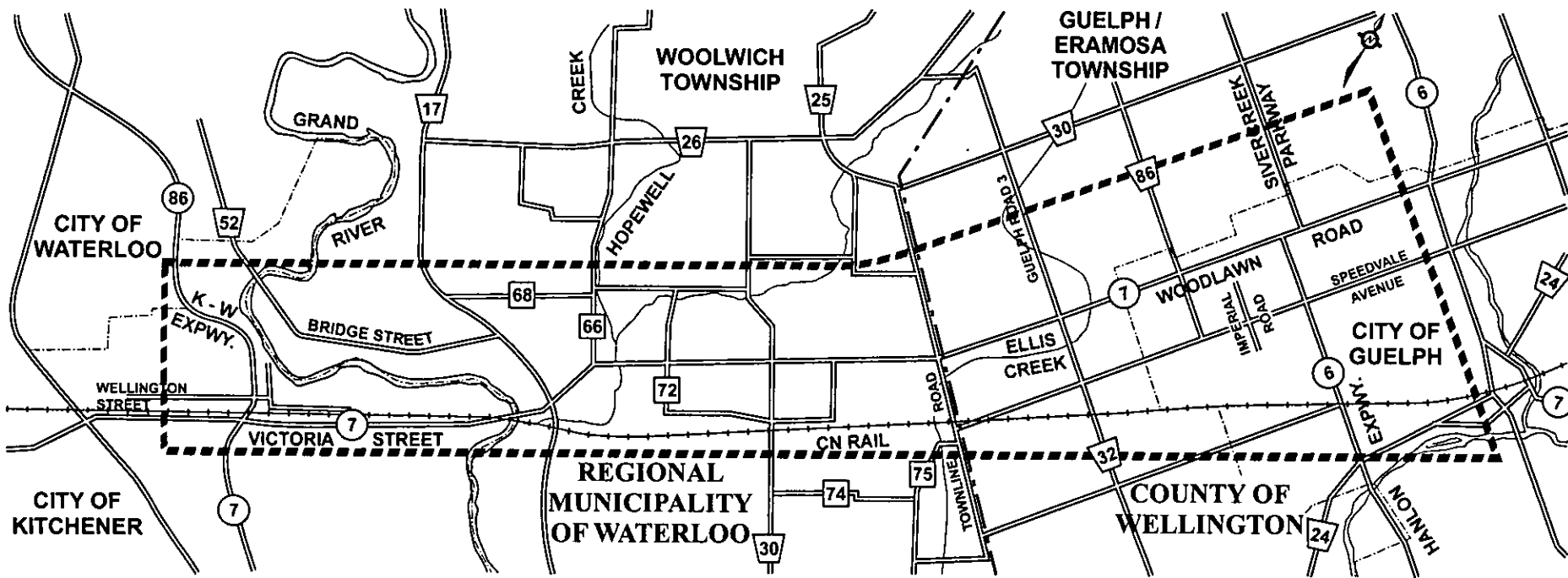
The study area, as shown on Exhibit 1, extends from the Kitchener-Waterloo Expressway (KWE) in the Regional Municipality of Waterloo (RMW), easterly to the Hanlon Expressway (Highway 6) in the City of Guelph. Within the RMW, the study area extends north of the community of Bridgeport and Woolwich Road 68 to approximately 700 m south of the CN rail line. Within the County of Wellington, the study area extends north to a location mid-way between County Road 30 and Woodlawn Road, with the south limits paralleling approximately 700 m south of the CN rail line.

The Ministry of Transportation (MTO) carried out the detailed noise analysis for the Recommended Route for Highway 7 from Kitchener to Guelph and their consultants, McCormick Rankin Corporation (MRC), summarized and interpreted the results for review with MTO. The analysis determined the potential noise impacts of the proposed highway on existing noise sensitive areas (NSA's) in the vicinity of the proposed alignment. An NSA is defined as the outdoor living area of a private home, townhouse, apartment building or hospital. The analysis compared future noise levels at these sites without the proposed highway against noise levels with the proposed highway.

## 2. METHODOLOGY

The noise analysis followed the Ministry of Transportation (MTO) / Ministry of Environment (MOE) Noise Protocol and MTO Noise Manual. Based on the MTO/MOE Noise Protocol, where a highway construction project is proposed through or adjacent to an existing or draft approved residential area, the Ministry shall investigate the feasibility of attenuating noise where impacts are significant ( $> 5$  dBA). The objective shall be to reduce noise levels, where warranted, to as close to 55 dBA or pre-construction ambient as is technically or economically feasible.

Future noise levels from the proposed undertaking are based on traffic projections 10 years after completion of the undertaking. Where traffic projections 10 years after completion are not available, the best available data may be used. For this project, 2016 traffic projections have been used in assessing future noise levels (see Appendix A).



----- STUDY AREA

HIGHWAY 7 PLANNING STUDY  
KITCHENER TO GUELPH

STUDY AREA

EXHIBIT  
1

In order to determine a noise impact, a comparison shall be made between the “do nothing” alternative in the future (2016) and noise levels with the undertaking at the same date. The significance of a noise impact will be calculated by comparing these two sound levels. The significance will be qualified by using the objective of 55 dBA in addition to the change in noise level above the ambient sound level.

Where a new or expanding highway adjacent to a noise sensitive land use is predicted to result in a noise level increase of 5 dBA or less, there is no need as part of the environmental assessment to implement noise control measures as the impact is considered to be slight. Where a new or expanding highway adjacent to a noise sensitive land use will result in a noise level increase of greater than 5 dBA, 10 years after completion, the Ministry shall investigate noise control measures within the highway right-of-way. Noise control measures, where applied will be designed to achieve levels as close to, or lower than, the objective of 55 dBA or pre-construction ambient noise levels as is technically or economically feasible. Noise control measures, where applied, should be cost effective and achieve a minimum attenuation of 5 dBA averaged over the first row of receivers.

STAMINA 2.0 computer modelling program was used to assess future noise levels given the complexity of the new highway alignment. STAMINA 2.0 was developed based on the FHWA Highway Noise Prediction Model and is approved for use in Ontario by the MOE and MTO. STAMINA 2.0 is a complex model which models the study area as a three dimensional image and predicts noise levels from road sources (existing and future roads) as heard from the outdoor activity areas of NSAs adjacent to the alignment. It considers numerous variables including traffic volumes, grade of road, posted speed, topography, pavement type, barriers and vegetation.

Noise levels were predicted in decibels in the A-weighted scale (dBA) and averaged over 24 hours (Leq 24). Future traffic conditions that were assumed for the analysis are shown in Appendix A.

### **3. NOISE ANALYSIS**

#### **3.1. NOISE RECEIVER LOCATIONS**

The Recommended Route extends through mostly agricultural land, however, there are a number of isolated residential homes and farms scattered throughout the study area that would be impacted by the proposed highway. The land uses along the rural central

section of Highway 7 are a mix of nurseries, residential, commercial and agriculture. The central section includes Shantz Station which is the most visible rural community development in the study area located at the intersection of Highway 7 and Shantz Station Road (Regional Road 30). Within the City of Guelph and Guelph/Eramosa Township a residential community exists along Silvercreek Parkway, north of Woodlawn Road. The Official Plan designation of these lands within the City is industrial; however, these homes pre-date the Official Plan land use designation. In Kitchener, industrial land uses are designated in two areas: Shirley Avenue/Riverbend Drive and Bridge Street (Bridgeport). The adjacent land uses along Victoria Street in the City of Kitchener are retail commercial with some industrial uses. In Guelph, the industrial/commercial land uses are bounded by Speedvale Avenue to the south, the west and north city limits to the west and north respectively. The industrial and commercial lands were not considered in the noise analysis.

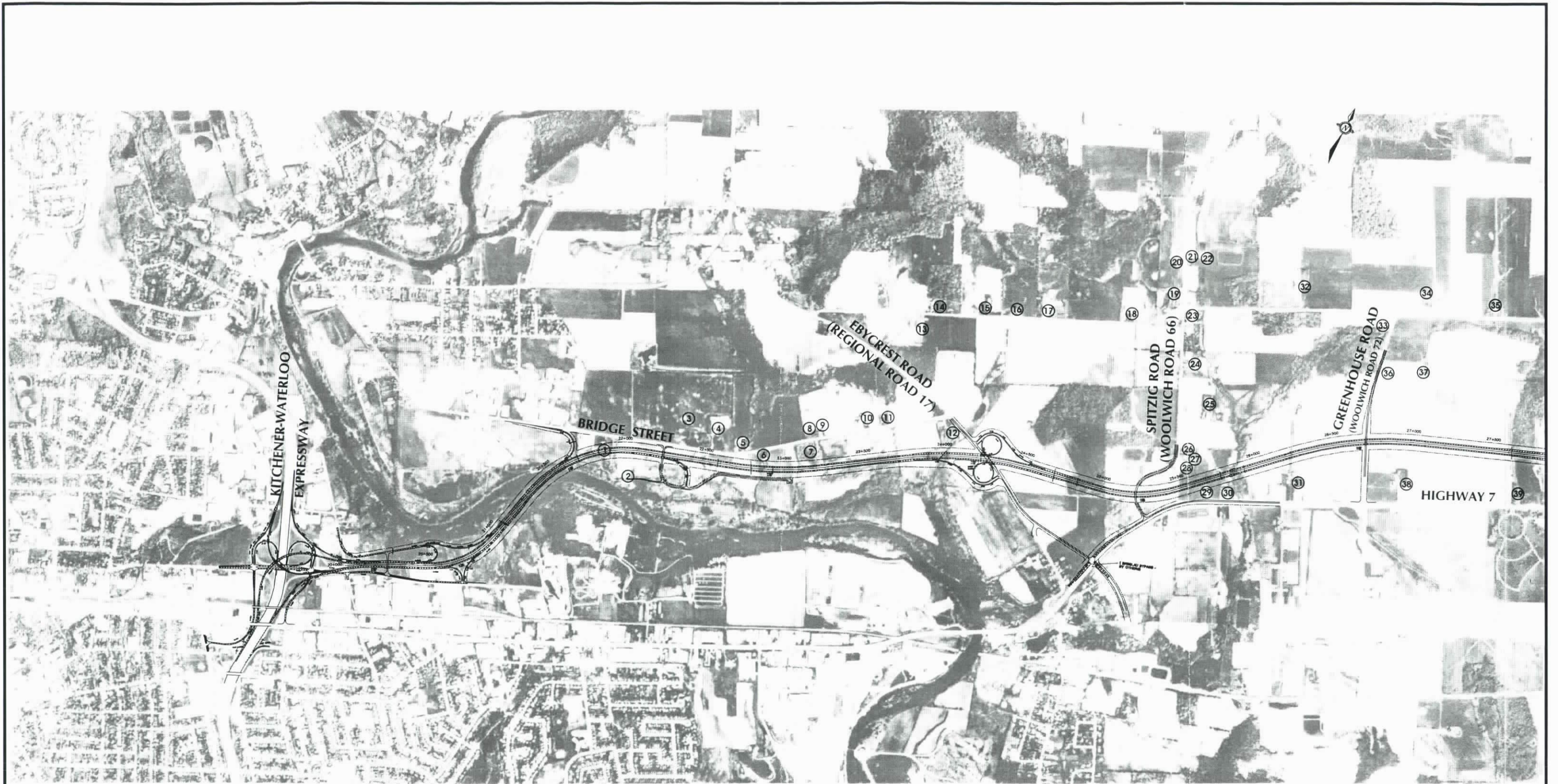
There was a total of ninety eight receiver locations identified as representative of the noise sensitive areas in the study area. An NSA is defined as the outdoor living area of a private home, townhouse, apartment building or hospital. Noise levels were predicted at the outdoor living area (typically backyard) of the receiver locations. The ninety-eight receiver locations were identified to represent the NSAs; sixteen of the receiver locations represented more than one NSA (2 to 14 NSAs). The receiver locations are shown on Exhibit 2. The analysis for future 'with new Highway 7' did not include eight receiver locations identified, as they would be removed with the new Highway 7 alignment.

## 3.2. ANALYSIS RESULTS

Noise levels were predicted using STAMINA 2.0 for the following scenarios:

- Future noise levels without new Highway 7 (Year 2016)
- Future noise levels with new Highway 7 (Year 2016)

A summary of the STAMINA 2.0 noise prediction analysis is presented in Exhibit 3. It summarizes the number of affected NSAs for different noise level ranges and includes the number of NSAs with an increase in noise levels of 0-5, 5-10 and greater than 10 dBA with and without the proposed highway. Exhibit 4 provides a summary of predicted 24 hour noise levels, both future without and future with (2016), including the increases at each of the NSAs through the corridor.



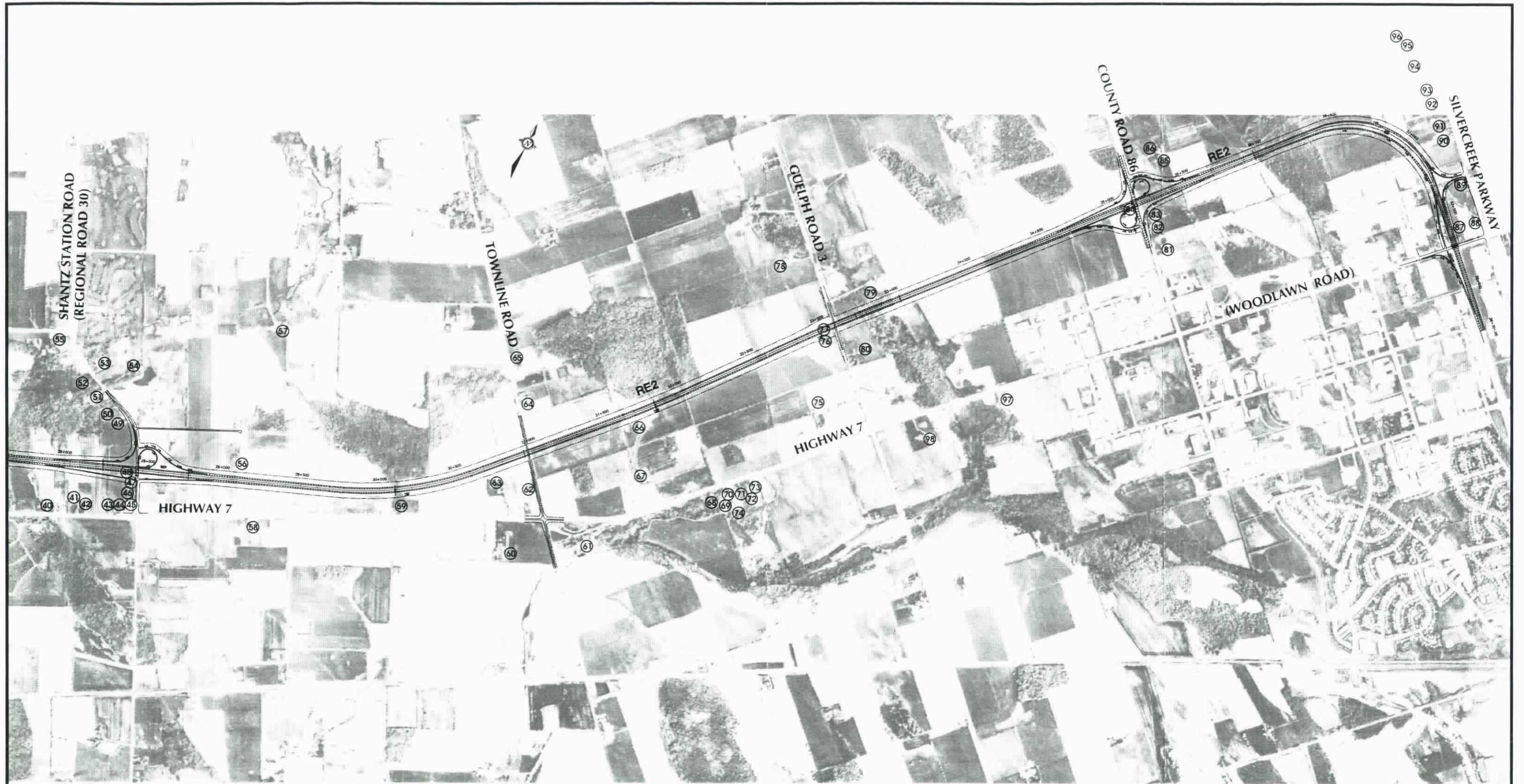
HIGHWAY 7 PLANNING STUDY  
KITCHENER TO GUELPH

RECEIVER LOCATIONS  
CONSIDERED FOR  
NOISE ANALYSIS

EXHIBIT

2a





HIGHWAY 7 PLANNING STUDY  
 KITCHENER TO GUELPH

RECEIVER LOCATIONS  
 CONSIDERED FOR  
 NOISE ANALYSIS

EXHIBIT  
**2b**

**Exhibit 3 – Summary of NSAs Affected**

Noise Level Range dBA Leq (24hr)	Number of NSAs					
	Without Highway 7 New	Increase with Highway 7 New			NSAs Subject to Decrease	With Highway 7 New
		0-5 dBA	5-10 dBA	>10 dBA		
45-50	30	16	7	5	0	12
50-55	47	33	11	2	0	35
55-60	52	24	13	0	12	59
>60	39	11	0	0	26	54
<b>Total # of NSAs</b>	<b>168</b>	<b>84</b>	<b>31</b>	<b>7</b>	<b>38</b>	<b>160</b>

**Exhibit 4 – Summary of Predicted Noise Levels**

Receiver Number	No. of Houses (NSAs)	Location	Noise Levels - Leq (24)		
			Without Proposed Highway 7	With Proposed Highway 7	Increase
1	1	WT-2 south of Bridge Street	54	N/A	N/A
2	1	WT-1 south of Bridge Street north of Grand River	45	55	10
3	1	WT-6 north of Bridge Street	50	59	9
4	1	WT-4 north of Bridge Street	48	57	9
5	1	WT-7 north of Bridge Street	54	61	7
6	1	WT-10 south of Bridge Street	54	66	12
7	1	WT-11 south of Bridge Street	50	63	13
8	1	WT-12 north of Bridge Street	56	60	4
9	1	WT-13 north of Bridge Street	55	60	5
10	1	WT-14 north of Bridge Street	55	59	4
11	1	WT-15 north of Bridge Street	57	60	3
12	1	WT-17 south of Bridge Street west of Reg. Road 17	59	61	2
13	1	North of Reg. Road 17	48	50	2
14	1	North of Reg. Road 17	49	50	1
15	1	North of Reg. Road 17	48	49	1
16	3	North of Reg. Road 17	46	48	2
17	3	WT-31 North of Reg. Road 17	45	45	0
18	1	WT-31 North of Reg. Road 17	50	51	1
19	1	West of Woolwich Road 66	50	50	0
20	1	West of Woolwich Road 66	61	61	0
21	1	East of Woolwich Road 66	54	54	0
22	1	East of Woolwich Road 66	49	50	1
23	1	WT-42 east of Woolwich Road 66	58	58	0
24	1	WT-41 east of Woolwich Road 66	53	54	1
25	1	WT-40 east of Woolwich Road 66	46	51	5

Receiver Number	No. of Houses (NSAs)	Location	Noise Levels - Leq (24)		
			Without Proposed Highway 7	With Proposed Highway 7	Increase
26	1	WT-39 east of Woolwich Road 66	53	57	4
27	1	WT-38 east of Woolwich Road 66	53	58	5
28	1	WT-37 east of Woolwich Road 66	54	60	6
29	1	WT-43 east of Woolwich Road 66	61	N/A	N/A
30	1	WT-45 east of Woolwich Road 66	61	N/A	N/A
31	1	WT-46 east of Woolwich Road 66	57	60	3
32	1	North of Woolwich Road 68	45	45	0
33	1	WT-47 west of Woolwich Road 72	54	54	0
34	1	North of Woolwich Road 68	45	47	2
35	1	North of Woolwich Road 68	47	49	2
36	1	WT-50 east of Woolwich Road 72	52	54	2
37	1	WT-49 east of Woolwich Road 72	45	51	6
38	1	WT-48 east of Woolwich Road 72	55	57	2
39	1	WT-50A west of Reg. Road 30	61	61	0
40	3	WT-51 west of Reg. Road 30	62	62	0
41	1	WT-54 west of Reg. Road 30	57	59	2
42	2	WT-55 west of Reg. Road 30	60	60	0
43	1	WT-57 west of Reg. Road 30	61	61	0
44	1	WT-58 west of Reg. Road 30	62	62	0
45	1	WT-60 west of Reg. Road 30	62	62	0
46	1	WT-61 west of Reg. Road 30	59	62	3
47	1	WT-62 west of Reg. Road 30	58	N/A	N/A
48	1	WT-63 west of Reg. Road 30	58	N/A	N/A
49	1	WT-67 west of Reg. Road 30	57	58	1
50	1	WT-68 west of Reg. Road 30	54	56	2
51	1	WT-70 west of Reg. Road 30	56	56	0
52	1	WT-71 west of Reg. Road 30	57	56	-1
53	1	East of Reg. Road 30	51	52	1
54	1	East of Reg. Road 30	46	49	3
55	1	West of Reg. Road 30 at Woolwich Road 68	54	54	0
56	1	WT-79 east of Reg. Road 30	49	64	15
57	1	WT-82 east of Reg. Road 30	45	45	0
58	1	WT-134 east of Reg. Road 30 and south of existing Hwy 7	65	63	-2
59	1	WT-84 west of Townline Road	63	63	0
60	1	WT-136 west of Townline Road south of existing Hwy 7	56	54	-2
61	1	GT 102 east of Townline Road south of existing Hwy 7	56	54	-2
62	1	WT-86 west of Townline Road	53	56	3
63	1	WT-85 west of Townline Road	52	59	7
64	1	East of Townline Road	45	54	9
65	1	East of Townline Road	47	50	3
66	1	GT-2 east of Townline Road	45	59	14

Receiver Number	No. of Houses (NSAs)	Location	Noise Levels - Leq (24)		
			Without Proposed Highway 7	With Proposed Highway 7	Increase
67	2	GT-1 east of Townline Road	52	52	0
68	1	GT-6 south of existing Hwy 7 between Townline Road and Guelph Road 3	67	64	-3
69	14	GT-7 south of existing Hwy 7 between Townline Road and Guelph Road 3	60	57	-3
70	6	GT-7 south of existing Hwy 7 between Townline Road and Guelph Road 3	62	59	-3
71	1	GT-8 south of existing Hwy 7 between Townline Road and Guelph Road 3	64	61	-3
72	1	GT-9 south of existing Hwy 7 between Townline Road and Guelph Road 3	63	60	-3
73	1	GT-10 south of existing Hwy 7 between Townline Road and Guelph Road 3	61	58	-3
74	7	GT-7 south of existing Hwy 7 between Townline Road and Guelph Road 3	55	53	-2
75	1	GT-11 west of Guelph Road 3	51	52	1
76	1	GT-13 west of Guelph Road 3	45	N/A	N/A
77	1	GT-14 west of Guelph Road 3	46	N/A	N/A
78	1	West of Guelph Road 3	45	50	5
79	1	GT-21 east of Guelph Road 3	45	61	16
80	1	GT-19 east of Guelph Road 3	48	56	8
81	1	CG-1 east of County Road 86	54	56	2
82	1	GT-25 east of County Road 86	59	61	2
83	1	GT-25 east of County Road 86	59	62	3
84	1	GT-22 west of County Road 86	56	N/A	N/A
85	1	GT-26 east of County Road 86	47	57	10
86	1	GT-26 east of County Road 86	49	56	7
87	12	CG-15 Exiting Hwy 7 and Silvercreek Parkway	Based on review this location is not a Noise Sensitive Area		
88	12	CG-15 Exiting Hwy 7 and Silvercreek Parkway	Based on review this location is not a Noise Sensitive Area		
89	3	CG-21 west of Silvercreek Parkway	53	58	5
90	3	GT-30 west of Silvercreek Parkway	52	57	5
91	4	GT-34 west of Silvercreek Parkway	53	56	3
92	2	GT-38 west of Silvercreek Parkway	52	55	3
93	5	GT-42 west of Silvercreek Parkway	53	55	2
94	5	GT-48 west of Silvercreek Parkway	51	53	2
95	1	West of Silvercreek Parkway	53	53	0

Receiver Number	No. of Houses (NSAs)	Location	Noise Levels - Leq (24)		
			Without Proposed Highway 7	With Proposed Highway 7	Increase
96	1	West of Silvercreek Parkway	51	52	1
97	1	East of Guelph Road 3 south of existing Hwy 7	69	67	-2
98	1	East of Guelph Road 3 south of existing Hwy 7	59	57	-2

<sup>1</sup> - The analysis does not include this receiver location for future with proposed Highway 7 because it is removed as part of the new Highway 7 construction.



- Denotes locations where impacts are greater than 5 dBA.

Of the ninety eight receiver locations identified, fifty three of the locations would have future noise level increases less than 5 dBA of which seventeen would have no increase in noise levels.

In addition, thirteen receiver locations analysed are expected to experience a reduction in future noise levels as a result of the proposed Highway 7 alignment. This is a result of traffic being diverted away from existing Highway 7.

Fifteen receiver locations are predicted to experience future noise level increases of between 5 and 10 dBA. These locations are as follows:

#### Receiver Locations with Noise Level Increases between 5 and 10 dBA

- Receiver No. 3 - WT-6 north of Bridge Street
- Receiver No. 4 - WT-4 north of Bridge Street
- Receiver No. 5 - WT-7 north of Bridge Street
- Receiver No. 9 - WT-13 north of Bridge Street
- Receiver No. 25 - WT- 40 east of Woolwich Road 66
- Receiver No. 27 - WT-38 east of Woolwich 66
- Receiver No. 28 - WT-37 east of Woolwich 66
- Receiver No. 37 - WT-49 east of Woolwich 72
- Receiver No. 63 - WT-85 west of Townline Road
- Receiver No. 64 - East of Townline Road
- Receiver No. 78 - West of Guelph Road 3
- Receiver No. 80 - GT-19 east of Guelph Road 3

- Receiver No. 86 - GT-26 east of County Road 86
- Receiver No. 89 - CG-21 west of Silvercreek Parkway
- Receiver No. 90 - GT-30 west of Silvercreek Parkway

Three receiver locations are predicted to experience future noise levels of 60 dBA or higher. Eight of the receiver locations would have future noise levels of 55-59 dBA. The remainder of receivers would have future noise levels less than 55 dBA.

Seven receiver locations are predicted to experience increases of over 10 dBA with new Highway 7 in place. These locations are as follows:

#### **Receiver Locations with Noise Level Increases Greater than 10 dBA**

- Receiver No. 2 - WT-1 south of Bridge Street north of Grand River
- Receiver No. 6 - WT-10 south of Bridge Street
- Receiver No. 7 - WT-11 south of Bridge Street
- Receiver No. 56 - WT-79 west of Regional Road 30
- Receiver No. 66 - GT-2 east of Townline Road
- Receiver No. 79 - GT-21 east of Guelph Road 3
- Receiver No. 85 - GT-26 east of County Road 86

Four receiver locations are predicted to experience noise levels greater than 60 dBA with the new Highway 7 alignment. Absolute noise levels at the remaining locations are predicted to be within the range of the provincial objective of 55 dBA.

## **4. POTENTIAL NOISE MITIGATION**

Although the projected noise level increases are greater than 5 dBA and absolute noise levels are higher than the provincial objective at seven receiver locations, mitigating measures are not warranted at three of the receiver locations due to the isolated nature of these houses.

However, at four receiver locations, in particular, the residential houses along Bridge Street, future sound level increases are greater than 5 dBA with absolute levels greater than 60 dBA. Noise attenuation measures could be considered at this location if deemed a cost-effective solution.

## 5. CONSTRUCTION NOISE

During construction of the proposed highway, the Contractor will abide by the municipal noise control by-laws. The Contractor will be required to keep idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities.

Construction may occur outside the normal working hours and weekends for certain activities along the new Highway 7. Such work will be carried out in compliance with local noise by-laws and Council approval of any Noise By-Law exemptions.

If complaints regarding construction noise arise during construction, they will be investigated according to the provisions of the existing "Noise Protocol" between the Ministry of Transportation and the Ministry of Environment.

## 6. CONCLUSION

The noise analysis determined that projected noise level increases as a result of the proposed Highway 7 alignment would be less than 5 dBA for sixty six of the receiver locations. For the remainder of the receiver locations (twenty one) the projected noise level increase as a result of the Highway 7 alignment would be greater than 5 dBA. The absolute noise levels are higher than the provincial objective at seven receiver locations; mitigating measures are not warranted at three of the receiver locations due to the isolated nature of these houses. As such, the warrant for mitigating measures for the houses along Bridge Street should be considered.

**APPENDIX A**

**TRAFFIC VOLUMES**

	Future Traffic (2016 AADT)	
	Without New Highway 7	With New Highway 7
<u>New Highway 7</u>		
KWE North of Highway 7	123,350	123,350
KWE South of Highway 7	146,150	146,150
KWE to Shirley Ave / Riverbend Dr Interchange	66,400	
Shirley Ave / Riverbend Dr Interchange to Grand River	49,800	-
Grand River to Regional Road 17	30,350	-
Regional Road 17 to Regional Road 30	43,700	-
Regional Road 30 to County Road 86	42,750	-
County Road 86 to Woodlawn Road	37,650	-
<u>Existing Highway 7</u>		
KWE	30,650	54,000
KWE to Regional Road 17	23,000	38,000
Regional Road 17 to Woolwich Road 72	17,900	31,400
Woolwich Road 72 to Regional Road 30	17,900	23,000
Regional Road 30 to Guelph Road 3	12,150	23,000
Guelph Road 3 to Silvercreek Parkway	30,800	44,400
<u>Crossing Roads</u>		
Silvercreek Parkway		6,350
Silvercreek Parkway North of ramps	6,350	-
Silvercreek Parkway South of ramps	17,250	-
Ramps	8,450	-
	7,400	
County Road 86	12,800	12,800
Guelph Road 3	2,550	2,550
Townline Road	2,100	2,100
Regional Road 30 north of proposed Highway 7	6,250	6,250
Regional Road 30 south of proposed Highway 7	5,100	6,250
Regional Road 30 south of existing Highway 7	9,600	6,250
Woolwich Road 72	2,550	?
Woolwich Road 66	2,550	2,550
Regional Road 17 North of existing Highway 7	19,800	-
Regional Road 17 South of existing Highway 7	29,350	-