Earth Tech Canada Inc.

#201-3275 Lakeshore Road, Kelowna, British Columbia V1W 3S9 Canada

Refer to File: 52468-3

3-002RJH (WAT)

February 13, 2002

District of Lake Country
10150 Bottom Wood Lake Road
Lake Country, BC V4V 2M1

Attention: Mr. Randy Rose, Administrator

Dear Randy:

Re: Oyama Sewer Service Area - Wastewater Servicing Options Report

Telephone

250.762.3727

Facsimile

250.762.7789

1.0 INTRODUCTION

Earth Tech Canada Inc. is pleased to present the following report summarizing our investigation into the most efficient long term method in which to provide wastewater service for existing and future lots in the Oyama area of Lake Country. In our assessment we have taken into account both capital and operational costs in our review.

This report compares four sewer servicing options. All options would provide collection of local wastewater from central Oyama to a central location on the isthmus between Wood Lake and Kalamalka Lake. From there, it would either be treated and disposed of locally, or conveyed to the existing lift station at Woodsdale, from where it would be pumped to the existing WWTP. Options for servicing include:

1. Local collection, a wastewater treatment system (activated sludge WWTP), and disposal through an infiltration gallery;

2. Local collection system and lift stations with forcemain running up the east slopes along Oyama Road to Woodsdale Lift Station;

3. Local collection system and lift station with forcemain running along the CN Railway tracks along Wood Lake to Woodsdale Lift Station;

4. Local collection system with lift station and low pressure forcemain running underwater through Wood Lake to Woodsdale Lift Station.

The objective of this letter is to provide Lake Country with sufficient information so that the long term direction for sewer servicing of the area can be determined. Order of magnitude cost estimates for the alternatives are presented for comparison and discussion purposes.

2.0 PROJECT CONSIDERATIONS

In addressing the wastewater servicing requirements to the above-noted lands, we considered the following:

1. **Costing information**: This includes both capital and operational costs for each option. A life cycle analysis is provided for each option.

2. **Intangible Issues**: This includes issues such as impact on existing residents, ease of installation and access.

3. **Phasing and Adaptability:** The ease of phasing of the project and how easily the project matches in with future development is considered.

3.0 ANALYSIS CRITERIA

The following criteria were used in the analysis with respect to sewer servicing of the designated design area.

Sewer Flow Generation Criteria

- Per capita design flow — 350 L/ca/day
  Infiltration allowance — 5,000 L/ha/day (above groundwater level)
  Infiltration allowance — 8,000 L/ha/day (below groundwater level)
- Population density — 2.5 persons per SF connection
- Peaking factor — Harmon Formula x 70%

Costing Criteria

- Long term rate of interest — 6.00%
- Long term construction inflation rate — 2.75%
- Contingency cost percentage — 15%
- Engineering cost percentage — 10%

Total discounted costs are based on a 25-year lifecycle. Capital and O&M costs are estimated in year 2002 dollars. The O&M costs are then factored up to develop a total cost over the 25-year lifespan of the project.

Planning Considerations

Plans for development densification is in accordance with the District of Lake Country OCP. In addition to the potential densification that is proposed from the isthmus of Wood and Kalamalka Lakes, development has also been identified to the northeast along the east slopes above Kalamalka Lake. For the purposes of this analysis, it was assumed that for all options, an area build-out of 968 equivalent single family units would be used as the total number of connections.

4.0 SERVICING OPTIONS

4.1 Introduction

This section presents four servicing options to sewer service the Oyama area of Lake Country. The options are set out to service a portion of the existing properties identified in Figure 1.0, plus properties that would be developed as a result of densification, plus properties that would develop on the area fringe. Capital and operational cost estimates are included at the end of this report. A lifecycle analysis sets out the total cost for a 25-year time frame.

The total estimated number of existing properties in the Oyama region are shown on Figure 1. With 459 existing parcels, the existing population is estimated to be 1,150 persons. Many of the parcels are larger agricultural lots, therefore it was estimated that many of these parcels in the outlying areas would not connect to the Lake Country sewer system. For the analysis, included are 225 existing connections, 243 connections from area densification and another 500 future development parcels on the fringe. This results in 968 total connections and a design population of 2,420 persons.

The local collection system was set at a constant number for all four options. Approximately 9.0 km of sanitary sewer main and one local lift station was assumed to be necessary to collect effluent.

Using the Harmon formula for wastewater peaking and a contributing flow area of 0.60 ha at 8,000 L/ha/day, the peak wet weather design flow from this area is 24.2 L/s. The average daily flow is estimated to be 847,000 L/day.

A summary of costs is included in Table 4.1 below.

Table 4.1 - Oyama Sewer Options
SUMMARY OF LIFECYCLE COSTS

Option	Description	Capital Cost ($)	Current O&M Year 2002 ($)	Discounted O&M cost	Total Discounted Cost ($)
1	WWTP and Disposal Field	$ 7,739,938	$ 382,484	$ 6,365,812	**$ 13,668,000**
2	Oyama Road forcemain	$ 5,623,999	$ 394,352	$ 6,563,335	**$ 12,525,000**
3	Railway Option	$ 6,222,250	$ 257,864	$ 4,403,401	**$ 10,273,000**
4	Underwater Option	$ 6,762,875	$ 241,484	$ 4,123,689	**$ 10,504,000**

4.2 Option 1: Local Collection System, and Wastewater Treatment Plant

This option is illustrated in Figure 2. A wastewater treatment plant and ground disposal field would be required to provide treatment and disposal of the effluent. The plant would likely be an activated sludge type plant with chemical addition necessary for tertiary treatment (nitrogen and phosphorus removal). Effluent from the plant would be pumped above to a ground disposal site located a sufficient distance away from the lakes and creeks.

A number of assumptions were made with this option. These included that land within 1.0 km of the WWTP site would be suitable for disposal of treated effluent. Another was the issue of land acquisition and land being found suitable for both the WWTP site and an effluent disposal field.

The Capital Cost is estimated to be $7,740,000. The total lifecycle cost is estimated to be $13,668,000.

Advantages to this option are that the facility and collection system are contained within the service area, power costs are relatively low and the capital cost is comparative to other options. The technology for this application is sound and environmental approvals shouldn't be difficult to obtain. This option stages well with increasing demands.

The disadvantages of this option are that there is a risk in not being able to find a suitable ground disposal site. Therefore this option would require that a hydrogeological investigation be completed. There is both quality and quantity concerns related to ground disposal and if implemented, this option would require a higher level of operational effort than pumping to the existing Lake Country WWTP.

4.3 Option 2: Local Collection System, Lift Station and Forcemain along Oyama Road

This option is illustrated in Figure 3. Wastewater would be collected by a local collection system and directed to a wet well and major lift station located along Oyama Road. The forcemain alignment would follow Oyama Road to the highest elevation. From there, it would flow to the Woodsdale Road Lift

Station by gravity. Using a design flow of 8 L/s, preliminary sizing indicates that a 150mm diameter forcemain is required. Three pump stations would be required along Oyama Road. Total horsepower required by the three stations would be in the range of 75 hp of total lift.

The Capital Cost is estimated to be $5,624,000. The total lifecycle cost is estimated to be $12,525,000.

Advantages of this option are the accessibility of the infrastructure, the comparative capital costing to the other options, proven technology and the ability to connect into the system or expand it with new development.

The major disadvantage to this system is the high operational cost due to the high pumping head required in following Oyama Road. The elevation gain is approximately 135 metres.

4.4 Option 3: Local Collection System and Lift Station with Forcemain along the CN Tracks

This option is similar to Option 2, however, the route of the forcemain would be brought down from Oyama Road to the railway right-of-way. This alignment is illustrated in Figure 4. We understand that there is a one time capital charge for the installation of new infrastructure within the railway right-of-way. The estimate is based on a capital charge of $25,000 per kilometre, however, this number may be negotiable with the railway company. With the lower alignment, pumping costs would be reduced. Also, connections from the east slopes would also be possible by gravity (without pumping) with effluent being driven into the forcemain by the elevation head.

The Capital Cost is estimated to be $6,222,250. The total lifecycle cost is estimated to be $10,273,448.

Advantages to this option include both low operating and capital installation costs. Connection into the main would be relatively easy.

Disadvantages include the cost of the one time fee for access to the railway right-of-way, and the limited ease of access to the sewer forcemain.

4.5 Option 4: Local Collection System with Lift Station and Forcemain through Wood Lake

This option was considered as it is a relatively straight forward process for design, installation and connection. The proposed concept involves the installation of the collection and pumping system similar to the other three options. The pump station, however, would pump effluent from the north end of Wood Lake into a 150mm pipeline that would be weighted and set on the lake bottom. A similar installation was completed on the north shores of Okanagan Landing in the year 2000. The pipe would have to be laid to grade with positive grade for the escape of gases that could separate from the sewage effluent. This option is illustrated in Figure 5.

The restricting issues are perceptions by the public and the Ministry officials in providing approvals for this type of work. The concept is solid on a technical level. With flow meters at the lift stations, the total flow could be monitored at both to track the volume of effluent and to see if leakage is occurring. It is noted that if a leak to the pipeline were to occur, that the lake would leak into the pipeline.

The Capital Cost is estimated to be $6,763,000. The total lifecycle cost is estimated to be $10,504,000.

The advantages of this option are the low operating costs and ease of installation.

The disadvantages to this system are the high initial capital cost and that access to the forcemain is difficult once the installation is complete and in service.

5.0 CONCLUSIONS AND RECOMMENDATIONS

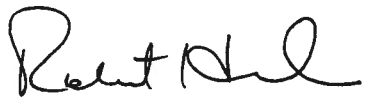
Based on our analysis, we have provided the following conclusions and recommendations:

- This is a costly area to service. Capital cost estimates range from $ 5,800 to $ 8,000 per lot to service.
- The cost is significant, but not unreasonably high. If a lesser number of sanitary sewer connections is provided, the costs will be substantially more. If only 500 existing and future development units were to connect, the cost per lot would increase by approximately 50%.
- The railway option appears to have a moderate capital cost, but offers longer term low operating costs. It also stages well for allowing future connections from the east benchlands of Oyama.
- The two lowest lifecycle cost options, Option 3, the railway route, and Option 4, a pipe in Wood Lake, offer the most cost effective solutions for sewer alignment to the District's sewer system. These two options should be considered in more detail, particularly in refining the operational costs, the installation costs in the lake, and along the railway grade.

We would be pleased to meet with you to discuss the report and if required, provide assistance in development of staging of these works. We thank you for the opportunity to be of service.

Sincerely,

Earth Tech Canada Inc.
per:



R.J. (Bob) Hrasko, P. Eng.
Project Manager

RJH:f

Attachments

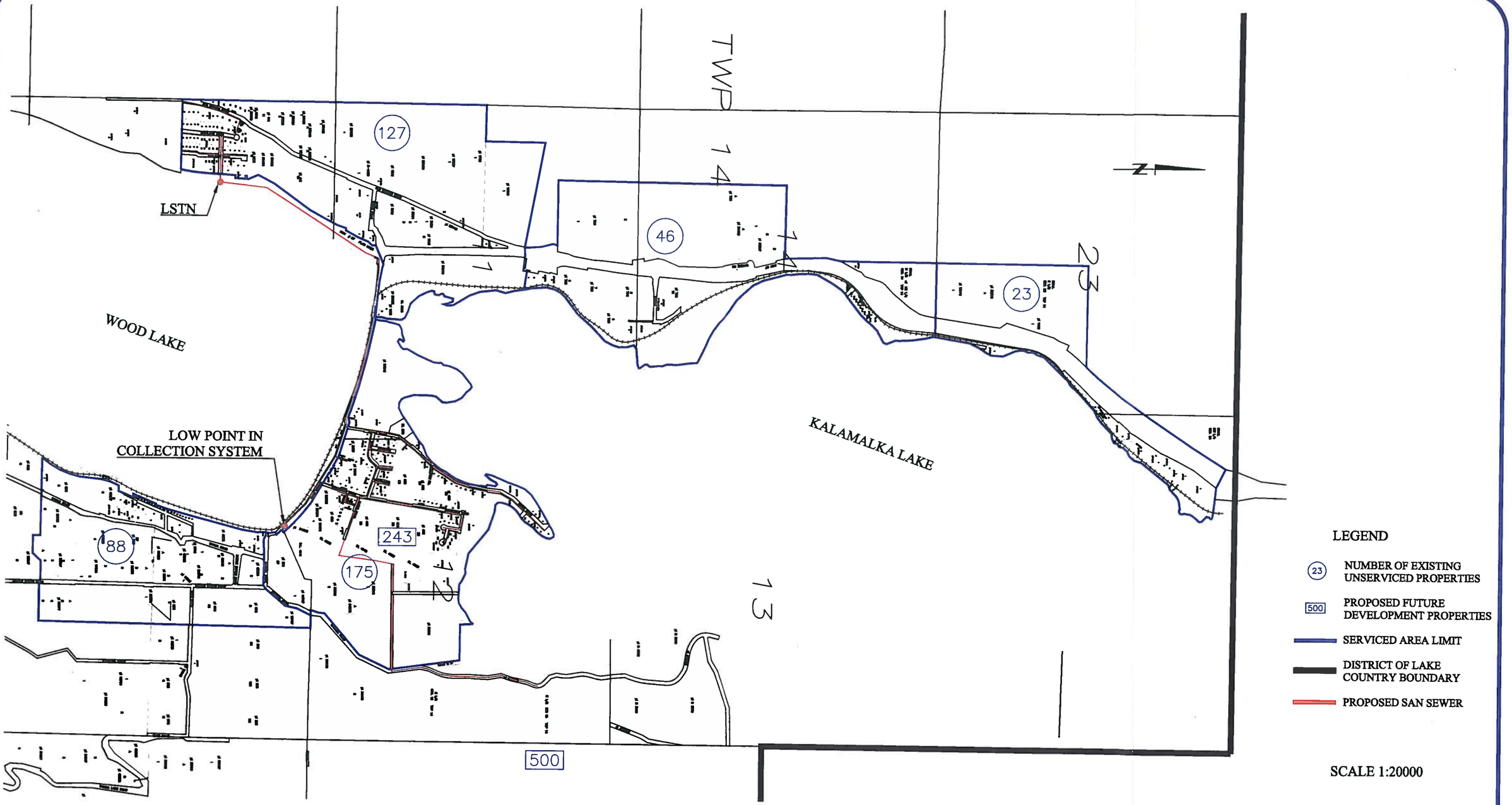


FIGURE 1
POTENTIAL
SERVICED PROPERTIES
OYAMA SEWER OPTIONS

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EARTH TECH

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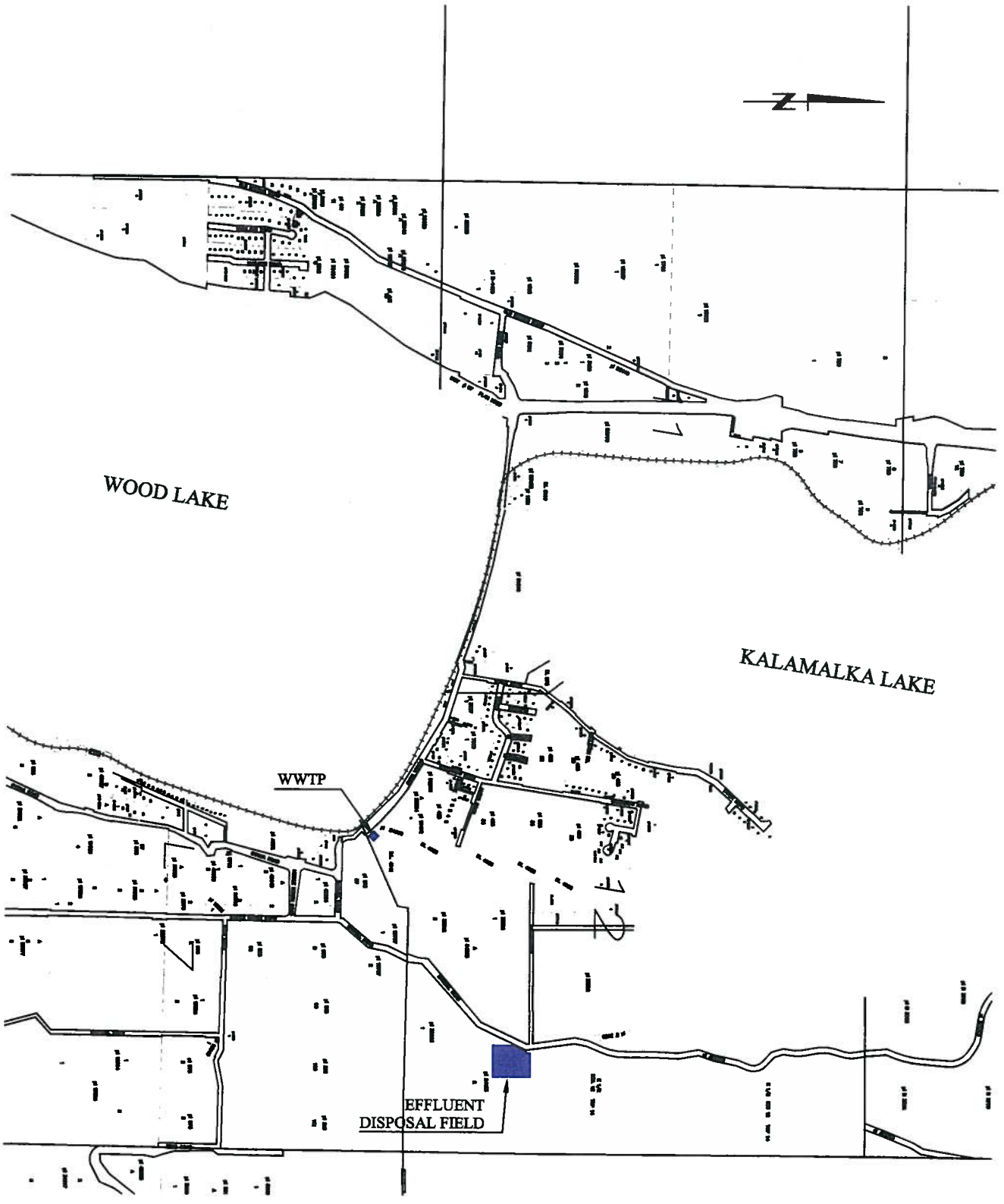

FIGURE 2
OPTION 1
WASTE WATER TREATMENT PLANT
AND TILE FIELD
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EARTH TECH

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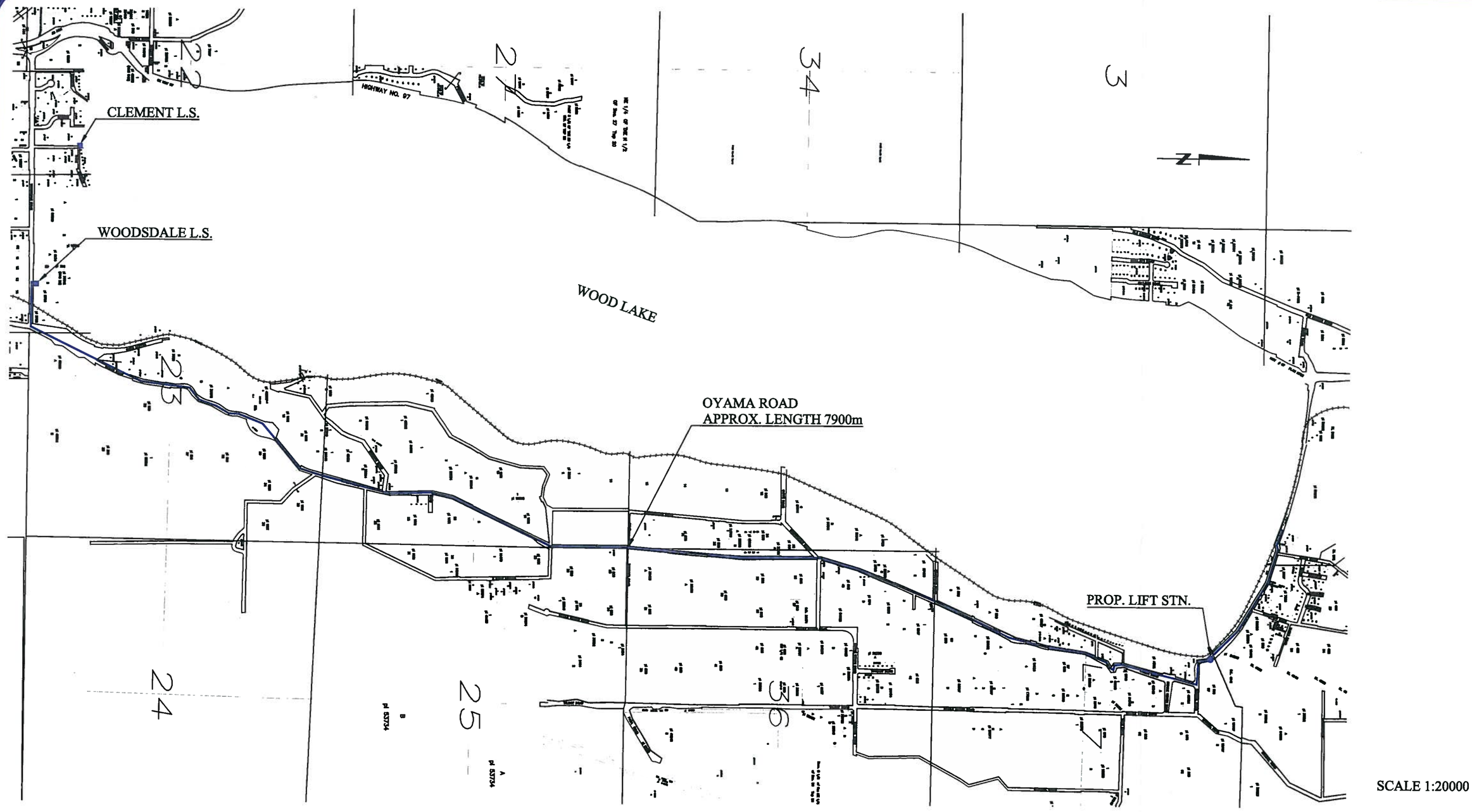

FIGURE 3
OPTION 2
OYAMA ROAD ALIGNMENT
OYAMA SEWER OPTIONS

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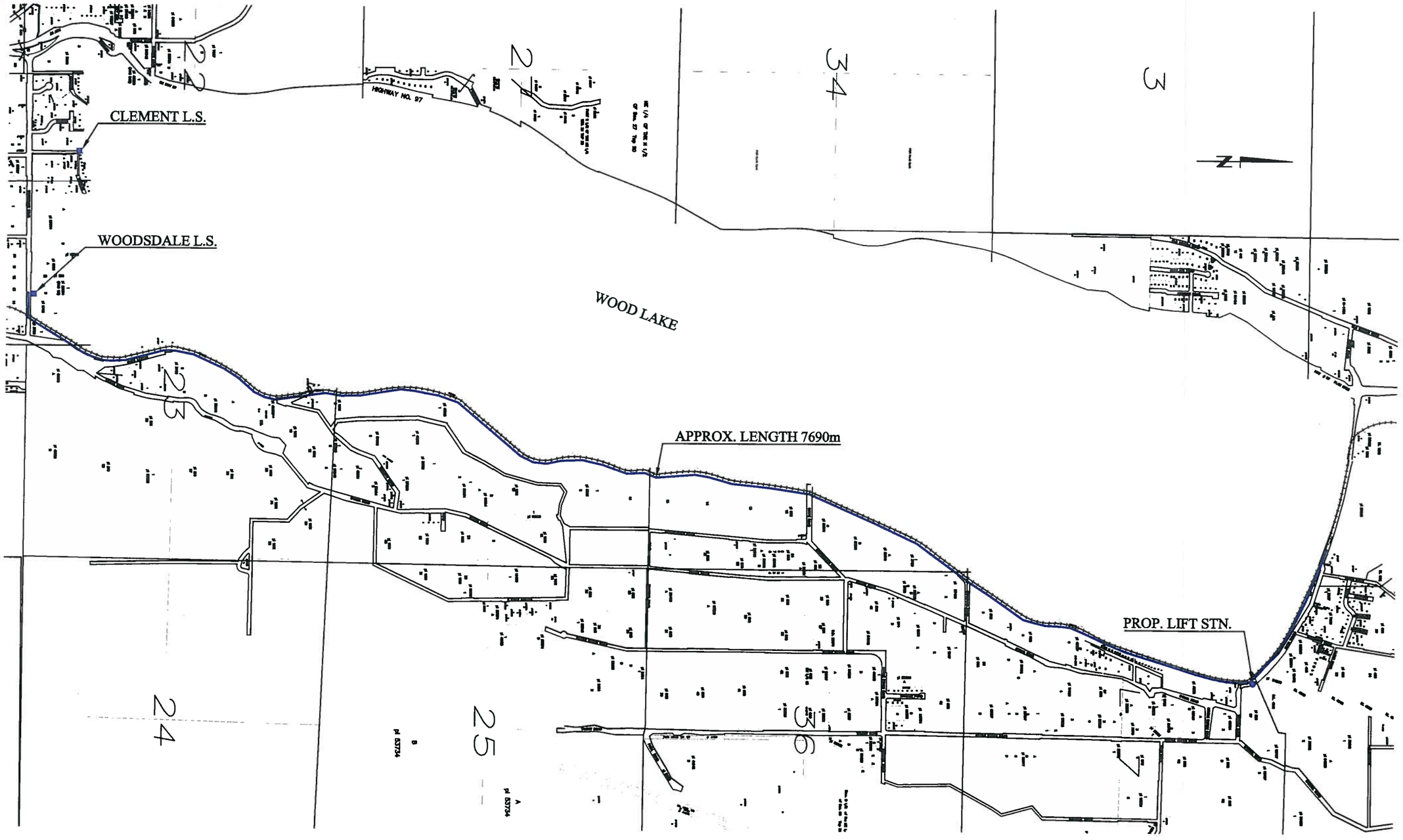

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FIGURE 4
OPTION 3
RAILWAY ALIGNMENT
OYAMA SEWER OPTIONS

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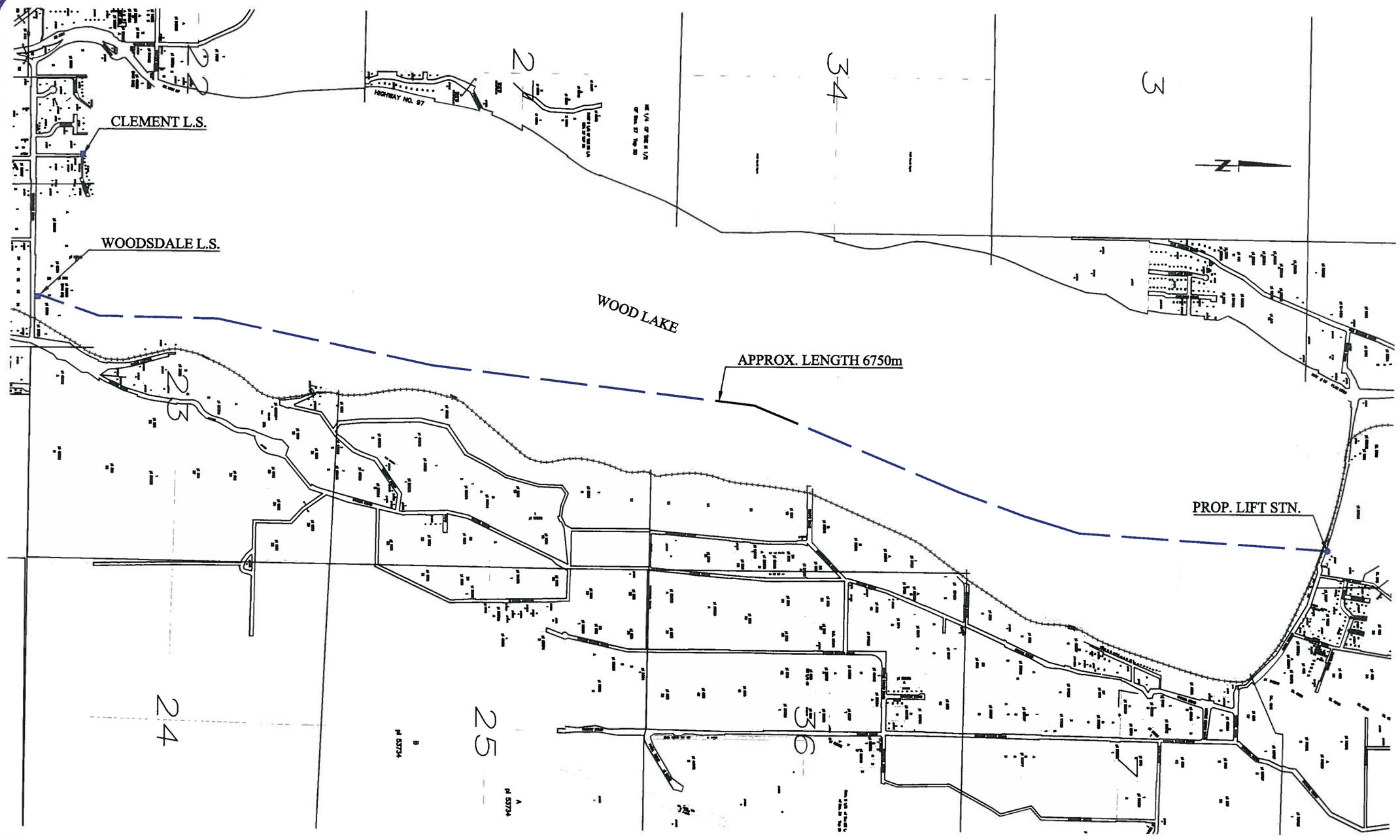

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FIGURE 5
OPTION 4
WOOD LAKE ALIGNMENT
OYAMA SEWER OPTIONS

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EARTH TECH

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Oyama Sewer Options

SUMMARY OF LIFECYCLE COSTS

Option	Description	Capital Cost ($)	Current O&M Year 2002 ($)	Discounted O&M cost ($)	Total Discounted Cost ($)	Capital Cost per Lot $
	Total Number of Existing Lots					**225**
	Total Number of Future Development Connections					**743**
1	Construct WWTP and Treat on site	$ 7,739,938	$ 382,484	$ 6,365,812	**$ 13,667,640**	$ 7,995.80
2	Oyama Road forcemain	$ 5,623,999	$ 394,352	$ 6,563,335	**$ 12,524,774**	$ 5,809.92
3	Railway Option	$ 6,222,250	$ 257,864	$ 4,403,401	**$ 10,273,448**	$ 6,427.94
4	Underwater Option	$ 6,762,875	$ 241,484	$ 4,123,689	**$ 10,503,760**	$ 6,986.44

Oyama Options 5246800

LIFECYCLE COSTS FOR SEWAGE TREATMENT AND DISPOSAL RJH

OPTION 1, CONSTRUCT WWTP AND INFILTRATION GALLERY

TOTAL No. of Units, 225 existing residential connections + 743 devel. Units

Average daily flow	847	m3 /day
Peak wet weather flow	87.1	m3 / hr

CAPITAL COSTS		No.	Unit		Unit Price		Extension
WWTP Supply and Install, 847 m3 capacity		847	m3/day	$	3,000	$	2,541,000
Pump station to tile field		1	each	$	35,000	$	35,000
Effluent disposal field, 847 m3 capacity	15 m field per m3	12705	m length	$	30	$	381,150
Forcemain to tile field		1000	m length	$	80	$	80,000
Land acquisition		4	acre	$	125,000	$	500,000
Local collection system (incl. MHs, restoration)		9000	m length	$	160	$	1,440,000
Pump station to WWTP		2	each	$	75,000	$	150,000
Service Connections		968	each	$	1,100	$	1,064,800
Subtotal , Capital Cost Estimate						$	6,191,950
Contingency and Engineering 25%						$	1,547,988
TOTAL CAPITAL COST, YEAR 2002 CDN DOLLARS						**$**	**7,739,938**

ANNUAL O & M COSTS							
Annual cost for sludge hauling		540	loads	$	150.00	$	81,000
Plant chemicals and supplies		1	L.S.	$	200,000.00	$	200,000
Part Time Operator		1.00	wages	$	60,000.00	$	60,000
O & M Pump / WWTP Electrical Costs	90	589,680	(kw - hr) /hr	$	0.05	$	29,484
San Lift stn 2 @ 0.10 X wages		0.20	wages	$	60,000.00	$	12,000
TOTAL O & M COSTS, YEAR 2002 CDN DOLLARS						**$**	**382,484**

PROGRAM INPUT DATA

6.00%	Interest (Discount) rate
2.75%	Inflation Rate
$ 7,739,938	Initial Capital Investment
$ 382,484	Initial Operating Cost
25	Lifecycle Period
2002	Starting Year

Year		Capital Cost ($)	2.75% O&M Cost ($)	Total Annual Cost ($)	6.00% Discounted Capital Cost ($)	Discounted O&M Cost ($)	Discounted Annual Cost ($)
	2002	7,739,938	382,484	8,122,422	7,301,828	360,834	7,662,662
	2003		393,002	393,002	-	349,771	349,771
	2004		403,810	403,810	-	339,047	339,047
	2005		414,915	414,915	-	328,651	328,651
	2006		426,325	426,325	-	318,575	318,575
	2007		438,049	438,049	-	308,807	308,807
	2008		450,095	450,095	-	299,339	299,339
	2009		462,473	462,473	-	290,161	290,161
	2010		475,191	475,191	-	281,265	281,265
	2011		488,258	488,258	-	272,641	272,641
	2012		501,686	501,686	-	264,282	264,282
	2013		515,482	515,482	-	256,179	256,179
	2014		529,658	529,658	-	248,324	248,324
	2015		544,223	544,223	-	240,710	240,710
	2016		559,189	559,189	-	233,330	233,330
	2017		574,567	574,567	-	226,176	226,176
	2018		590,368	590,368	-	219,242	219,242
	2019		606,603	606,603	-	212,520	212,520
	2020		623,284	623,284	-	206,004	206,004
	2021		640,425	640,425	-	199,687	199,687
	2022		658,036	658,036	-	193,565	193,565
	2023		676,132	676,132	-	187,630	187,630
	2024		694,726	694,726	-	181,877	181,877
	2025		713,831	713,831	-	176,301	176,301
	2026		733,461	733,461	-	170,895	170,895
	2027		753,631	753,631	-	165,656	165,656
			Net Present Value		**$ 7,301,828**	**$ 6,365,812**	**$ 13,667,640**
					Capital	**O&M**	**TOTAL**

Oyama Options Report 5246800

LIFECYCLE COSTS FOR SEWAGE TREATMENT AND DISPOSAL RJH

OPTION 2, CONSTRUCTION OF LIFT STATIONS AND FORCEMAIN ON OYAMA ROAD

TOTAL No. of Units, 225 existing residential connections + 743 devel. Units

Average daily flow 847 m3 /day
peak wet weather flow 87.1 m3 / hr

CAPITAL COSTS	No.	Unit		Unit Price		Extension
Local collection system	9000	m length	$	160	$	1,440,000
Local sanitary lift stations	1	each	$	75,000	$	75,000
Service Connections	968	each	$	1,100	$	1,064,800
Pump stations along route	3	each	$	125,000	$	375,000
Forcemain along Oyama Road	7900	m length	$	100	$	790,000
Changes to downstream lift stations	2	each	$	20,000	$	40,000
Lake Country WWTP expansion	847	m3/day	$	1,500	$	1,270,500
Subtotal , Capital Cost Estimate					$	5,055,300
Contingency and Engineering 25%					$	1,263,825
TOTAL CAPITAL COST, YEAR 2002 CDN DOLLARS					$	**6,319,125**

ANNUAL O & M COSTS

Add'l WWTP chemicals and supplies		1	L.S.	$	200,000.00	$	200,000
Additional operator @ WWTP		-	wages	$	60,000.00	$	-
O & M Pump / WWTP Electrical Costs	520	3,407,040	(kw - hr) /hr	$	0.05	$	170,352
San Lift stns 4 @ 0.10 each		0.40	wages	$	60,000.00	$	24,000
TOTAL O & M COSTS, YEAR 2002 CDN DOLLARS						$	**394,352**

PROGRAM INPUT DATA

	6.00%	Interest (Discount) rate
	2.75%	Inflation Rate
$	**6,319,125**	Initial Capital Investment
$	**394,352**	Initial Operating Cost
	25	Lifecyele Period
	847	Capacity of Option m3/day
	2002	Starting Year

Year	Capital Cost ($)	2.75% O&M Cost ($)	Total Annual Cost ($)	6.00% Discounted Capital Cost ($)	Discounted O&M Cost ($)	Discounted Annual Cost ($)
2002	6,319,125	394,352	6,713,477	5,623,999	372,030	6,333,469
2003		405,197	405,197	-	360,624	360,624
2004		416,340	416,340	-	349,567	349,567
2005		427,789	427,789	-	338,849	338,849
2006		439,553	439,553	-	328,460	328,460
2007		451,641	451,641	-	318,389	318,389
2008		464,061	464,061	-	308,627	308,627
2009		476,823	476,823	-	299,164	299,164
2010		489,935	489,935	-	289,992	289,992
2011		503,408	503,408	-	281,101	281,101
2012		517,252	517,252	-	272,482	272,482
2013		531,477	531,477	-	264,128	264,128
2014		546,092	546,092	-	256,029	256,029
2015		561,110	561,110	-	248,179	248,179
2016		576,540	576,540	-	240,570	240,570
2017		592,395	592,395	-	233,194	233,194
2018		608,686	608,686	-	226,044	226,044
2019		625,425	625,425	-	219,114	219,114
2020		642,624	642,624	-	212,396	212,396
2021		660,296	660,296	-	205,883	205,883
2022		678,454	678,454	-	199,571	199,571
2023		697,112	697,112	-	193,452	193,452
2024		716,282	716,282	-	187,521	187,521
2025		735,980	735,980	-	181,771	181,771
2026		756,220	756,220	-	176,198	176,198
2027		777,016	777,016	-	170,796	170,796
		Net Present Value		**$ 5,623,999**	**$ 6,563,335**	**$ 12,524,774**
				Capital	**O&M**	**TOTAL**

Oyama Options 5246800

LIFECYCLE COSTS FOR SEWAGE TREATMENT AND DISPOSAL RJH

OPTION 3, COLLECT AND PIPE ALONG RAILWAY ROW TO WOODSDALE LIFT STATION

TOTAL No. of Units, 225 existing residential connections + 743 devel. Units

Average daily flow	847	m3 /day
peak wet weather flow	87.1	m3 / hr

CAPITAL COSTS	No.	Unit	Unit Price	Extension
Local collection system	9000	m length	$ 160	$ 1,440,000
Local sanitary sewer lift stations	1	each	$ 75,000	$ 75,000
Service Connections	968	each	$ 1,100	$ 1,064,800
Pump stations along route	1	each	$ 150,000	$ 150,000
Forcemain along Railway Tracks	7700	m length	$ 100	$ 770,000
Payment for Rail ROW use, one time fee	6.7	m length	$ 25,000	$ 167,500
Changes to downstream lift stations	2	each	$ 20,000	$ 40,000
Lake Country WWTP expansion	847	m3/day	$ 1,500	$ 1,270,500
Subtotal , Capital Cost Estimate				$ 4,977,800
Contingency and Engineering 25%				$ 1,244,450
TOTAL CAPITAL COST, YEAR 2002 CDN DOLLARS				**$ 6,222,250**
ANNUAL O & M COSTS				
Plant chemicals and supplies	1	L.S.	$ 200,000.00	$ 200,000
Part Time Operator 2 stns @ 0.1 wage each	0.20	wages	$ 60,000.00	$ 12,000
O & M Pump / WWTP Electrical Costs	140 917,280	(kw - hr) /hr	$ 0.05	$ 45,864
TOTAL O & M COSTS, YEAR 2002 CDN DOLLARS				**$ 257,864**

PROGRAM INPUT DATA

	6.00%	Interest (Discount) rate
	2.75%	Inflation Rate
$	6,222,250	Initial Capital Investment
$	257,864	Initial Operating Cost
	25	Lifecycle Period
	847	Capacity of Option ML/day
	2002	Starting Year

Year	Capital Cost	2.75% O&M Cost	Total Annual Cost	6.00% Discounted Capital Cost	Discounted O&M Cost	Discounted Annual Cost
	($)	($)	($)	($)	($)	($)
2002	6,222,250	257,864	6,480,114	5,870,047	243,268	6,113,315
2003		264,955	264,955	-	235,809	235,809
2004		272,242	272,242	-	228,579	228,579
2005		279,728	279,728	-	221,571	221,571
2006		287,421	287,421	-	214,777	214,777
2007		295,325	295,325	-	208,192	208,192
2008		303,446	303,446	-	201,809	201,809
2009		311,791	311,791	-	195,622	195,622
2010		320,365	320,365	-	189,624	189,624
2011		329,175	329,175	-	183,810	183,810
2012		338,228	338,228	-	178,174	178,174
2013		347,529	347,529	-	172,711	172,711
2014		357,086	357,086	-	167,416	167,416
2015		366,906	366,906	-	162,283	162,283
2016		376,996	376,996	-	157,307	157,307
2017		387,363	387,363	-	152,484	152,484
2018		398,016	398,016	-	147,809	147,809
2019		408,961	408,961	-	143,277	143,277
2020		420,207	420,207	-	138,884	138,884
2021		431,763	431,763	-	134,626	134,626
2022		443,637	443,637	-	130,498	130,498
2023		455,837	455,837	-	126,497	126,497
2024		468,372	468,372	-	122,619	122,619
2025		481,252	481,252	-	118,859	118,859
2026		494,487	494,487	-	115,215	115,215
2027		508,085	508,085	-	111,682	111,682
		Net Present Value		**$ 5,870,047**	**$ 4,403,401**	**$ 10,273,448**
				Capital	**O&M**	**TOTAL**

Oyama Options Report 5246800
LIFECYCLE COSTS RJH
OPTION 4, UNDERWATER FORCEMAIN TO WOODSDALE

TOTAL No. of Units, 225 existing residential connections + 743 devel. Units

Average daily flow	847	m3 /day
peak wet weather flow	87.1	m3 / hr

CAPITAL COSTS	No.	Unit	Unit Price	Extension
Local collection system	9000	m length	$ 160	$ 1,440,000
Sanitary sewer local lift stations	1	each	$ 75,000	$ 75,000
Service Connections	968	each	$ 1,100	$ 1,064,800
Pump stations along route	1	each	$ 150,000	$ 150,000
150 mm Forcemain under Wood Lake	6750	m length	$ 200	$ 1,350,000
Changes to downstream lift stations	2	each	$ 30,000	$ 60,000
Lake Country WWTP expansion	847	m3/day	$ 1,500	$ 1,270,500
Subtotal , Capital Cost Estimate				$ 5,410,300
Contingency and Engineering 25%				$ 1,352,575
TOTAL CAPITAL COST, YEAR 2002 CDN DOLLARS				**$ 6,762,875**

ANNUAL O & M COSTS					
Plant chemicals and supplies		1	L.S.	$ 200,000.00	$ 200,000
Part Time Operator 2 stns @ 0.1 wage each		0.20	wages	$ 60,000.00	$ 12,000
O & M Pump / WWTP Electrical Costs	90	589,680	(kw - hr) /hr	$ 0.05	$ 29,484
TOTAL O & M COSTS, YEAR 2002 CDN DOLLARS					**$ 241,484**

PROGRAM INPUT DATA

6.00%	Interest (Discount) rate
2.75%	Inflation Rate
$ 6,762,875	Initial Capital Investment
$ 241,484	Initial Operating Cost
25	Lifecycle Period
847	Capacity of Option ML/day
2002	Starting Year

Year	Capital Cost ($)	2.75% O&M Cost ($)	Total Annual Cost ($)	6.00% Discounted Capital Cost ($)	Discounted O&M Cost ($)	Discounted Annual Cost ($)
2002	6,762,875	241,484	7,004,359	6,380,071	227,815	6,607,886
2003		248,125	248,125	-	220,830	220,830
2004		254,948	254,948	-	214,059	214,059
2005		261,959	261,959	-	207,496	207,496
2006		269,163	269,163	-	201,134	201,134
2007		276,565	276,565	-	194,968	194,968
2008		284,171	284,171	-	188,990	188,990
2009		291,985	291,985	-	183,195	183,195
2010		300,015	300,015	-	177,578	177,578
2011		308,265	308,265	-	172,134	172,134
2012		316,743	316,743	-	166,856	166,856
2013		325,453	325,453	-	161,740	161,740
2014		334,403	334,403	-	156,781	156,781
2015		343,599	343,599	-	151,974	151,974
2016		353,048	353,048	-	147,315	147,315
2017		362,757	362,757	-	142,798	142,798
2018		372,733	372,733	-	138,420	138,420
2019		382,983	382,983	-	134,176	134,176
2020		393,515	393,515	-	130,062	130,062
2021		404,337	404,337	-	126,074	126,074
2022		415,456	415,456	-	122,209	122,209
2023		426,881	426,881	-	118,462	118,462
2024		438,620	438,620	-	114,830	114,830
2025		450,682	450,682	-	111,309	111,309
2026		463,076	463,076	-	107,896	107,896
2027		475,811	475,811	-	104,588	104,588
		Net Present Value		**$ 6,380,071**	**$ 4,123,689**	**$ 10,503,760**
				Capital	**O&M**	**TOTAL**

Oyama Sewer Options

SUMMARY OF LIFECYCLE COSTS

Option	Description	Capital Cost ($)	Current O&M Year 2002 ($)	Discounted O&M cost ($)	Total Discounted Cost ($)	Capital Cost per Lot $
	Total Number of Existing Lots					225
	Total Number of Future Development Connections					743
1	Construct WWTP and Treat on site	$ 7,739,938	$ 382,484	$ 6,365,812	**$ 13,667,640**	$ 7,995.80
2	Oyama Road forcemain	$ 5,623,999	$ 394,352	$ 6,563,335	**$ 12,524,774**	$ 5,809.92
3	Railway Option	$ 6,222,250	$ 257,864	$ 4,403,401	**$ 10,273,448**	$ 6,427.94
4	Underwater Option	$ 6,762,875	$ 241,484	$ 4,123,689	**$ 10,503,760**	$ 6,986.44