Final Report

Roadway Management System

Submitted to:

LEDUC COUNTY




January 2006

ISL

Executive Summary

Leduc County has approximately 2200 kilometres of paved and graveled roadways that services a large agricultural community, the Nisku Industrial Business Park, resource industries, seven hamlets and numerous residential subdivisions. The County has recognized a need to further advance the planning process outlined in the Transportation Master Plan and has initiated the development of the Roadway Management System (RMS). ISL was retained to assess the County's existing and future roadway infrastructure and system needs and recommend projects for 5, 10 and 20-year plans that will preserve and enhance the County's roadway network.

The objectives of the Roadway Management System are:

- Develop a comprehensive inventory of the existing roadway and bridge network.
- Define a strategy for the development and preservation of the roadway network based on life-cycle costs.
- Develop an engineering based criteria for prioritizing capital projects to ensure an orderly, efficient and cost-effective development and preservation of the roadway network.
- Recommend projects in order of priority for 5, 10 and 20-year plans.
- Provide cost estimates for the recommended projects.

In evaluating the existing roadway network, a comprehensive inventory of roadway information was gathered and summarized. The inventory contains roadway data and that was gathered from either existing data sources or from field surveys performed as part of this study. The inventory includes road surface type, road classification, traffic volumes, visual condition index, structural condition index, bridge condition assessments, roadway surface width and other pertinent roadway data.

A series of four stakeholder group meetings were held throughout the project. These meetings included County Roadway Maintenance Staff, Nisku Business Association,

Genesee Generating Station and Leduc Planning and Development. Issues discussed included high maintenance roadways, drainage concerns, trucking activities, and operational and safety concerns.

As part of the Roadway Management System, past roadway planning and traffic studies were also reviewed. The studies provided information on proposed roadway improvements within the County and surrounding municipalities. The key issues from these studies are integrated into the RMS to ensure an orderly growth of roadway network with every changing demographics.

A life cycle cost analysis of roadway surfaces was also conducted as part of the RMS. Within the County, 85% of the roadways are graveled surfaced with paved roads accounting for 12% and oiled roads 3%. Life cycle cost analysis for County paved and cold mix roads roadways are based on life expectancy of 40 and 20 years respectfully. With proper maintenance of gravel roadway, the theoretical life expectancy is infinite and therefore no calculations are required.

In comparing the life cycle cost of paved versus cold mix surfaced roads, a 23% savings on yearly costs can be realized with a paved surface roadway. Although the estimated costs used in the comparison are at a planning level, and various factors can affect the actual life of roadway, the comparison illustrates the preference for paved surface roads in terms of life cycle costs.

A priority ranking system was developed to assist in producing the 5, 10 and 20 year capital programs. The purpose of the priority ranking system is to provide a system where a logical, efficient and cost-effective transportation network can be developed. The priority ranking system is based on roadway network continuity, traffic volumes/growth, roadway condition, roadway safety, connectivity of paved roadways and roadway network capacity. Primary and Secondary highways are under the jurisdiction of Alberta Infrastructure and Transportation and therefore were not considered in the development of the capital programs.

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1.0 Introduction

1.1 Background

Leduc County has approximately 2200 kilometres of paved, cold mixed and gravelled roadways that services a large agricultural community, the Nisku Industrial Business Park, resource industries, seven hamlets and numerous residential subdivisions. The County is characterized by its proximity to the City of Edmonton and the major urban centres of Leduc, Beaumont and Devon as well as the Edmonton International Airport located within the County boundaries.

In 2001, the Leduc County Transportation Master Plan Study was carried out. In assessing the transportation infrastructure, Leduc County has recognized a need to further advance the planning process outlined in the Transportation Master Plan and has initiated the development of a Roadway Management System (RMS). ISL was retained to assess the County's existing and future roadway infrastructure and system needs and recommend projects for 5, 10 and 20-year plans that will preserve and enhance the County's roadway network.

1.2 Study Objectives

The primary objective of the RMS is to develop engineering based criteria for prioritizing capital projects to ensure an orderly, efficient and cost-effective development and preservation of the roadway network. Other project objectives include the following:

- Develop a comprehensive inventory of the existing roadway and bridge network.
- Define a strategy for the development and preservation of the roadway network based on life-cycle costs.
- Recommend projects in order of priority for 5, 10 and 20-year plans.
- Provide concept level cost estimates for the recommended projects.

2.0 Data Gathering

2.1 Existing Roadway Network

Leduc County presently has approximately 2200km of County Main Roads, Local Roads, Hamlet and Subdivision Roads under its jurisdiction and control. An overall map of the County showing the existing roadway network is shown in Exhibit 2.1. Exhibit 2.2 illustrates the existing roadway functional classification.

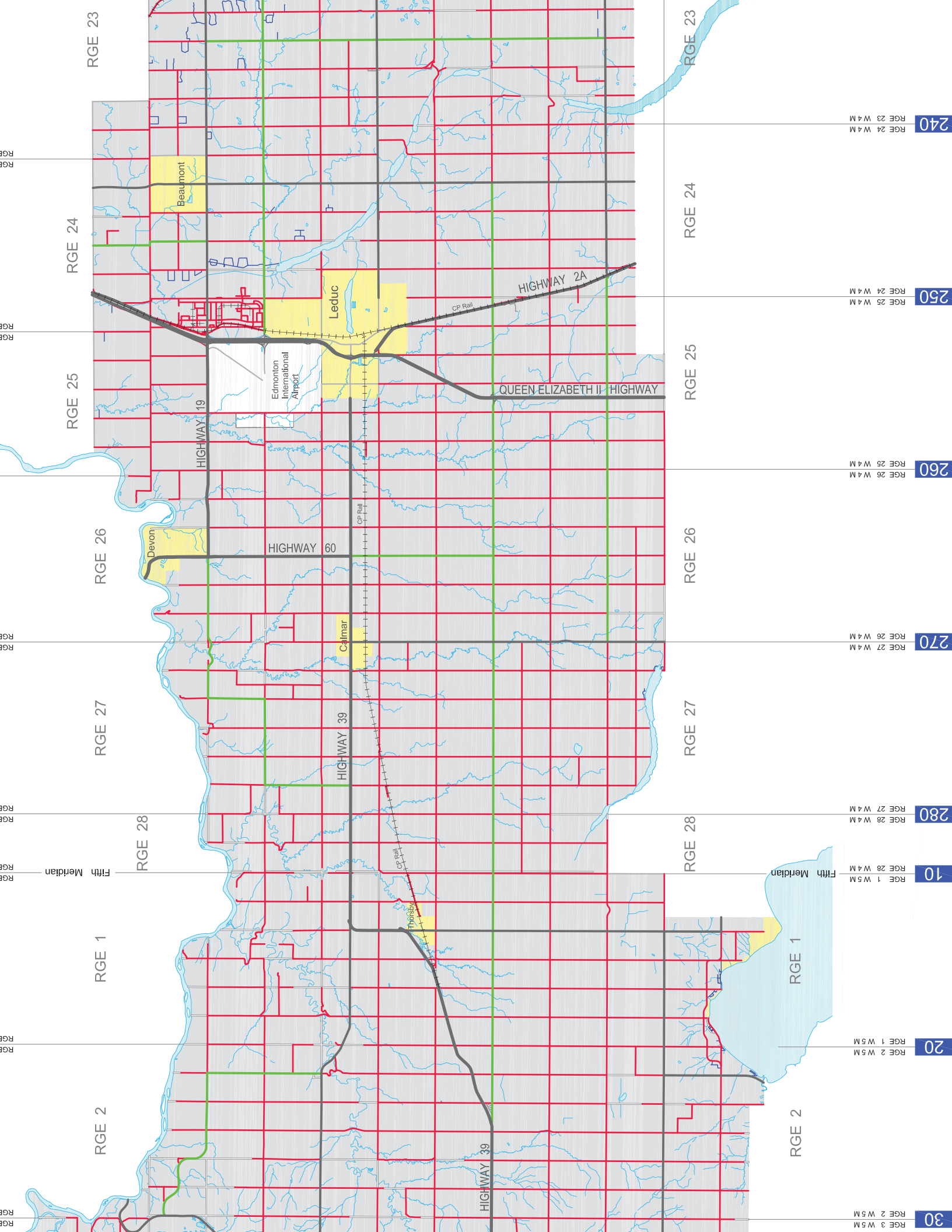
In evaluating the existing roadway network, a comprehensive inventory of roadway information was gathered and summarized in a spreadsheet format. The inventory contains the following roadway data and was gathered from either existing data sources or from field surveys performed as part of this study:

- Surface Type - Roadway surface type data was taken from the County's 2005 updated RoadNet GIS system. The three surface types are gravel, cold mix/oiled and paved

- Road Classification - Data taken from the County's 2005 updated RoadNet GIS system. The three classifications are County Main Roads, Special Purpose Roads, and Local Roads.

- Traffic Counts - Data taken from the County's 2001 Transportation Master Plan and supplemented by additional new raw data traffic counts collected to date by the County and from Alberta Infrastructure & Transportation data base. All traffic count data was factored to Average Annual Daily Traffic (AADT) and projected to 2005 traffic volumes using a 3.0% growth rate.

- Accidents - Data taken from the County's 2001 Transportation Master Plan. (ISL requested recent accident information from the RCMP but the request was denied.)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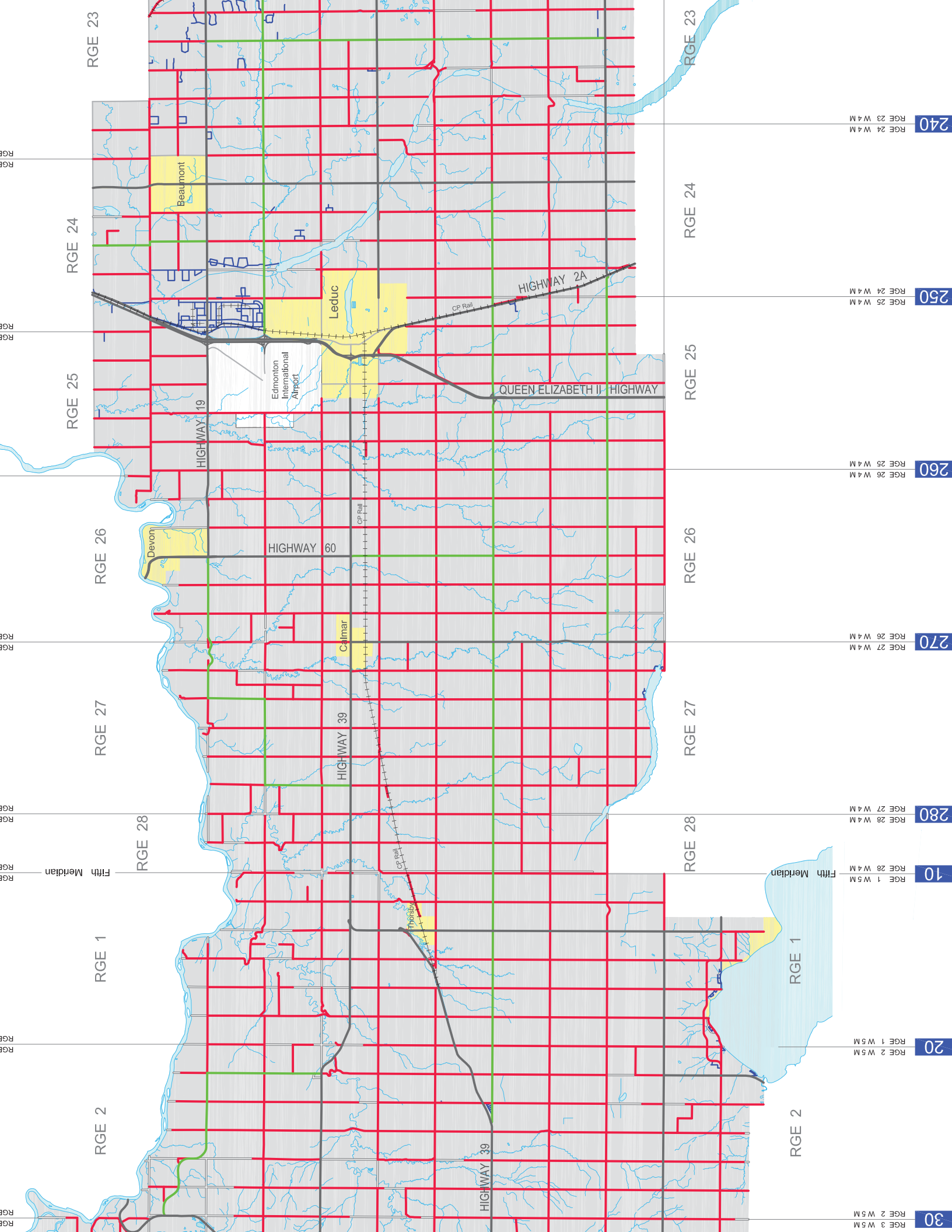
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Fifth Meridian
Beaumont
Leduc
Edmonton International Airport
Devon
Calmar
Thorsby
HIGHWAY 2A
QUEEN ELIZABETH II HIGHWAY
HIGHWAY 19
HIGHWAY 60
HIGHWAY 39
CP Rail

- Visual Condition Index (VCI) of Roadways – Conducted by ISL as part of the study. This is a commonly recognized method of assessing the relative conditions of a number of roadways. The VCI evaluated roadway condition with attention to cracking, rutting, potholes, and surface deterioration. Roadway sections were ranked on a 1 to 5 basis as follows:
    1. Very Poor – Reduced roadway operating speeds (<40kph) with extensive deformations and possible vehicle damage.
    2. Poor – Many surface deformations with short roadway sections requiring reduced speeds.
    3. Average – Some surface deformations with normal roadway operating speeds.
    4. Good – No surface deformations.
    5. Very Good – New or like new roadway surface.

- Structural Condition Assessment – Conducted by Thurber Engineering Ltd. as part of the study. Benkelman Beam testing was conducted on all paved roads within the County at a rate of three tests per kilometer. This is a commonly recognized method of assessing the structural adequacy of a paved roadway by measuring deflections on the roadway surface. Deflection results are summarized for each roadway section.

- Bridge Condition Assessment – Data summarized from Alberta Infrastructure and Transportation data base.

- Pavement Structure – Data summarized from County roadway record drawings.

- Roadway Surface Width – Field measurements taken by ISL as part of the study.

- Year of Construction - Data summarized from County roadway record drawings.

- Sub-standard Roadway Alignments – Noted from field reviews conducted by ISL as part of the study and from stakeholder input.

- Safety Issues - Noted from field reviews conducted by ISL as part of the study and from stakeholder input.

All inventory data is summarized in appendix A and contained on the attached CD.

2.2 Stakeholder Input

A series of four stakeholder group meetings were held throughout the project. These meetings included County Roadway Maintenance Staff, Nisku Business Association, Genesee Generating Station and Leduc Planning and Development. Issues discussed included high maintenance roadway and drainage areas, trucking activities, operational and safety concerns.

2.2.1 County Roadway Maintenance Staff

A meeting was held at Leduc County office on Wednesday, March 30, 2005 to discuss roadway and bridge maintenance issues with County Roadway Maintenance Staff. A total of 58 specific issues were identified during the meeting. The major issues were identified as:

- Poor structural condition of roadways
- Increased traffic volumes from new residential areas, oilfield trucking, recreational areas and regional land fill.
- Inadequate drainage adjacent to roadways and undersized culverts.
- Safety related issues such as poor sightlines, and substandard roadway alignments.

A summary of stakeholder input can be found in the appendix.

2.2.2 Nisku Business Association

A meeting was held at County office on Wednesday, April 13, 2005 to discuss roadway and drainage issues within the Nisku Industrial Business Park with the Nisku Business Association Board. The major issues were identified as:

- Upgrading of 5th Street and 8th Street to a paved industrial roadway standard.
- Upgrading of 15 Avenue to a paved industrial roadway standard.
- The upgrading of all other roadways in Nisku to a paved industrial roadway standard is envisioned but a lower priority.

2.2.3 Genesee Generating Station

A meeting was held at Genesee Generating Station on Tuesday, May 10, 2005 to discuss roadway and drainage issues in and around the Genesee site with Paula Schnick, EPCOR Land Services Co-ordinator. The major issues were identified as:

- Existing roads in and around the site were generally considered to be in good condition.
- The site generates little truck traffic on County roads. Almost all truck traffic utilizes Highway 770.
- Future mining plans are in place for development on the west side of Highway 770. This proposed development would involve closure of some County Local roads.

2.2.4 Leduc County Planning and Development

A meeting was held at County office on Wednesday, May 18, 2005 to discuss transportation planning issues within the County with Phil Newman, Director of Planning and Development for Leduc County. The major issues were identified as:

- Final report of the North Area Structure Plan (ASP) to be issued in the near future. The ASP identifies proposed road classification of future roadway improvements within the County and adjacent municipalities of City of Edmonton and Strathcona County.
- Spine Road extension to the South City of Edmonton boundary remains a high priority.
- Realignment planning for relocation Range Road 250 between Twp Road 502 to 500.
- Planning for upgrading of Twp Road 243 from Range Road 504 to 510.

- All frontage has been developed on Pigeon Lake. Some opportunity exists for secondary development to occur, e.g. Kerr Cape ¼ section.

2.3 Planning Studies

A number of planning studies were reviewed and information gathered on proposed roadway improvements within the County and surrounding municipalities. The key issues from these studies are integrated into the RMS to ensure an orderly growth of roadway network with ever-changing demographics. The planning studies reviewed and the key issues are listed below along with the key issues taken from the planning studies.

2.3.1 Leduc County Transportation Master Plan – May, 2001

A number of roadway improvement projects recommended for implementation have yet to be completed. These projects include:

- Nisku Spine Road
- Range Road 233 (Twp 494 to Twp 504)
- Range Road 254/253 (Twp 504 to Twp 512)
- New Sarepta Connector
- Beaumont West Connector
- Fruitland Road

These programs will be carried forward and included in the capital programs.

The master plan also identified a traffic volume threshold of 400 vehicles per day as the guideline for upgrading existing roadways to a paved standard. This guideline is used in development of the capital plan priority rankings.

2.3.2 Leduc County North Area Structure Plan – June, 2005

The North ASP provided a plan showing a number of key roadway network connections in Leduc County at the border with the City of Edmonton. An arterial roadway network was defined that integrates County roadways with new development in the southeast and southwest sections of Edmonton. Major four lane arterials were identified as range

Road 254/253 (170 St), Nisku Spine Road (91 St), Range Road 243 (66 St) and Township Road 512.

2.3.3 Leduc County Saunders Lake Area Structure Plan – September, 2004

This study provides conceptual realignment plans for the Rge Road 250/ Twp Road 500/Rge Road 245 (South Nisku Spine Road) along the east boundary of the City of Leduc. The plan indicates realignment of the roadway through the City of Leduc in the area of northeast Telford Lake.

2.3.4 Leduc County Blackmud Creek Area Structure Plan – September, 2004

This study provides information of proposed Industrial and commercial development over the study. No specific upgrading of the existing roadway network is identified.

2.3.5 Alberta Transportation Southeast Anthony Henday Drive Functional Planning Study (Draft Report) – January, 2004

The Southeast Anthony Henday Drive Functional Planning Study establishes the major roadway network for southeast Edmonton and roadway connections to the south into Leduc County. The major north-south arterial roadways include 91 Street, 50 Street and 17 Street with 66 and 34 Street designated as minor arterial roadways.

2.3.6 City of Leduc Transportation Study – July 2000

This study provides short and long range roadway network information within the City of Leduc. The Nisku South Spine was identified as an upgraded roadway to a paved four lane divided arterial standard.

2.4 Historical Resources Impact Assessment

Altamira Consulting Ltd. performed a Historical Resources Impact Assessment for the entire Leduc County with the specific objective to identify Historical Resources concerns or associated interests that may affect future planning and management of the County's roadway system. The report outlines current Historical Resources sites of interest and a

predictive model which identifies Historical Resource potential for all remaining portions of the County. Digital (GIS) maps showing the model distribution and specific locations is contained on a CD with the report.

2.5 County Road Programs

The County current operates four different roadway construction and maintenance programs. These are:

- Local Road Construction Program
- Rural Cold Mix Program
- Nisku Cold Mix Program
- Major Maintenance Program

The programs are based on a three year plan and are updated yearly based on current needs and carry over work from previous years. Information compiled within the programs are project description, location, type of work, roadway length, priority and comments. No cost estimates are provided for the various projects.

3.0 Life Cycle Costs

3.1 Introduction

Life cycle cost analysis of roadway surfaces is an effective tool in determining best long-term economic benefit of a roadway. The expected life of roadway can be affected by a number of factors that can dramatically influence the actual life of a roadway, e.g. truck traffic, soil conditions. For cost comparison purposes, we have considered these factors to be consistent for the various road surfaces.

Within the County, 85% of the roadways are graveled surfaced with paved roads accounting for 12% and oiled roads 3%. Life cycle cost analysis for County paved and cold mix roads roadways are based on life expectancy of 40 and 20 years respectfully. With proper maintenance of gravel roadway, the theoretical life expectancy is infinite and therefore no calculations are required.

The life cycle costs shown below are based on theoretical time frames and were developed for comparison purposes in determining the most cost effective surfacing strategy. Actual roadway maintenance strategies would need to be based on project specific parameters.

A yearly escalation of 4% was used in the cost estimates.

3.2 Paved Roads

For the purpose of the cost comparisons, we have assumed the average life of a paved road is 40 years. This value is based on accepted industry standards and our local roadway experience. With initial construction and scheduled maintenance over the life the paved road outlined below, the life cycle cost is calculated below:

Year 1 Asphalt Cost - $90/tonne

• Year 1 – Construct Paved Road	$190,000/km
• Year 6 – Seal Coat	$ 18,000/km
• Year 13 – Overlay	$ 80,000/km
• Year 19 - Seal Coat	$ 29,970/km
• Year 26 – Overlay	$133,200/km
• Year 32 - Seal Coat	$ 49,900/km
• Year 40 – Reconstruct	
Total	$501,070/km

Cost Per Year Paved Road – $12,525

3.3 Cold Mix Roads

We have assumed the average life of a cold mix road to be 20 years. The life cycle costs are calculated as follows:

Cold Mix Cost - $75/tonne

• Year 1 – Construct Cold Mix Road	$160,000
• Year 5 – Major Maintenance	$ 30,400
• Year 10 – Overlay	$ 88,800
• Year 15 – Major Maintenance	$ 45,000
• Year 20 – Reconstruct	
Total	$324,200

Cost Per Year Cold Mix Road – $16,210

3.4 Life Cycle Cost Comparison

In comparing the life cycle cost of paved versus cold mix surfaced roads, a 23% savings on yearly costs can be realized with a paved surface roadway. Although the estimated costs used in the comparison are at a planning level, and various factors can affect the actual life of roadway, the comparison illustrates the preference for paved surface roads in terms of life cycle costs.

4.0 Priority Ranking

4.1 Methodology

4.1.1 Paved Road Capital Program

In order to develop a logical, efficient and cost-effective transportation network, a priority ranking system was developed to assist in producing the 5, 10 and 20 year capital plans. The priority ranking system is based on roadway network continuity, traffic volumes/growth, roadway condition, roadway safety, connectivity of paved roadways and roadway network capacity.

A list of potential roadway projects were developed the gathered data and based on the following:

- Roads identified for improvements from reviewed planning studies.
- Graveled roads where traffic volumes exceeded 400 vehicles per day.
- Visual condition.
- Safety hazards such as substandard horizontal alignments or poor sightlines.
- Logical extensions of existing paved roads.
- Roads with poor existing or projected Level of Service (LOS). LOS is a measure used which provides a standard description of the ease of traffic flow or contrarily the level of traffic congestion.

The projects were ranked in order of highest priority to lowest based on a weighted scale of the primary criteria. Each roadway project were rated on 1 to 5 basis for each of the six primary criteria and assigned a weighted value that reflects the importance of the criteria within the overall roadway network as follows.

- Roadway Network Continuity - Weighted Value of 25%.
- Traffic Volumes/Growth – Weighted Value 25%
- Roadway Condition – Weighted Value 15%
- Safety – 15%

- Connectivity of Paved Roads – 10%
- Roadway Network Capacity – 10%

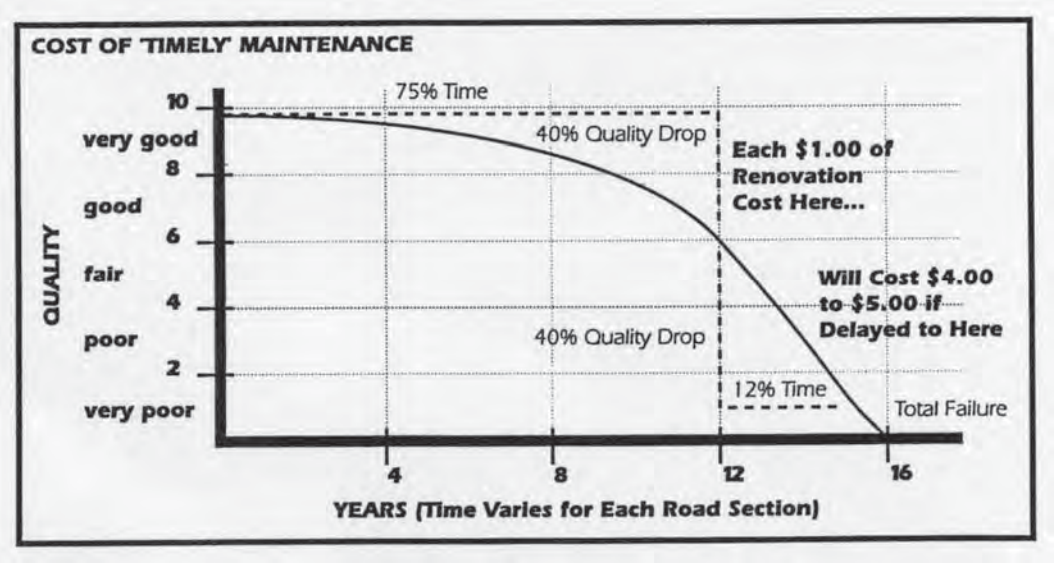
A summary of the Paved Road Capital Program priority list is shown on the following page in Figure 4.1.

4.1.2 Gravel Road Capital Program

The priority ranking for the Gravel Road Capital program is based on stakeholder input from County Roadway Maintenance staff and the visual condition assessment.

4.1.3 Maintenance Program

The ultimate goal of the roadway maintenance program is to extend the life of a roadway to meet or exceed its design life. To meet this goal, the maintenance program is based on the timely implementation of scheduled overlays and final asphalt lifts on staged paving projects. If these paving projects are deferred too long, the structural condition of the pavements may deteriorate to the stage where it is no longer cost-effective to rehabilitate them, and it becomes necessary to reconstruct at a much higher cost.



The priority ranking system is based strictly on the visual condition assessment and structural condition assessment. All paved County Main Roads and paved Local Roads were reviewed and ranked from highest priority to lowest. All roadways were evaluated

Capital Priority List

Rank	Road Name	From	To	Continuity Rating	Traffic Volumes	Condition Rating	Safety Rating	Connectivity Rating	Capacity Rating	Total	Weighted Total
1	Nisku Collector Roads			5	5	5	2	4	4	25	435
2	Rge 254/253	Twp 504	Twp 512	5	4	4	3	4	3	23	400
3	Nisku Spine Road	Twp 502	Twp 512	5	4	5	1	5	3	23	395
4	South Nisku Spine Road	Twp 500	Twp 502	5	3	3	1	4	3	19	330
5	Nisku Local Roads			3	4	5	2	3	2	19	330
6	Twp 510	Rge 234	Rge 245	4	4	2	1	5	3	19	325
7	Rge 243	Twp 510	Twp 512	4	4	3	1	3	3	18	320
8	Twp 510	Rge 250	Rge 255	4	3	4	1	3	3	18	310
9	Rge 240/235	Twp 502	Twp 512	4	4	3	1	3	2	17	310
10	Rge 253/252	Twp 504	Twp 512	3	3	4	1	3	3	17	285
11	Rge 244	Twp 504	Twp 510	3	3	3	1	3	3	16	270
12	Rge 32	Twp 484	Twp 490	2	4	4	2	2	1	15	270
13	Twp 505	Rge 243	Rge 245	3	3	3	1	3	2	15	260
14	Twp 505	Rge 234	Rge 241	3	3	3	1	2	2	14	250
15	Rge 233	Twp 494	Twp 510	1	4	3	2	2	2	14	240
16	Rge 11	Twp 495	Twp 502	2	3	3	1	3	2	14	235
17	Rge 241	Twp 500	Twp 504	2	3	3	1	3	2	14	235
18	Rge 240	Twp 510	Twp 512	2	3	3	1	3	2	14	235
19	Rge 263	Twp 490	Twp 495	2	3	2	1	4	2	14	230
20	Rge 223	Twp 500	Twp 502	1	3	3	3	2	2	14	230
21	Rge 40	Twp 490	Twp 492	2	3	3	1	2	1	12	215
22	Rge 244	Twp 481	Twp 494	1	3	4	1	1	2	12	205
23	Rge 263	Twp 482	Twp 490	2	2	3	1	3	1	12	200
24	Twp 500	Rge 221	Rge 223	1	3	3	1	3	1	12	200
25	Rge 252	Twp 481	Twp 494	1	3	2	1	2	2	11	185
26	Rge 224	Twp 502	Twp 510	1	2	3	1	2	2	11	175
27	Twp 502	Rge 223	Rge 224	1	2	3	1	2	2	11	175
28	Rge 260	Twp 482	Twp 490	1	2	2	1	2	1	9	150

Capital Priority List

Rank	Road Name	From	To	Continuity Rating	Traffic Volumes	Condition Rating	Safety Rating	Connectivity Rating	Capacity Rating	Total	Weighted Total
1	Nisku Collector Roads			5	5	5	2	4	4	25	435
2	Rge 254/253	Twp 504	Twp 512	5	4	4	3	4	3	23	400
3	Nisku Spine Road	Twp 502	Twp 512	5	4	5	1	5	3	23	395
4	South Nisku Spine Road	Twp 500	Twp 502	5	3	3	1	4	3	19	330
5	Nisku Local Roads			3	4	5	2	3	2	19	330
6	Twp 510	Rge 234	Rge 245	4	4	2	1	5	3	19	325
7	Rge 243	Twp 510	Twp 512	4	4	3	1	3	3	18	320
8	Twp 510	Rge 250	Rge 255	4	3	4	1	3	3	18	310
9	Rge 240/235	Twp 502	Twp 512	4	4	3	1	3	2	17	310
10	Rge 253/252	Twp 504	Twp 512	3	3	4	1	3	3	17	285
11	Rge 244	Twp 504	Twp 510	3	3	3	1	3	3	16	270
12	Rge 32	Twp 484	Twp 490	2	4	4	2	2	1	15	270
13	Twp 505	Rge 243	Rge 245	3	3	3	1	3	2	15	260
14	Twp 505	Rge 234	Rge 241	3	3	3	1	2	2	14	250
15	Rge 233	Twp 494	Twp 510	1	4	3	2	2	2	14	240
16	Rge 11	Twp 495	Twp 502	2	3	3	1	3	2	14	235
17	Rge 241	Twp 500	Twp 504	2	3	3	1	3	2	14	235
18	Rge 240	Twp 510	Twp 512	2	3	3	1	3	2	14	235
19	Rge 263	Twp 490	Twp 495	2	3	2	1	4	2	14	230
20	Rge 223	Twp 500	Twp 502	1	3	3	3	2	2	14	230
21	Rge 40	Twp 490	Twp 492	2	3	3	1	2	1	12	215
22	Rge 244	Twp 481	Twp 494	1	3	4	1	1	2	12	205
23	Rge 263	Twp 482	Twp 490	2	2	3	1	3	1	12	200
24	Twp 500	Rge 221	Rge 223	1	3	3	1	3	1	12	200
25	Rge 252	Twp 481	Twp 494	1	3	2	1	2	2	11	185
26	Rge 224	Twp 502	Twp 510	1	2	3	1	2	2	11	175
27	Twp 502	Rge 223	Rge 224	1	2	3	1	2	2	11	175
28	Rge 260	Twp 482	Twp 490	1	2	2	1	2	1	9	150

through one overlay cycle which is in the order of 12 to 20 years. Further visual and structural condition assessments would be required after each overlay cycle in order to re-evaluate the maintenance needs.

A summary of the Maintenance Program priority list is shown on the following page in Figure 4.2.

5.0 Capital and Maintenance Programs

5.1 Program Description

The capital program is separated into three sections: Paved Roads, Gravel Roads and Nisku Roads. The 5, 10 and 20 year programs have been developed and are listed below.

5.1.1 Paved Road Capital Projects – Five Year Plan

Year 1 and Year 2

Planning studies and detailed design work scheduled for completion. No construction projects are scheduled.

Year 3

Nisku Spine Road from Airport Road to 15 Avenue

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.
- Purchase additional road right-of-way.

Estimated Cost – $1,386,000

Nisku Spine Road from 15 Avenue to 17 Avenue

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.
- Purchase additional road right-of-way.

Estimated Cost – $1,342,000

Township Road 510 from Rge 240 to Rge 242

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.
- Upgrade creek crossings.

Estimated Cost – $2,138,000

Township Road 510 from Rge 235 to Rge 240

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $2,138,000

Year 4

Nisku Spine Road from 20 Avenue to 25 Avenue

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.
- Purchase additional road right-of-way.

Estimated Cost – $1,812,000

Township Road 510 from Rge 252 to Rge 254

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.
- Upgrade creek crossings.

Estimated Cost – $2,138,000

Year 5

Nisku Spine Road from 25 Avenue to Twp 510

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard.
- Construct new bridge at creek crossing.
- Ditches and drainage culverts improvements.
- Purchase additional land for road right-of-way.

Estimated Cost – $4,640,000

Township Road 510 from Rge 242 to Rge 244

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.
- Upgrade creek crossings.

Estimated Cost – $2,138,000

Township Road 510 from Rge 244 to Rge 245

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.
- Upgrade creek crossing.

Estimated Cost – $1,070,000

5.1.2 Paved Roads Capital Projects – 10 Year Plan

Year 6

Nisku Spine Road from Twp 510 to Twp 512

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard.
- Ditches and drainage culverts improvements.
- Purchase land for road right-of-way.

Estimated Cost – $8,330,000

Township Road 510 from Rge 250 to Rge 252

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $2,138,000

Year 7

Range Road 253 from Twp 510 to Twp 512

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Upgrade ditch and drainage culverts
- Purchase additional road right-of-way.

Estimated Cost - $3,578,000

Range Road 254 from Twp 504 to Twp 510

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard.
- Construct new bridge at Whitemud Creek
- Upgrade ditch and drainage culverts
- Purchase additional road right-of-way.

Estimated Cost - $4,658,000

Year 8

Nisku Spine Road from Twp 500 to Airport Road

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.
- Purchase additional road right-of-way.

Estimated Cost – $3,578,000

Nisku Spine Road from Twp 494 to Twp 500

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.
- Purchase land for additional road right-of-way.

Estimated Cost – $8,330,000

Year 9

Range Road 243 from Twp 510 to Twp 512

Proposed Improvements

- Construct the initial two lanes of a paved four lane divided arterial roadway standard.
- Upgrade ditch and drainage culverts.
- Upgrade creek crossings.
- Purchase land for additional road right-of-way.

Estimated Cost – $3,578,000

Range Road 235 from Twp 510 to Twp 512

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $2,138,000

Range Road 240 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Township Road 510 from Rge 254 to Rge 255

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $1,070,000

Year 10

Range Road 240 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard
- Upgrade ditch and drainage culverts

Estimated Cost - $1,710,000

Range Road 252 from Twp 510 to Twp 512

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard
- Upgrade ditch and drainage culverts.
- Upgrade creek crossing

Estimated Cost - $2,138,000

Range Road 253 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a paved two lane arterial roadway standard
- Upgrade ditch and drainage culverts

Estimated Cost - $2,138,000

Range Road 244 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

5.1.3 Paved Roads Capital Projects – 20 Year Plan

Year 11

Range Road 32 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Township Road 505 from Rge 243 to Rge 245

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $1,711,000

Township Road 505 from Rge 235 to Rge 241

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $1,711,000

Range Road 233 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 233 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 12

Township Road 505 from Rge 234 to Rge 235

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $855,000

Range Road 11 from Twp 495 to Twp 500

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $855,000

Range Road 241 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 233 from Twp 500 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 11 from Twp 500 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 241 from Twp 500 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 13

Range Road 233 from Twp 494 to Twp 500

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 253 from Twp 510 to Twp 512

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard
- Upgrade ditch and drainage culverts

Estimated Cost - $2,138,000

Nisku Spine Road from Airport Road to 15 Avenue

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culvert improvements.

Estimated Cost – $828,000

Range Road 240 from Twp 510 to Twp 512

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts
- Upgrade creek crossings

Estimated Cost - $1,711,000

Nisku Spine Road from 15 Avenue to 20 Avenue

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culvert improvements.

Estimated Cost – $1,337,000

Year 14

Range Road 263 from Twp 494 to Twp 495

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $855,000

Range Road 223 from Twp 500 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 40 from Twp 490 to Twp 492

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Nisku Spine Road from 20 Avenue to 25 Avenue

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.

Estimated Cost – $1,070,000

Range Road 263 from Twp 492 to Twp 494

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 15

Range Road 244 from Twp 492 to Twp 494

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Nisku Spine Road from 25 Avenue to Twp 510

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard.
- Construct new bridge at creek crossing.
- Ditches and drainage culverts improvements.

Estimated Cost – $3,326,000

Range Road 263 from Twp 490 to Twp 492

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 244 from Twp 490 to Twp 492

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 16

Range Road 254 from Twp 504 to Twp 510

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard.
- Construct new bridge at Whitemud Creek
- Upgrade ditch and drainage culverts

Estimated Cost - $3,326,000

Nisku Spine Road from Twp 510 to Twp 512

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard.
- Ditches and drainage culverts improvements.

Estimated Cost – $2,138,000

Township Road 500 from Rge 221 to Rge 223

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $1,711,000

Year 17

Range Road 244 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 263 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Nisku Spine Road from Twp 500 to Airport Road

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard.
- Ditches and drainage culverts improvements.

Estimated Cost – $2,138,000

Range Road 263 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 18

Range Road 244 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Nisku Spine Road from Twp 494 to Twp 500

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard
- Ditches and drainage culverts improvements.

Estimated Cost – $2,138,000

Range Road 244 from Twp 481 to Twp 482

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $855,000

Range Road 252 from Twp 490 to Twp 494

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 19

Range Road 224 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 243 from Twp 510 to Twp 512

Proposed Improvements

- Construct the final two lanes of a paved four lane divided arterial roadway standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $2,138,000

Range Road 252 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 224 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Year 20

Range Road 252 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Township Road 502 from Rge 223 to Rge 224

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts.

Estimated Cost – $855,000

Range Road 260 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

Range Road 252 from Twp 481 to Twp 482

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $855,000

Range Road 260 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a paved local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $1,711,000

5.1.4 Gravel Road Capital Projects – Five Year Plan

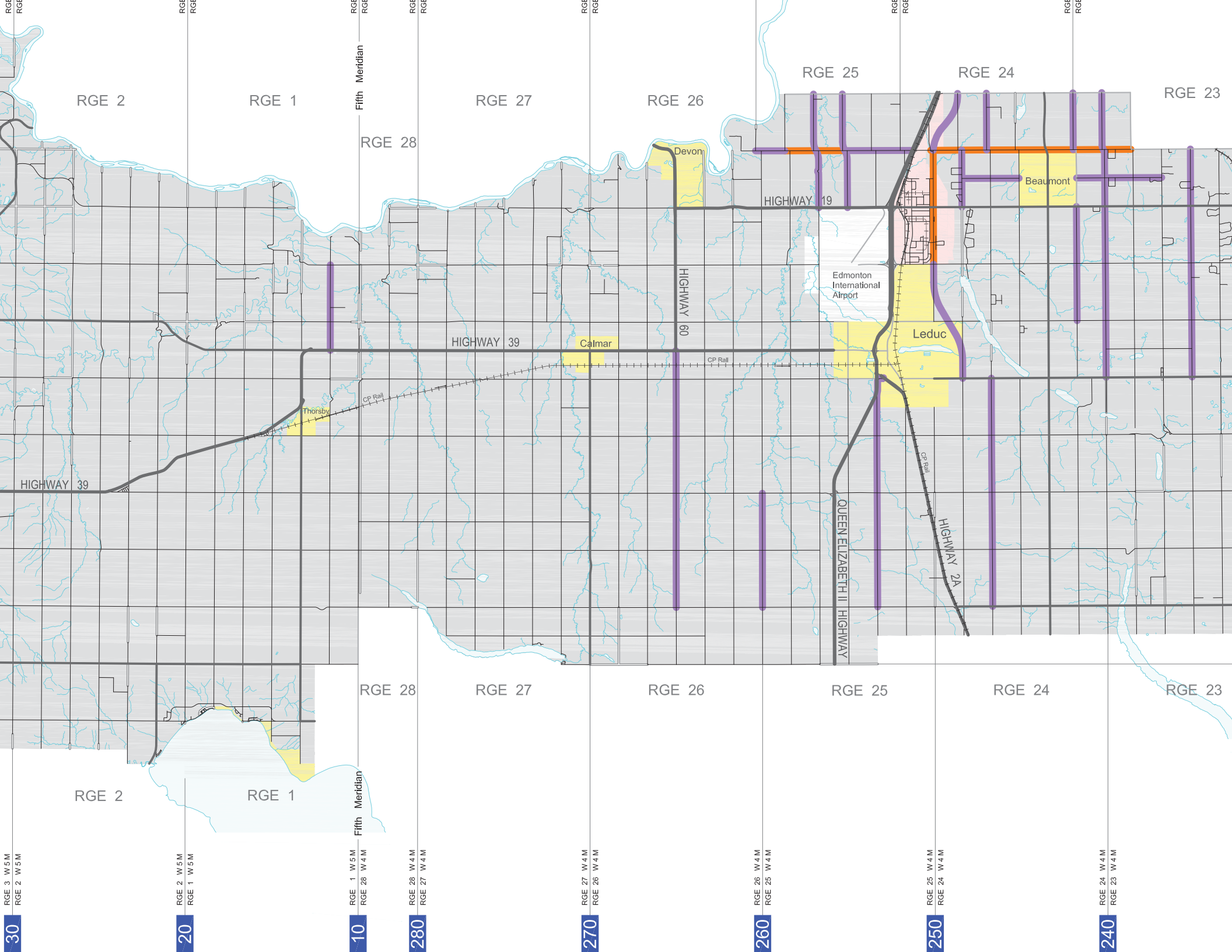
Year 1

Range Road 243 from Twp 504 to Twp 510

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $646,000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Fifth Meridian
RGE 28
RGE 27
RGE 26
RGE 25
RGE 24
RGE 23
Devon
Beaumont
HIGHWAY 19
HIGHWAY 60
Edmonton International Airport
Leduc
HIGHWAY 39
Calmar
CP Rail
Thorsby
QUEEN ELIZABETH II HIGHWAY
HIGHWAY 2A
RGE 3 W 5 M
RGE 2 W 5 M
RGE 1 W 5 M
RGE 28 W 4 M
RGE 27 W 4 M
RGE 26 W 4 M
RGE 25 W 4 M
RGE 24 W 4 M
RGE 23 W 4 M
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240

Range Road 223/Twp 510 Intersection

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $135,000 (County portion)

Range Road 232 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $646,000

Range Road 15 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $646,000

Range Road 262 from Twp 500 to Twp 501

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $323,000

Township Road 502A from Rge 12 to Rge 12A

Proposed Improvements

- Realign roadway through creek valley
- Upgrade ditch and drainage culverts

Estimated Cost - $700,000

Year 2

Range Road 262 from Twp 501 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $323,000

Range Road 262 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 234 from Twp 502 to Twp 504

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 234 from Twp 500 to Twp 502

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 220 from Twp 502 to Twp 503

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $323,000

Year 3

Township Road 503 from East of Rge 220 to Rge 221

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $505,000

Township Road 493A from Rge 240A to Rge 241

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Improve roadway alignment at east and west end of road.
- Upgrade ditch and drainage culverts

Estimated Cost - $291,000

Township Road 492 from Rge 234 to 0.8 Km West of Rge 234

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Improve roadway alignment.
- Upgrade ditch and drainage culverts

Estimated Cost - $647,000

Township Road 485/ Range Road 234 to Intersection

Proposed Improvements

- Improve roadway alignment.

Estimated Cost - $135,000

Range Road 273 from Twp 482 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 241 from Twp 481 to Twp 484

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $970,000

Year 4

Township Road 474 from Rge 21 to Rge 23

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 241 from Twp 484 to Twp 490

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

Range Road 33 from Twp 473 to Twp 480

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $970,000

Range Road 32 from Twp 473 to Twp 474

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $323,000

Year 5

Range Road 32 from Twp 474 to Twp 480

Proposed Improvements

- Reconstruct existing gravel road to a gravel local road standard.
- Upgrade ditch and drainage culverts

Estimated Cost - $650,000

5.1.5 Nisku Paved Road Capital Projects – Five Year Plan

Year 1

5th Street from 12 Ave to 15 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,090,000

8th Street from 23 Ave to 25 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

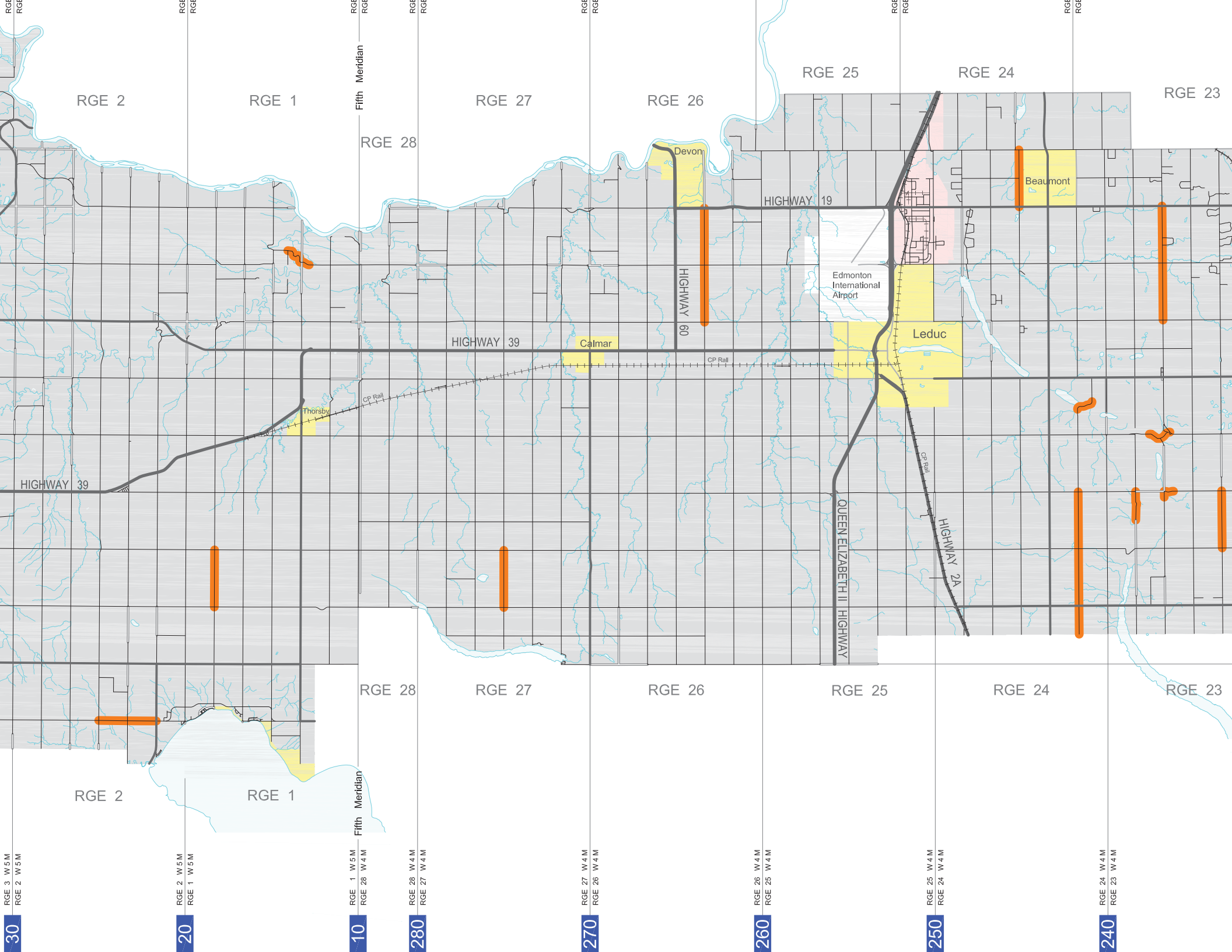
Estimated Cost - $1,070,000

5th Street from 15 Ave to 17 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,300,000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RGE 1
Fifth Meridian
RGE 28
RGE 27
RGE 26
RGE 25
RGE 24
RGE 23
Devon
Beaumont
HIGHWAY 19
HIGHWAY 60
Edmonton International Airport
Leduc
HIGHWAY 39
Calmar
CP Rail
Thorsby
HIGHWAY 2A
QUEEN ELIZABETH II HIGHWAY
RGE 3 W 5 M
RGE 2 W 5 M
RGE 1 W 5 M
RGE 28 W 4 M
RGE 27 W 4 M
RGE 26 W 4 M
RGE 25 W 4 M
RGE 24 W 4 M
RGE 23 W 4 M
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260
250
240

8th Street from 20 Ave to 23 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $814,000

5th Street from 17 Ave to 20 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $936,000

15th Avenue from 5 St to 7 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $667,000

15th Avenue from 7 St to 9 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $696,000

Year 2

7th /8th Street from 8A St to 13 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $888,000

5th Street from 20 Ave to N of 22 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $927,000

8th Street from 13 Ave to 15 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $814,000

8th Street from 15 Ave to 17 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,395,000

8th Street from 17 Ave to 20 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $930,000

14th Avenue/6th Street from 5 St to 15 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $658,000

8A Street from 7 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $901,300

Year 3

15th Avenue from 9 St to 11 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Collector roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $703,000

10th Street from 15 Ave to 16 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $316,000

Year 4

4th Street from 11 Ave to 15 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,230,000

4th Street from 15 Ave to 17 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,083,000

4th Street from 17 Ave to 20 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $833,000

4th Street from 20 Ave to 22 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $591,000

4th Street from 22 Ave to 25 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,083,000

18A Avenue/4A Street/19th Avenue

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $441,000

Year 5

11th Avenue/12th Avenue from 4 St to 7 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,776,000

13th Avenue from 4 St to 7 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,026,000

5.1.6 Nisku Paved Road Capital Projects – Ten Year Plan

Year 6

7th Street from 12 Ave to N. of 15 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,313,000

15A Avenue/ 6 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $393,000

Year 7

17th Avenue from 4 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,236,000

18th Avenue from 4 St to 5 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $392,000

18th Avenue from 5 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $987,000

Year 8

19th Avenue from 5 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $985,000

Year 9

6th Street from 20 Ave to 22 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $592,000

22nd Avenue from 4 St to 7 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,080,000

Year 10

21st Avenue from 6 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $733,000

7th Street from 21 Ave to 23 Ave

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $590,000

23rd Avenue from 7 St to 8 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $304,000

25th Avenue from 6 St to 9 St

Proposed Improvements

- Reconstruction of the existing cold mix roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $784,000

Sparrow Drive Service Road from 20 Avenue to 25 Avenue

Proposed Improvements

- Reconstruction of the existing gravel roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $1,568,000

Year 11 – Projects will be deleted should 4th Street Close North of 25 Avenue

4th Street from 25 Ave to ¼ Line

Proposed Improvements

- Reconstruction of the existing gravel roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

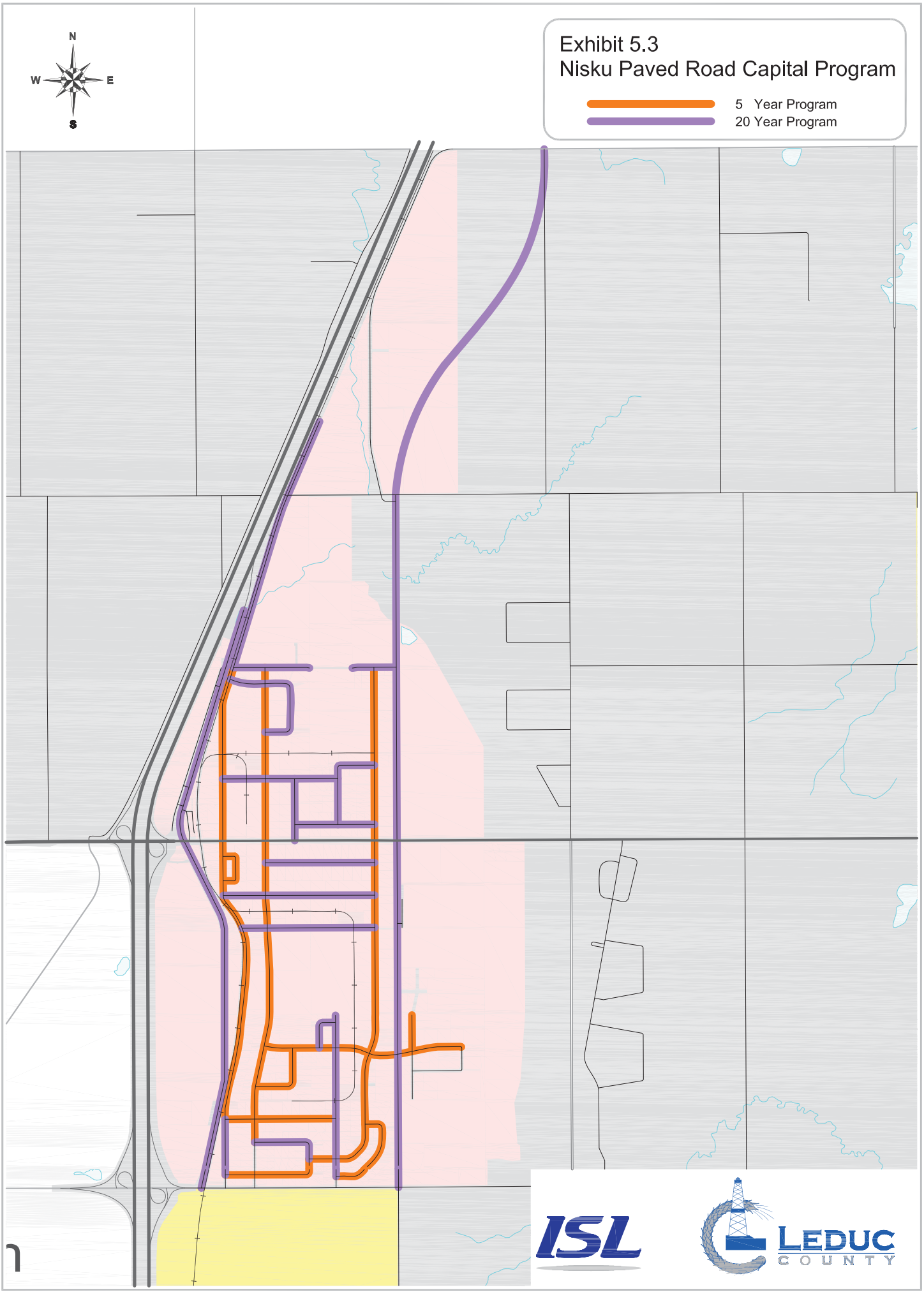
Estimated Cost - $784,000

4th Street from ¼ Line to 30 Ave

Proposed Improvements

- Reconstruction of the existing gravel roadway to a paved Industrial Local roadway standard.
- Upgrade ditch and drainage culverts
- Landscape of road right-of-way (ROW).

Estimated Cost - $795,000



5.1.7 Roadway Maintenance Projects

Road maintenance projects have identified and prioritized from highest to lowest based upon the visual and structural condition rating. These projects include the overlay or final stage paving of paved main roads and Nisku paved roads. The timing of the maintenance work and depth of asphalt overlay requires review on a project by project basis to ensure adequate structural capacity of roadway.

Year 1

7th Street from 8A Ave to 10 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $14,700

Wizard Lake Road from Rge 270 to Rge 271 and from Twp 480 to 481

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $488,000

Airport Road from Rge 242 to Rge 250

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 2

West Devon Main Road from Twp 502 to Twp 504

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $521,000

Sparrow Drive from Twp 504 to Twp 510

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $521,000

4th Street from 10 Ave to 11 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $14,700

9th Street from 17 Ave to 20 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $131,000

Year 3

Looking Back Lake Main Road from Rge 221 to Rge 231

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,563,000

Year 4

Glen Park Main Road from Rge 250 to Rge 260

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,563,000

Year 5

Glen Park Main Road from Rge 260 to Rge 270

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,563,000

Year 6

Sparrow Drive from Twp 502 to Twp 504

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $521,000

24th Avenue from 4 St to 5A St

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $85,000

Joseph Lake Main Road from Twp 494 to Twp 502

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 7

Joseph Lake Main Road from Twp 502 to Twp 510

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

5A Street from 18A Ave to 19 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $73,000

23A Avenue from 4 St to 5A St

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $34,000

9th Street Service Road from 17 Ave to 18 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $42,000

Year 8

616X from Rge 12 to Rge 21

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,466,000

Year 9

Clover Lawn North Main Road from Twp 482 to Twp 490

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Clover Lawn North Main Road from Twp 490 to Twp 494

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 10

Glen Park Main Road from Rge 242 to Rge 250

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 11

Glen Park Main Road from Rge 280 to Rge 12

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 12

Glen Park Main Road from Rge 270 to Rge 280

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,563,000

Year 13

Glen Park Main Road from Rge 12 to Rge 22

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,563,000

Year 14

West Devon Main Road from Rge 263 to Rge 272

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,302,000

Year 15

West Devon Main Road from Rge 272 to Rge 275

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $781,000

St. Francis Main Road from Rge 32 to Rge 40

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,042,000

Year 16

St Francis Main Road from Rge 40 to Rge 45

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,303,000

Year 17

Rabbit Hill Road from Twp 504 to Twp 510

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $521,000

14th Avenue from 10 St to 11 St

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $75,000

Year 18

West Devon Main Road from Twp 500 to Twp 502

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,050,000

Year 19

5th Street from 10 Ave to 12 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $65,000

5th Street from 23A Ave to 25 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $130,000

10th Street from S of 14 Ave to 15 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $72,000

11th Street from 14 Ave to 15 Ave

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $36,000

Year 20

Airport Road from Rge 231 to Rge 242

Proposed Improvements

- Asphalt Overlay of existing paved road

Estimated Cost - $1,824,000

5.1.8 Bridge Maintenance Projects

The County's bridge maintenance program is currently administered by EXH Engineering. EXH has submitted a three year bridge maintenance programs to Alberta Infrastructure and Transportation (AIT) for program and funding approval. Currently, the County has received an approved Local Road Bridge Request from AIT for 2005, 2006 and 2007. No cost estimates for the proposed work are available for this report. A summary of the approved bridge files is listed below:

2005 Construction

- Bridge File No. 74926 – Watercourse near Alsike
- Bridge File No. 1139 – Irvine Creek near Ellerslie

2006 Construction

- Bridge File No. 7541 – Watercourse near Telfordville
- Bridge File No. 7747 – Watercourse near Telfordville

2007 Construction

- Bridge File No. 13084
- Bridge File No. 13994 – Watercourse near Sunnybrook
- Bridge File No. 1090 – Watercourse near Devon

Other bridge rehabilitation projects on the County's priority list include the following:

- Bridge File No. 8046 – Watercourse near Leduc
- Bridge File No. 2247 – Eyot Irrigation Ditch near Millet
- Bridge File No. 76922 – Watercourse near Kavanagh
- Bridge File No. 75180 – Watercourse near Calmar
- Bridge File No. 13993 – Black Creek near Warburg
- Bridge File No. 9864 – Whitemud Creek near Kavanagh

- Bridge File No. 71293 – Irvine Creek near Beaumont
- Bridge File No. 76733 – Watercourse near Thorsby
- Bridge File No. 6543 – Watercourse near Leduc
- Bridge File No. 73862 – Watercourse near Leduc
- Bridge File No. 76385 – Watercourse near Warburg
- Bridge File No. 73681 – Watercourse near Nisku
- Bridge File No. 79497 – Watercourse near Telfordville
- Bridge File No. 588 – Clearwater Creek near Nisku
- Bridge File No. 6888 – Watercourse near Calmar

5.2 Program Costs

The cost of each of the individual projects was estimated in 2005 dollars. The estimates have been prepared to a "Level D" as outlined in the Leduc County Capital Planning document and are shown in Appendix H of this report. Details of the cost breakdowns are shown in Figure 5.1 on the following page. A contingency of 25% and an engineering amount of 10% have been included.

The County is currently proposing to allow a 25 % increase with the maximum vehicle weights within the Nisku Industrial Business Park. To accommodate the higher vehicle loads, a higher structural capacity pavement structure would need to be constructed. The additional pavement structure costs would increase the project costs by approximately a 25%.

FIGURE 5.1

Cost Estimate Breakdown (2005 Dollars)

Item	Cost
Cold Mix Removal	$12 m^2
Total Grading (New Roadway)	$300,000 km
Total Grading (Road Widening)	$15 m^2
Subgrade Preparation	$5 m^2
300mm Granular Base Course	$16 m^2
150mm Granular Base Course	$12 m^2
125mm Asphalt Concrete Pavement	$24 m^2
New Bridge Structure	$4,000 m^2
Drainage & Culvert Improvement	10% of roadway costs
Contingency	25% of roadway costs
Engineering	10% of roadway costs
Land	$30 m^2

6.0 Recommendations

6.1 Capital Programs

It is recommended that the County implement the Paved Road, Gravel Road and Nisku Paved Road Capital Programs as identified in Section 5 of this report.

6.2 Maintenance Program

It is recommended that the County implement the Maintenance program as identified in Section 5 of this report.

6.3 Others

- Based on life cycle costs, phase out cold mix surface roadways in favour of paved surfaces at the end of the cold mix road life.

6.4 On Going Review

It is recommended that this Roadway Management System be reviewed annually to take into account changes in travel patterns, changes in the rate of deterioration of Leduc County's roads and to ensure that project estimates completed are updated.

6.5 Policy/Procedural Changes

Keep track of project costs by project rather than by time and materials. Will allow for more accurate tracking of Leduc County costs.