

# LRS Uses in a Municipality

## City of Edmonton's Spatial Land Inventory Management (SLIM)

GIS-T

March 17, 2003

Colorado Springs



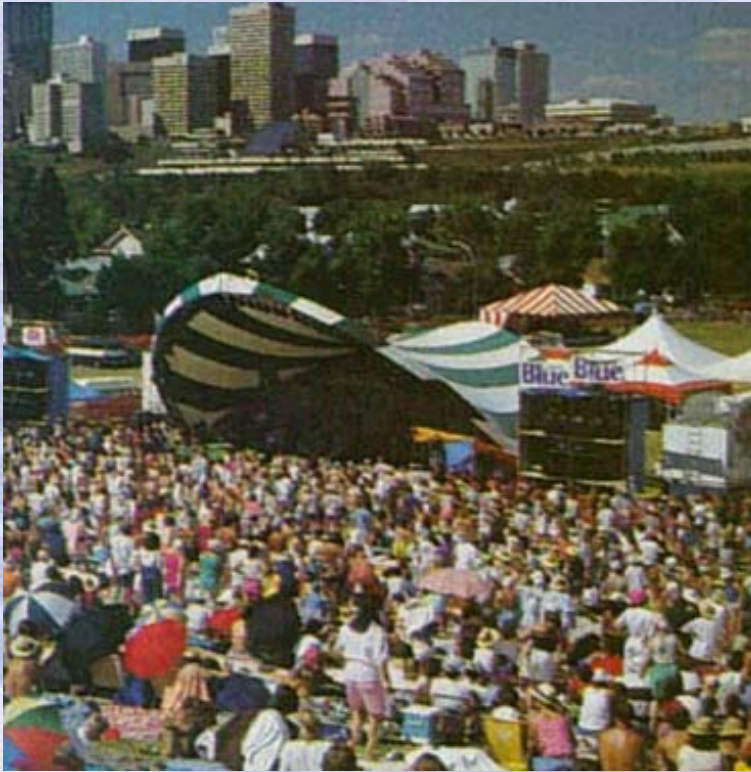
# Edmonton, Canada



# Edmonton, CANADA



# Edmonton



# Spatial Land Inventory Management (SLIM)

- Based on a transformative vision for spatial data management involving a repository and integration with other corporate applications that provides business staff with immediate access to the most current information



# SLIM

- Culture of excellence in GIS and data maintenance
- 80 per cent of municipal data related to a location
- Business staff knowledgeable in mapping and spatial data



# SLIM Data

- Legal Survey parcels
- Assessment parcels
- Title parcels
- Civic holdings
- Parkland Assets
- Zoning and Land Use
- Underground utilities
- Street Lights and Trolley
- Addresses
- Single Line Street Network
- Sidewalk structure/condition
- Road structure/condition
- Buildings, entryways
- Demographic data
- Administrative areas such as
  - Community leagues
  - Neighbourhoods
  - Wards
  - Voting subdivisions
  - Business Revitalization Zones (BRZ)
  - Residential parking program
  - Neighbourhood structure plans
  - Area structure plans
  - Major commercial corridors
  - Inspection areas
  - Traffic districts / zones



# Temporal Data

- Store data in three states:
  - Proposed
  - Current
  - Historical
- Maintain audit trail for data maintainers
- Maintain historical and proposed states for business users





# SLIM Software

- GeoMedia v5.0
- GeoMedia WebMap Professional
- GeoMedia Objects
- GeoMedia Transportation Manager
- Visual Basic
- ASP
- Crystal Reports
- Plumtree Portal (under development)
- GeoMedia Professional v5.0
- GeoMedia Transaction Manager (GTM)
- GeoMedia GDO for Oracle
- GeoMedia Transportation Analyst
- Visual Source Safe
- ZIP Internet
- IntelliWhere On Demand
- GeoMedia Web Map
- GeoMedia Parcel Manager
- GeoMedia Data Warehouse Tools
- Oracle 8i Spatial
- Oracle 9i Spatial
- Oracle Workspace Manager (OWM)
- FlexGrid
- Front Page
- FME



# LRS Project Objectives

- Retire text based inventory system built in 1979
- Integrate with Province of Alberta “Municipal Pavement Management Application”
- Generate inventory information from existing graphical Street Network
- Collect and maintain detailed structure/condition information for
  - Pavements
  - Sidewalks
  - Curbs/Gutters, Medians, Islands



# Inventory Data

## LRS Integrated:

Pavement, curb/gutter, medians, islands	3,148 km	\$4.0 billion
Sidewalks	4,138 km	\$0.6 billion

## Future Implementation:

Bridges	143	\$0.3 billion
Distinct Auxiliary Structures (e.g. bollards, gates, streetscape features)	22,625	\$1.4 million
Continuous Auxiliary Structures (e.g. guardrails, Jersey barriers, noise/retaining walls)	222 km	\$34 million



# LRS Data

- Pavement condition assessments include:
  - Visual Condition Index (Surface defects) (VCI)
  - Ride Comfort Index (RCI)
  - Structural Adequacy Index (SAI)
  
- Sidewalk condition assessments include:
  - Condition Severity Index
  - Trip Hazards



# LRS Integration

- Municipale Pavement Management Application
  - Provincial system used by major municipalities throughout the province
  - Summarized condition and structure data is analyzed
    - budgeting options and funding needs
    - planning future projects based on funding
  - Results can be graphically represented



# LRS Solution

- LRS Tools
  - GeoMedia Professional
  - GeoMedia Transportation
  - GeoMedia Transaction Manager
  - Oracle Spatial and Oracle Workspace Manager (OWM)
  - Custom code



# LRS Project Challenges

- Conversion of data from text to match graphic road network
- New, challenging technology for team
- Challenge defining an urban LRS Model
- Significant change and learning required
- Temporarily increased workloads for customers



# Benefits

- Inventory and condition based on graphic Road Network
- Detailed condition data recorded
- Easy graphical representation of information
- Manual calculation effort no longer necessary
- Temporal functionality





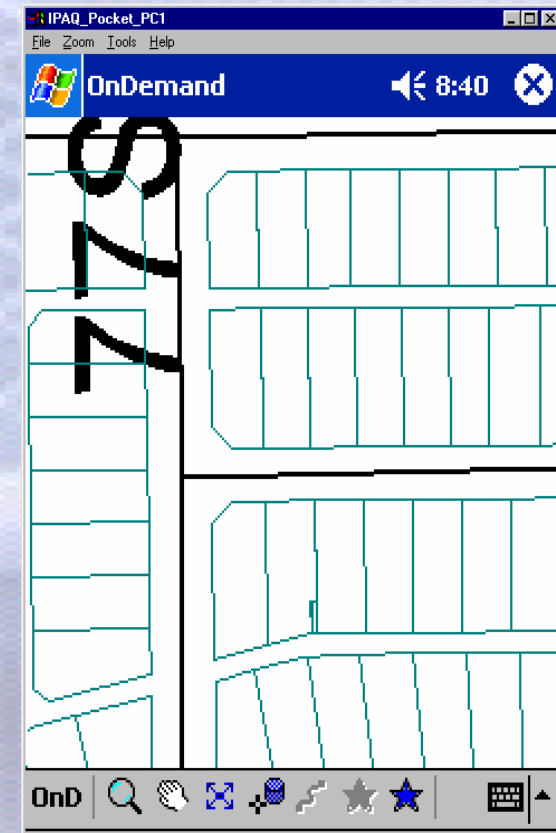
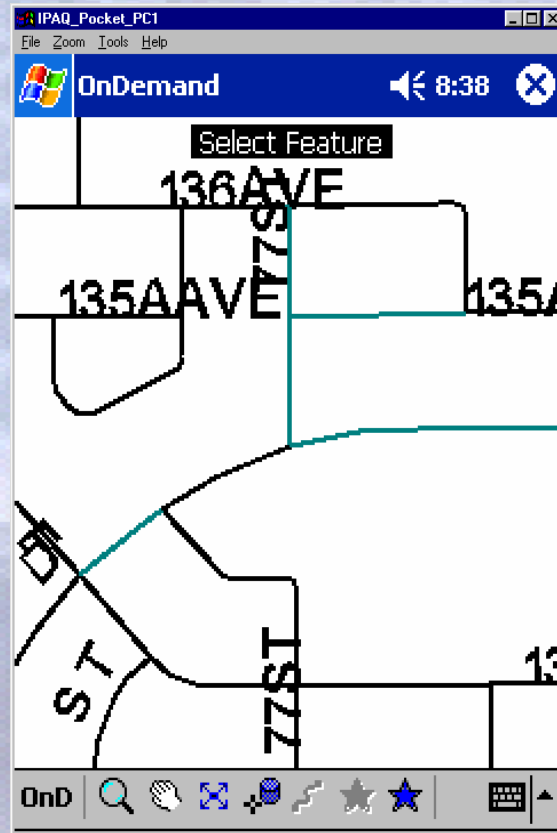
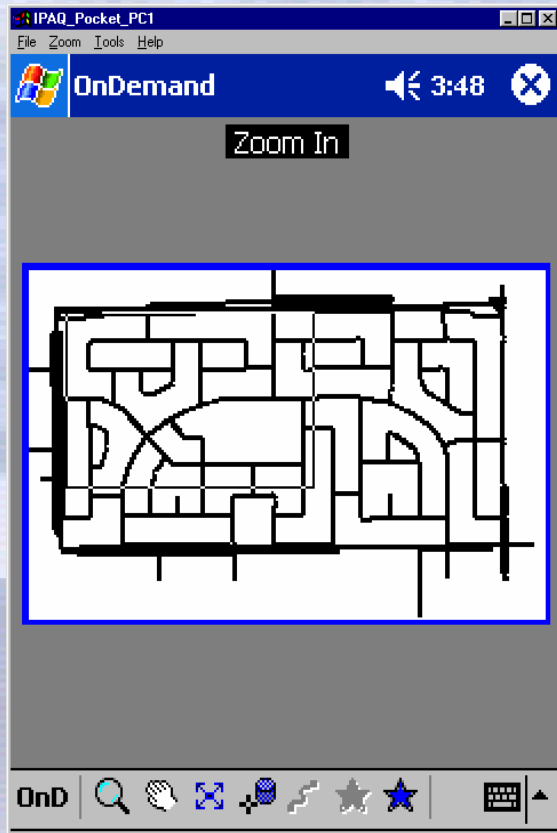
# Field Data Entry

- Performance comparison of paper surveys and electronic surveys
  - Overall, electronic survey process was in excess of 30% faster than the manual survey process
  - Detailed data available electronically and no data storage issues
  - Existing paper survey costs could be reduced by approximately 15-30%
  - Survey staffing levels could be re-allocated to begin including assessments of auxiliary structures



# PDA Data Capture

## Select details to display



# PDA Data Capture

## Sidewalk Condition Assessment

IPAQ\_Pocket\_PC1

File Zoom Tools Help

**Sidewalk Conditions** 8:27 OK

On: 135A AVENUE NW  
From: 75 STREET NW  
To: 77 STREET NW

Pavement: **Mono**

Surveyor: Chris Bielicki

Width: 1.5

Comment:

Done

General Distresses Major Distresses

Record: |<< >>|>\* of 1

IPAQ\_Pocket\_PC1

File Zoom Tools Help

**Sidewalk Conditions** 8:33 OK

WV 3 1 +

CL	1*	AF	75 STREET NW	X	Cmt	1	+	-
CL	1	AF	75 STREET NW	X	Cmt	1	+	-
WV	*	AF	75 STREET NW	X	Cmt	1	+	-

5's: 0 + - Len: 3

General Distresses Major Distresses

Record: |<< >>|>\* of 1

IPAQ\_Pocket\_PC1

File Zoom Tools Help

**Sidewalk Conditions** 8:36 OK

Distress: CL  
Rating: 1\*  
Address: 75 STREET NW(AF)  
Distress Count: 1  
Distress Comments: testing  
On: 135A AVENUE NW  
From: 75 STREET NW  
To: 77 STREET NW  
General Comments: test

OK

General Distresses Major Distresses

Record: |<< 1 >>|>\* of 1



# Demonstration



## City Website

[www.edmonton.ca](http://www.edmonton.ca)

<http://maps.gov.edmonton.ab.ca>

## Contacts

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[Wendy.Ritchie@edmonton.ca](mailto:Wendy.Ritchie@edmonton.ca)



# Road Structure Maintenance

GeoMedia Professional - [MapWindow1]

File Edit View Insert Tools Analysis Warehouse Legend Window Transportation Parcel Manager Transaction Help LRS Addressing Land Use Navigate Navigate

Road Structures

Name	Value
On Street Name	100 STREET NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	98 AVENUE NW
From Intersection Offset (m)	0
To Intersection	ROSSDALE ROAD NW [Eastbound]
To Intersection Offset (m)	0
Length (m)	196
Width (m)	13.4
Area (sq. m)	2626
Pavement Type	Soil Cement
Lane Position	0000
Lane Type	CenterLine
Lane Kilometers	0
Construction Date (mm/dd/yyyy)	06/06/1900
Revision Date (mm/dd/yyyy)	06/06/1984
Road Classification	Residential

Select | Record 118 of 15642 | Locate | Search | Clear

Road Composition

Layer Sequence	Layer Type	Thickness (cm)
1	Asphalt	5
2	Soil Cement	15
3	Gravel	15

Insert | Delete | Copy | Delete | OK | Cancel

11:15.579

Press F1 for Help.

Start | Inbox - Mic... | TOAD | [10]:01:54 | Microsoft... | Untitled... | Exploring... | Exploring... | GeoMed... | Windows... | 2:37 PM

GeoMedia Professional - [MapWindow1]

File Edit View Insert Tools Analysis Warehouse Legend Window Transportation Parcel Manager Transaction Help LRS Addressing Land Use Navigate Navigate

Road Structures

Name	Value
On Street Name	100 AVENUE NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	92 STREET NW (Right Turn Cutoff)
From Intersection Offset (m)	0
To Intersection	93 STREET NW
To Intersection Offset (m)	0
Length (m)	137
Width (m)	8
Area (sq. m)	1131
Pavement Type	Soil Cement
Lane Position	0000
Lane Type	CenterLine
Lane Kilometers	0
Construction Date (mm/dd/yyyy)	06/06/1952
Revision Date (mm/dd/yyyy)	06/06/1999
Road Classification	Residential

Select | Record 48 of 15642 | Locate | Search | Clear

Road Composition

Layer Sequence	Layer Type	Thickness (cm)
1	Asphalt	5
2	Soil Cement	30

Insert | Delete | Copy | Delete | OK | Cancel

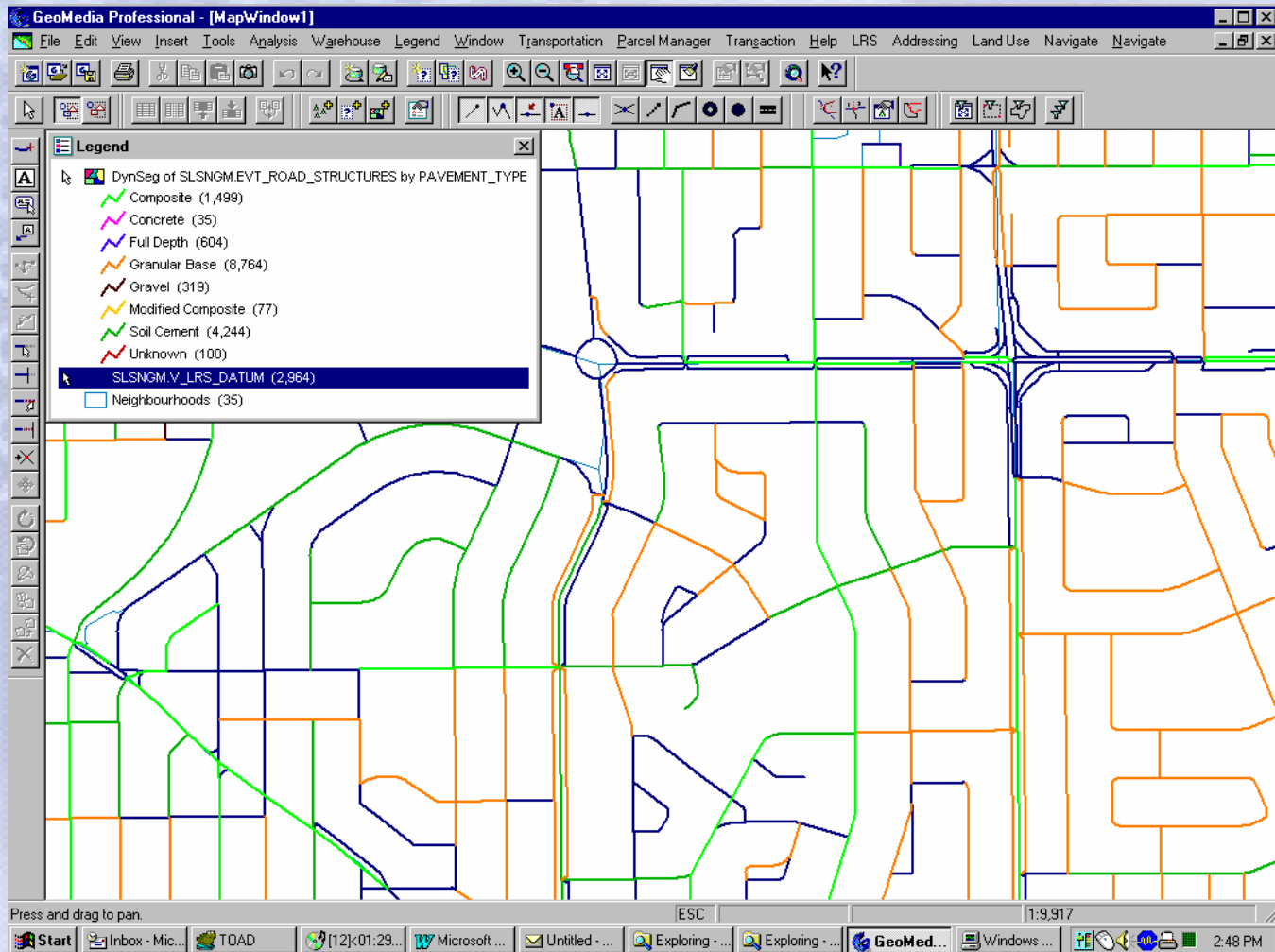
11:15.579

Press F1 for Help.

Start | Inbox - Mic... | TOAD | [09]:03:52 | Microsoft... | Untitled... | Exploring... | Exploring... | GeoMed... | Windows... | 2:30 PM



# Road Structure Thematic by Pavement Type



# Pavement Condition Maintenance

GeoMedia Professional - IManWindow11

Pavement Conditions

Pavement Condition Event

Name	Value
Surveyor	Blaine Hamilton
Visual Condition Index	8.34
Low Alligator %	.90
Med Alligator %	
High Alligator %	
Low Mapping %	
Med Mapping %	
High Mapping %	
Low Long and Trans %	.15
Med Long and Trans %	.15
High Long and Trans %	
Low Edge %	
Med Edge %	
High Edge %	
Low Distortion %	
Med Distortion %	.60
High Distortion %	
Low Rutting %	
Med Rutting %	
High Rutting %	
Low Ravelling %	1.88
Med Ravelling %	

Select    Record 4 of 13    < > >\*

Locate    Search    Area = 2654.000000000001    Clear

Pavement Condition Details

Condition Type	Condition Level	Length (m)	Width (m)	Area (sq. m)
Alligator	L	4.00	6.00	24.00
Distortion	M	4.00	4.00	16.00
Longitudinal	M	4.00		
Ravelling	L			50.00
Transverse	L	4.00		

Insert    Delete    Copy    Update %

Delete    OK    Cancel

1:9.917

Start    Inbox - Mic...    TOAD    [14] <03:53...    Microsoft ...    Untitled ...    Exploring ...    Exploring ...    GeoMed...    Windows ...    2:54 PM





# Sidewalk Structure Maintenance

The screenshot displays the GeoMedia Professional interface. A data table titled "Sidewalk Structures" is open, showing details for a specific record. The table has two columns: "Name" and "Value".

Name	Value
On Street Name	115 AVENUE NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	93 STREET NW
From Intersection Offset (m)	0
To Intersection	94 STREET NW
To Intersection Offset (m)	0
Lateral Offset (m)	6.55
Side Code	EVEN
Length (m)	78
Width (m)	1.5
Surface Finish	Standard
Configuration Type	Monolithic
Material	Concrete
Construction Date (mm/dd/yyyy)	06/06/1978
Revision Date (mm/dd/yyyy)	06/06/1996
Retire Date (mm/dd/yyyy)	

Below the table, there are navigation controls: "Select", "Locate", "Search", "Delete", "OK", and "Cancel". A status bar at the bottom of the table indicates "Record 16 of 24009".

The background shows a map view with a grid of streets. A specific sidewalk structure is highlighted in green on the map, corresponding to the data in the table.



# Sidewalk Condition Maintenance

**Sidewalk Conditions**

Sidewalk Event Details

Name	Value
On Street Name	40 AVENUE NW
Carriageway	EB-S
Segment Type	NORMAL
Special Key	N/A
From Intersection	117 STREET NW
To Intersection	119 STREET NW (Northbound)
Material Type	Concrete
Lateral Offset (m)	7
Side Code	ODD
Surveyor	David Machnicky
Collection Date (mm/dd/yyyy)	07/03/2003
Visual Condition Index	3.8
Trip Hazard Severity 1	1
Trip Hazard Severity 2	2
Retire Date (mm/dd/yyyy)	
ID	776

Record 4 of 8

**Sidewalk Conditions**

Sidewalk Event Details

Distress Details

Condition	Level	Distress Count	Trip Severity	ID
DJ	2	1	2	403
DJ	3	4	3	402
DJ	4	4	4	404
MD	1	4		407
MD	1**	1	1	408
MO	2	1		413
MO	3	2		416
No Distress	5	37		419
PS	4	2		415

Location Record(s) for Distress ID: 401

Name	Value
Address	119 Street
Address Modifier	CO
Distress Count	1
Comments	
ID	281

Record 1 of 1



# Island Structure Maintenance

The screenshot displays the GeoMedia Professional interface. A data table titled 'Island Structures' is open, showing details for a specific record. The table has two columns: 'Name' and 'Value'. The data for the selected record is as follows:

Name	Value
Street Name Full	OSLAND DRIVE NW
Carriageway	B
Segment Type	CULDESAC
Special Key	AddressRange=142-186/ID=17732
From Intersection	OSLAND CLOSE NW {Cul de sac} {Address 200-236}/OSLAND DRIVE
From Intersection Offset (m)	0
To Intersection	OSLAND DRIVE NW {Cul de sac} {Address 142-186}/OSLAND DRIVE
To Intersection Offset (m)	-23.089973845839
Curb Type	Unknown
Functional Type	Unknown
Center Fill Material	Unknown
Perimeter (m)	32
Area (sq. m)	0
Construction Date (mm/dd/yy)	06/06/1988
Revision Date	06/06/1988
Retire Date (mm/dd/yyyy)	
ID	1

Below the table, there are navigation controls: 'Select', 'Locate', 'Delete', 'Search', and 'Clear'. A status bar at the bottom of the table indicates 'Record 1 of 1140'. The background shows a map with a green line representing the selected structure. The Windows taskbar at the bottom shows the Start button, several open applications (Inbox, TOAD, Microsoft Office, etc.), and the system clock showing 3:01 PM on 03/15/2003.



# Island Condition Maintenance

The screenshot displays the GeoMedia Professional interface. The main map window shows a grid with a vertical island highlighted in green. A data table titled 'Island Conditions' is overlaid on the map, showing details for a specific record.

Name	Value
On Street Name	97 STREET NW
Carriageway	SB-S
Segment Type	NORMAL
Special Key	N/A
From Intersection	115 AVENUE NW
To Intersection	116 AVENUE NW
Surveyor	David Machnicky
Visual Condition Index	3
Collection Date (mm/dd/yyyy)	02/03/2003
Retire Date (mm/dd/yyyy)	
ID	147

Below the table are navigation controls: Select, Locate, Delete, and Record 3 of 3. The bottom status bar shows 'Press F1 for Help.' and a scale of 1:3,455.



# Curb / Gutter Structure Maintenance

The screenshot displays the GeoMedia Professional interface. The main window is titled 'Curb & Gutter Structures' and contains a data table with the following information:

Name	Value
On Street Name	OSBORNE CRESCENT NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	OSBORNE GATE NW [Northbound]
From Intersection Offset (m)	0
To Intersection	OSBORNE GATE NW [Southbound]
To Intersection Offset (m)	0
Lateral Offset (m)	-4.55
Side Code	0DD
Curb Length (m)	100
Gutter Width (m)	250
Curb Type	Unknown
Construction Date (mm/dd/yyyy)	06/06/1976
Revision Date (mm/dd/yyyy)	06/06/1998
Retire Date (mm/dd/yyyy)	

Below the table, there are navigation controls including 'Select', 'Locate', 'Delete', and 'Search' buttons. The status bar shows 'Record 37 of 30156'. The map view on the right shows a street layout with a red rectangle highlighting a specific curb and gutter structure.



# Curb / Gutter Condition Maintenance

**GeoMedia Professional - [MapWindow1]**

File Edit View Insert Tools Analysis Warehouse Legend Window Transportation Parcel Manager Transaction Help LRS Addressing Land Use Navigate Navigate

**Curb Conditions**

Name	Value
On Street Name	9 STREET NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	77 AVENUE NW
To Intersection	78 AVENUE NW
Surveyor	Blaine Hamilton
Curb Height (cm)	4
Lateral Offset (m)	-5.8
Side Code	EVEN
Visual Condition Index	4
Collection Date (mm/dd/yyyy)	01/31/2003
Retire Date (mm/dd/yyyy)	
ID	107

Select | Record 1 of 9 | Clear

Locate | Search | Delete | OK | Cancel

Press F1 for Help. ESC 1:5.000

Start | Exploring - C:\SLIM... | Exploring - G:\Land... | [05]<00:27> - CD PL... | Visual SourceSafe E... | GeoMedia Profe... | 5:08 PM



# Condition Details

**Detail Condition Reports**

LRS Traversal

On Street Name	101 STREET NW
Carriageway	B
Segment Type	NORMAL
Special Key	N/A
From Intersection	115 AVENUE NW
To Intersection	116 AVENUE NW

Select

Produce Pavement Detail Report  Produce Sidewalk Detail Report

Associated LRS Events

On Street Name	Carriageway	Segment Type	Special Key	From Intersecti
<input checked="" type="checkbox"/> 101 STREET NW B		NORMAL	N/A	115 AVENUE

Select All  
 Unselect All

OK Cancel

## Pavement Condition Detail

STREET NAME: 101 STREET NW  
 FROM: 115 AVENUE NW  
 TO: 116 AVENUE NW

SURVEY DATE: 02/03/2003  
 SURVEYOR: B Dave Hamilton

VISUAL CONDITION INDEX: 7.05

CRACKING PERCENTAGE				DEFORMATION PERCENTAGE			
	LOW	MEDIUM	HIGH		LOW	MEDIUM	HIGH
ALLIGATOR:			0.95	DISTORTION:			0.24
MAPPING:				RUTTING:			
LONG TRANS:				RAVELLING:			
EDGE:							

DETAIL DISTRESSES		LENGTH:	WIDTH:	AREA:
Alligabr	H	10	2	20
Distrtion	L			5
Alligabr	H	10	2	20
Distrtion	L			5

Edmonton  
 Monday, March 10, 2003  
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## City Website

[www.edmonton.ca](http://www.edmonton.ca)

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## Contacts

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