



# Bridging the Gap between Engineering and GIS

**Presented by: Karen Stewart, B.Tech, GISP**

Manager of Geomatics

Township of Langley

February 13, 2006

# Agenda



GIS and Asset Management

---

- Introduction
- History
- Goals
- Implementation
- Benefits
- Conclusion

# Introduction



GIS and Asset Management

---

Township of Langley (TOL), BC, Canada

- Approximately 91,000 residents
- 135 square miles
- City of Langley is not included
- Rapid growth rate
- Estimated to double in size in 10 years
- 70% of land base is in ALR
- 30% contains the majority of the 34,000 parcels

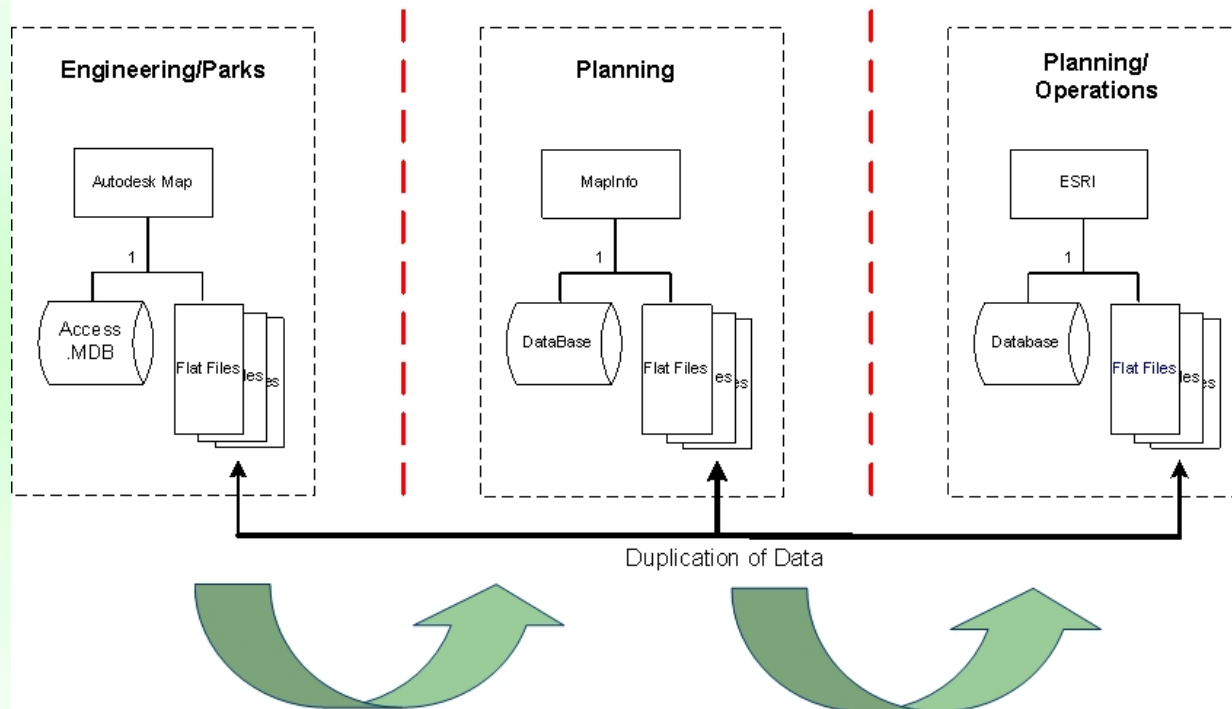
# Growth Management



GIS and Asset Management

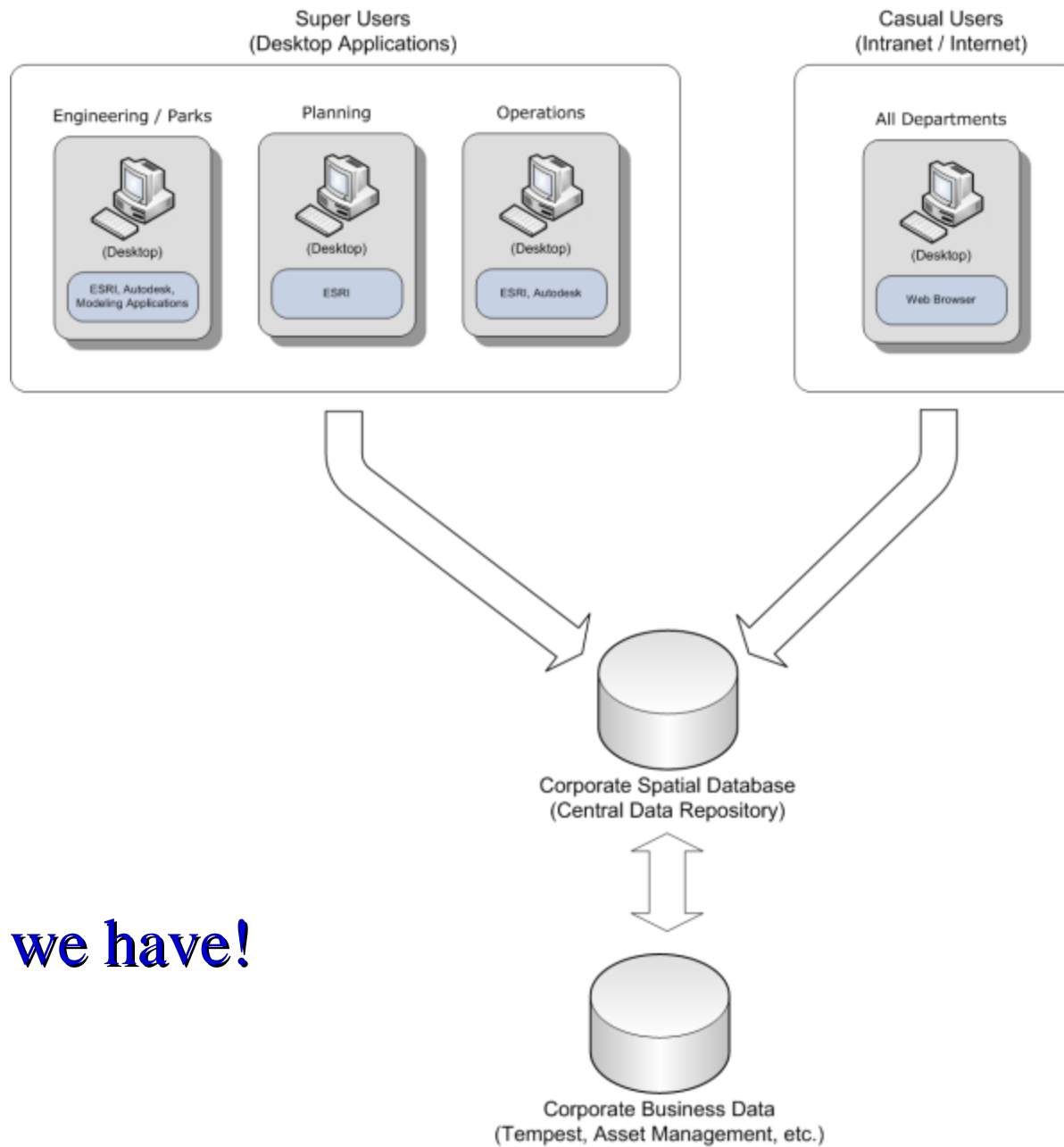
- Effective Growth Management
- Restructure Legacy Spatial Information
- Enterprise Geographic Information System (GIS)
- GIS Products to Structure and Deploy Spatial Information
- Mapping/CAD to Manage Cadastre and Infrastructure Spatial Information in the Enterprise Database
- Conversion software for interoperability

# What we had!



Data transfer between departments required conversion, whether scheduled or 'on the fly', which created processing delays.

Geomatics Department, Township of Langley



**What we have!**

# Goals



GIS and Asset Management

- Integrate existing enterprise systems  
**(Land records/Tax and GIS)**
- Coordinate the functions and datasets of internal departments  
**(One Source Data)**
- Promote information sharing and standardization of procedures  
**(Standards for data collection)**
- Reduce redundancies in data collection and maintenance  
**(Addresses in one source)**
- Increase functionality and efficiency in business processes

# Implementation

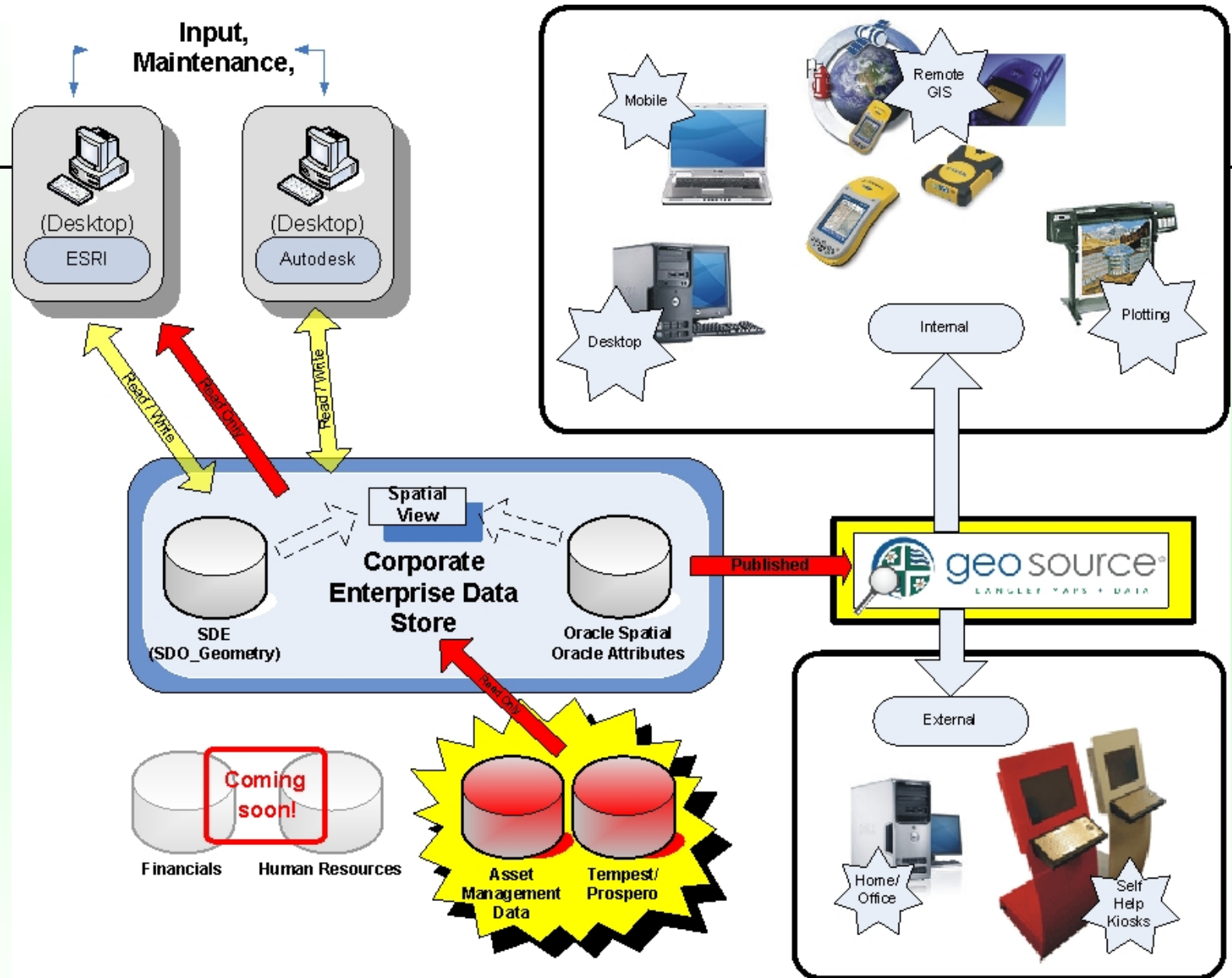


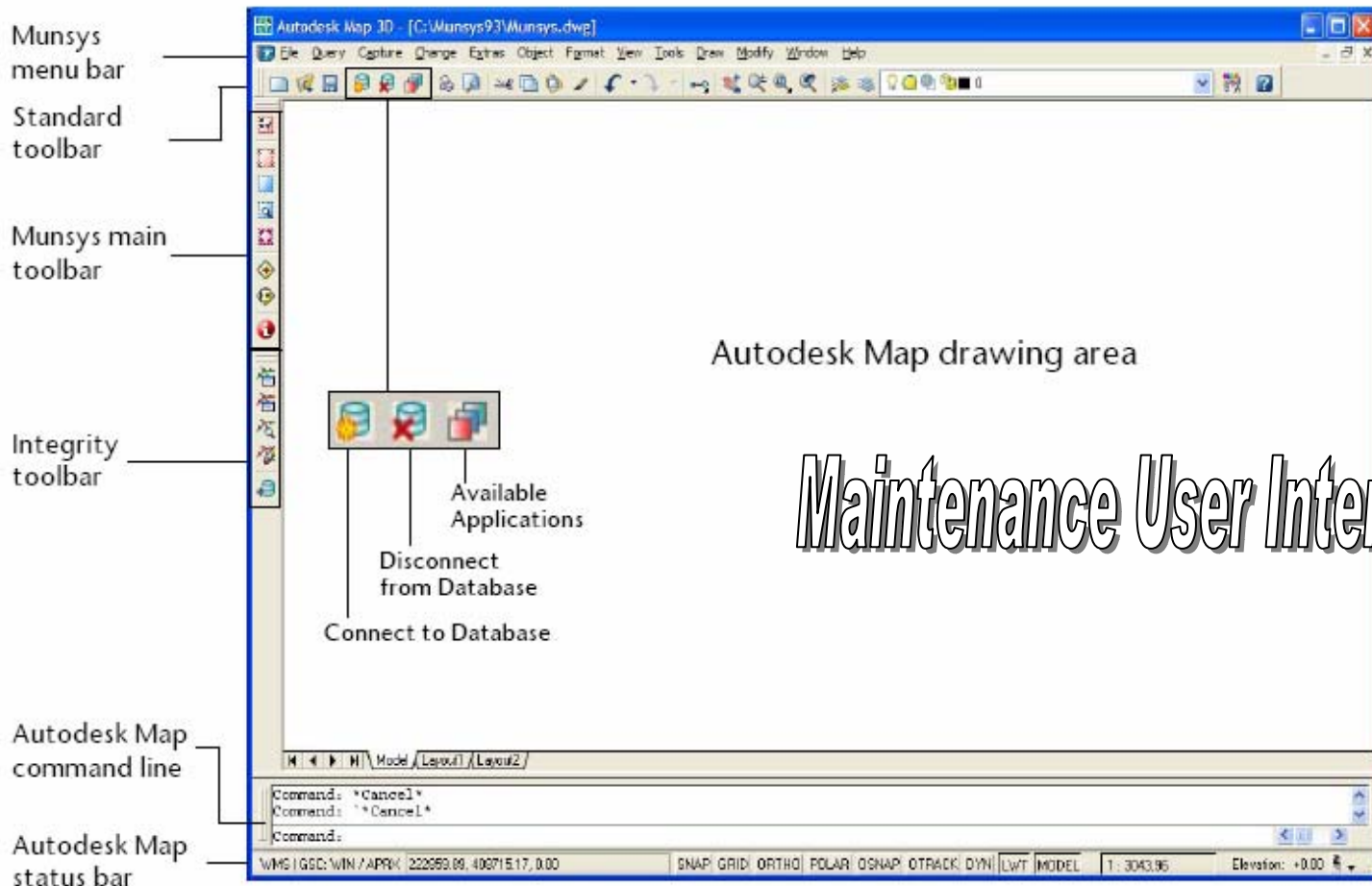
GIS and Asset Management

- Updated maintenance tools and processes have structured sewer and cadastre
- Spatial data is linked directly to Enterprise Systems
- Using Open Source Formats for all applications to promote integration
- Spatial Data is input directly into Enterprise Database – no file format storage of GIS
- Native Oracle spatial data is published and accessed directly with Maintenance and Publication applications

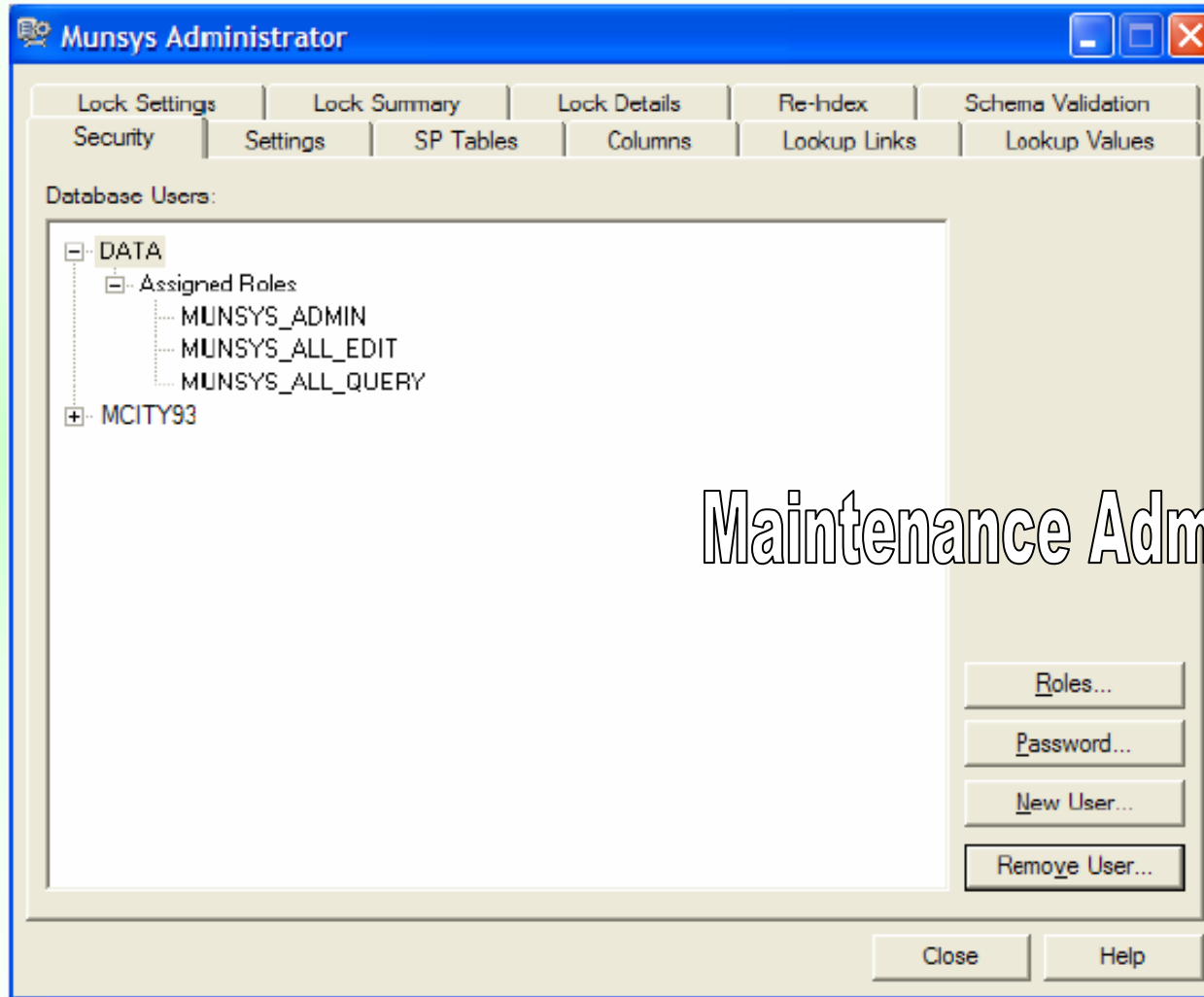


# The Geomatics Vision





# Maintenance User Interface



Maintenance Administrator

**Munsys Administrator**

Lock Settings | Lock Summary | Lock Details | Re-Index | Schema Validation  
 Security | Settings | SP Tables | Columns | Lookup Links | Lookup Values

Spatial Tables: **SP\_PARCEL**

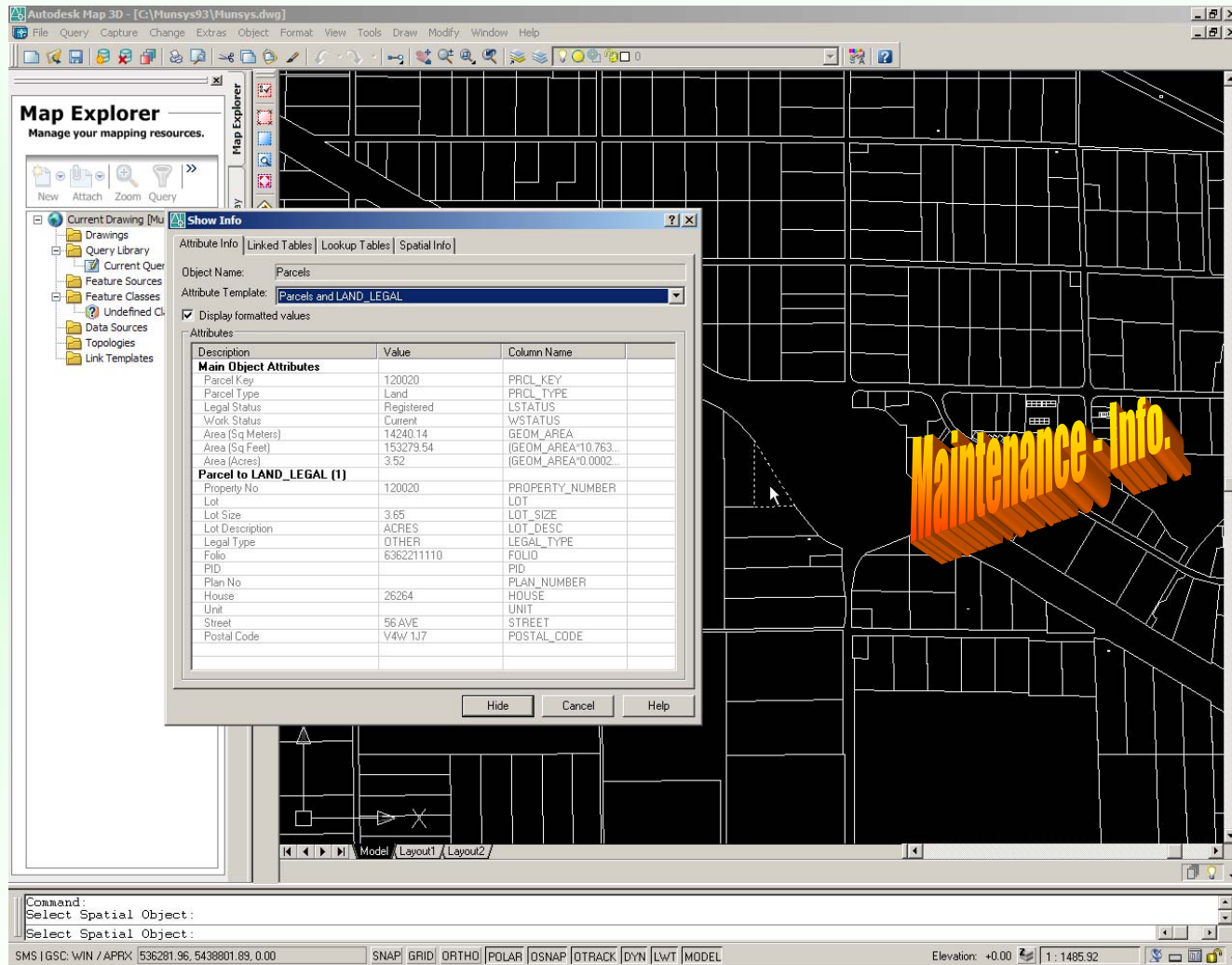
Column Name	Data Type	Width	Precision
GID	NUMBER	10	0
PRCL_KEY	VARCHAR2	50	
PRCL_TYPE	CHAR	3	
LSTATUS	CHAR	1	
WSTATUS	CHAR	1	
GEOM_AREA	NUMBER		
COMMENTS	VARCHAR2	150	
TAG_X	NUMBER		
TAG_Y	NUMBER		
TAG_VALUE	VARCHAR2	40	
TAG_SIZE	NUMBER		
TAG_ANGLE	NUMBER		
TAG_JUST	CHAR	2	
GEOMETRY	SDO_GEOMETRY	0	
LAYER_NAME	VARCHAR2	255	

Add...  
 Modify...  
 Delete...  
 Commit

Close Help

Admin Columns

# GIS and Asset Management

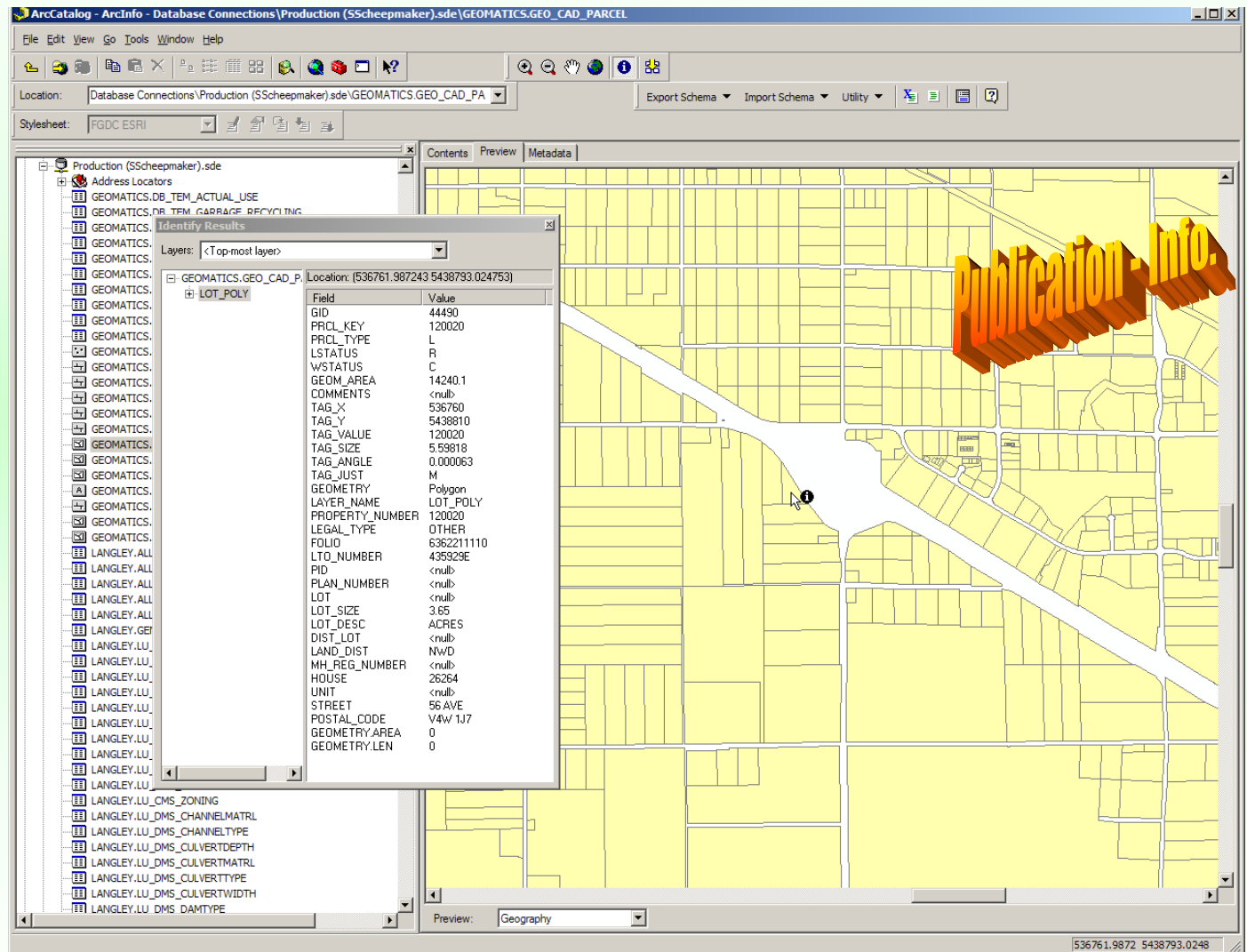


The screenshot shows the Autodesk Map 3D interface with a parcel map. A 'Show Info' dialog box is open, displaying the following attribute data:

Description	Value	Column Name
<b>Main Object Attributes</b>		
Parcel Key	120020	PRCL_KEY
Parcel Type	Land	PRCL_TYPE
Legal Status	Registered	LSTATUS
Work Status	Current	WSTATUS
Area (Sq Meters)	14240.14	GEOM_AREA
Area (Sq Feet)	153279.54	(GEOM_AREA*10.763...
Area (Acres)	3.52	(GEOM_AREA*0.0002...
<b>Parcel to LAND_LEGAL (1)</b>		
Property No	120020	PROPERTY_NUMBER
Lot		LOT
Lot Size	3.65	LOT_SIZE
Lot Description	ACRES	LOT_DESC
Legal Type	OTHER	LEGAL_TYPE
Folio	6362211110	FOLIO
PID		PID
Plan No		PLAN_NUMBER
House	26264	HOUSE
Unit		UNIT
Street	56 AVE	STREET
Postal Code	V4W 1J7	POSTAL_CODE

Maintenance - Info.

# GIS and Asset Management



The screenshot shows the ArcCatalog interface with a map of land parcels. A yellow semi-transparent overlay is applied to a specific parcel. An 'Identify Results' window is open, showing the following data:

Field	Value
GID	44490
PRCL_KEY	120020
PRCL_TYPE	L
LSTATUS	R
WSTATUS	C
GEOM_AREA	14240.1
COMMENTS	<null>
TAG_X	536760
TAG_Y	5438810
TAG_VALUE	120020
TAG_SIZE	5.53818
TAG_ANGLE	0.000063
TAG_JUST	M
GEOMETRY	Polygon
LAYER_NAME	LOT_POLY
PROPERTY_NUMBER	120020
LEGAL_TYPE	OTHER
FOLIO	6362211110
LTO_NUMBER	435929E
PID	<null>
PLAN_NUMBER	<null>
LOT	<null>
LOT_SIZE	3.65
LOT_DESC	ACRES
DIST_LOT	<null>
LAND_DIST	NwD
MH_REG_NUMBER	<null>
HOUSE	26264
UNIT	<null>
STREET	56 AVE
POSTAL_CODE	V4W 1J7
GEOMETRY.AREA	0
GEOMETRY.LEN	0

Publication - Info.

# Reading from Maintenance

Object Name: Parcels  
 Attribute Template: Parcels and LAND\_LEGAL  
 Display formatted values

Description	Value	Column Name
<b>Main Object Attributes</b>		
Parcel Key	120020	PRCL_KEY
Parcel Type	Land	PRCL_TYPE
Legal Status	Registered	LSTATUS
Work Status	Current	WSTATUS
Area (Sq Meters)	14240.14	GEOM_AREA
Area (Sq Feet)	153279.54	(GEOM_AREA*10.763...)
Area (Acres)	3.52	(GEOM_AREA*0.0002...)
<b>Parcel to LAND_LEGAL (1)</b>		
Property No	120020	PROPERTY_NUMBER
Lot		LOT
Lot Size	3.65	LOT_SIZE
Lot Description	ACRES	LOT_DESC
Legal Type	OTHER	LEGAL_TYPE
Folio	6362211110	FOLIO
PID		PID
Plan No		PLAN_NUMBER
House	26264	HOUSE
Unit		UNIT
Street	56 AVE	STREET
Postal Code	V4W 1J7	POSTAL_CODE

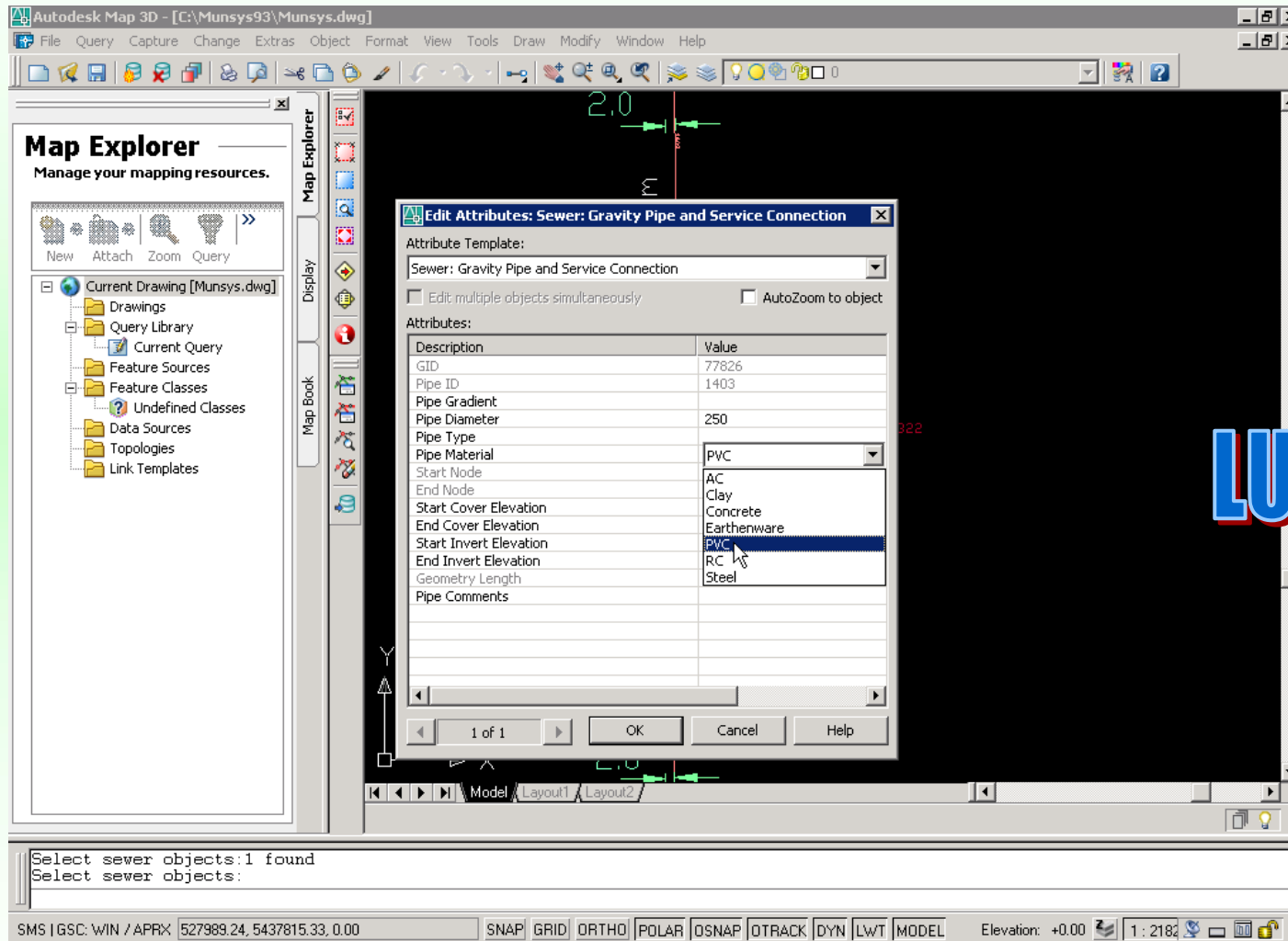
# Reading from Publication

Layers: <Top-most layer>  
 Location: (536761.987243 5438793.024753)

Field	Value
GID	44490
PRCL_KEY	120020
PRCL_TYPE	L
LSTATUS	R
WSTATUS	C
GEOM_AREA	14240.1
COMMENTS	<null>
TAG_X	536760
TAG_Y	5438810
TAG_VALUE	120020
TAG_SIZE	5.59818
TAG_ANGLE	0.000063
TAG_JUST	M
GEOMETRY	Polygon
LAYER_NAME	LOT_POLY
PROPERTY_NUMBER	120020
LEGAL_TYPE	OTHER
FOLIO	6362211110
LTO_NUMBER	435929E
PID	<null>
PLAN_NUMBER	<null>
LOT	<null>
LOT_SIZE	3.65
LOT_DESC	ACRES
DIST_LOT	<null>
LAND_DIST	NwD
MH_REG_NUMBER	<null>
HOUSE	26264
UNIT	<null>
STREET	56 AVE
POSTAL_CODE	V4W 1J7
GEOMETRY.AREA	0
GEOMETRY.LEN	0

Link

Land Records



**Edit Attributes: Sewer: Gravity Pipe and Service Connection**

Attribute Template: Sewer: Gravity Pipe and Service Connection

Edit multiple objects simultaneously  AutoZoom to object

Description	Value
GID	77826
Pipe ID	1403
Pipe Gradient	
Pipe Diameter	250
Pipe Type	
Pipe Material	PVC
Start Node	AC
End Node	Clay
Start Cover Elevation	Concrete
End Cover Elevation	Earthenware
Start Invert Elevation	PVC
End Invert Elevation	RC
Geometry Length	Steel
Pipe Comments	

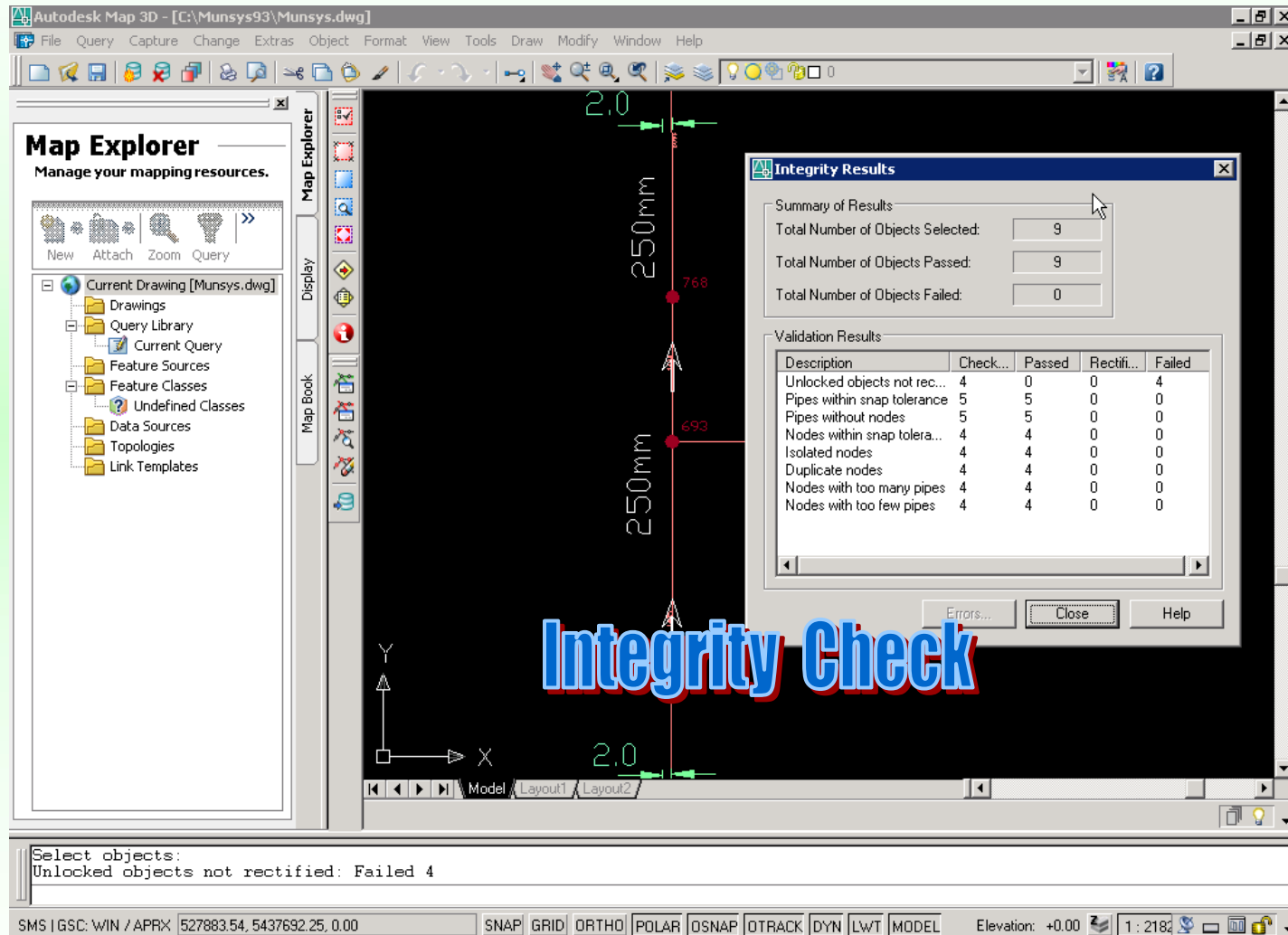
1 of 1 | OK | Cancel | Help

Select sewer objects: 1 found  
Select sewer objects:

SMS | GSC: WIN / APRX | 527989.24, 5437815.33, 0.00 | SNAP | GRID | ORTHO | POLAR | OSNAP | OTRACK | DYN | LWT | MODEL | Elevation: +0.00 | 1: 2182

**LUT**





The screenshot shows the Autodesk Map 3D interface with a pipe network diagram. A red pipe is highlighted with nodes labeled 693 and 768. Dimensions of 250mm and 2.0 are shown. An 'Integrity Results' dialog box is open, displaying the following data:

**Summary of Results**

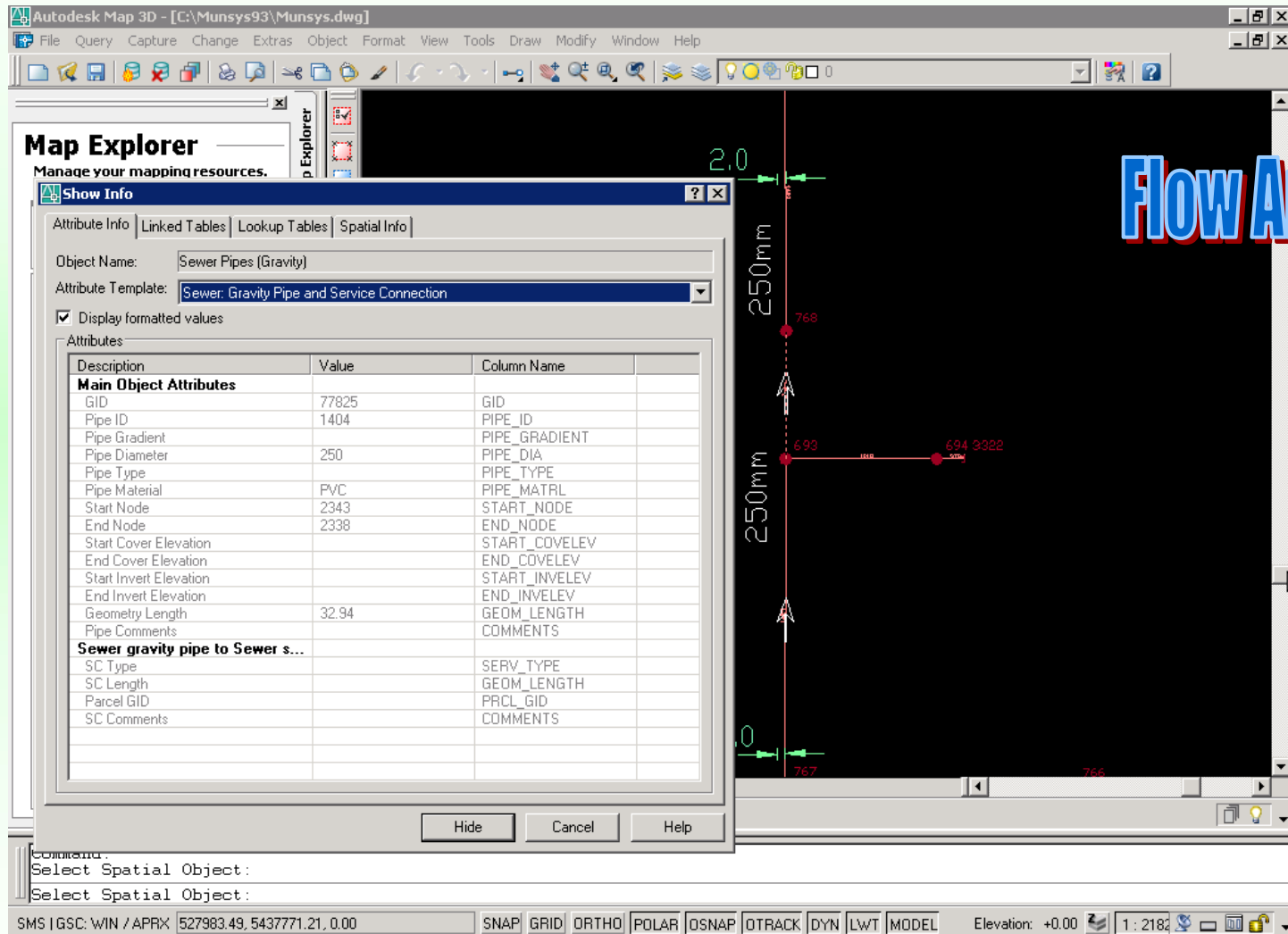
- Total Number of Objects Selected: 9
- Total Number of Objects Passed: 9
- Total Number of Objects Failed: 0

**Validation Results**

Description	Check...	Passed	Rectifi...	Failed
Unlocked objects not rec...	4	0	0	4
Pipes within snap tolerance	5	5	0	0
Pipes without nodes	5	5	0	0
Nodes within snap tolera...	4	4	0	0
Isolated nodes	4	4	0	0
Duplicate nodes	4	4	0	0
Nodes with too many pipes	4	4	0	0
Nodes with too few pipes	4	4	0	0

At the bottom of the interface, the command line shows: `Select objects: Unlocked objects not rectified: Failed 4`

**Integrity Check**



**Map Explorer**  
Manage your mapping resources.

**Show Info**

Attribute Info | Linked Tables | Lookup Tables | Spatial Info

Object Name: Sewer Pipes (Gravity)  
Attribute Template: Sewer: Gravity Pipe and Service Connection

Display formatted values

Description	Value	Column Name
<b>Main Object Attributes</b>		
GID	77825	GID
Pipe ID	1404	PIPE_ID
Pipe Gradient		PIPE_GRADIENT
Pipe Diameter	250	PIPE_DIA
Pipe Type		PIPE_TYPE
Pipe Material	PVC	PIPE_MATRL
Start Node	2343	START_NODE
End Node	2338	END_NODE
Start Cover Elevation		START_COVELEV
End Cover Elevation		END_COVELEV
Start Invert Elevation		START_INVELEV
End Invert Elevation		END_INVELEV
Geometry Length	32.94	GEOM_LENGTH
Pipe Comments		COMMENTS
<b>Sewer gravity pipe to Sewer s...</b>		
SC Type		SERV_TYPE
SC Length		GEOM_LENGTH
Parcel GID		PRCL_GID
SC Comments		COMMENTS

Flow Arrows

Comments:  
Select Spatial Object:  
Select Spatial Object:

SMS | GSC: WIN / APRX | 527983.49, 5437771.21, 0.00 | SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL | Elevation: +0.00 | 1: 2182

# Current Projects



GIS and Asset Management

- Mining a five year inventory of digital legal survey plans
- Implementing and enforcing digital submission standards (*cadastre and infrastructure*)
- Streamlining cadastral and infrastructure input and data maintenance
- Consolidating all existing data sets into an enterprise GIS
- Publishing GIS data via Web Application

# 2 Year Plan



GIS and Asset Management

- Continue to structure and improve data using new maintenance processes
- Leverage and improve existing data models (*e.g.: addition of service connections*)
- Continue to follow best practices to design and implement all data models
- Publish Spatial and Enterprise data via the Internet (geosource suite of products)
- Implement geosource map viewer, image viewer and departmental reports.

# Users of GIS Data



GIS and Asset Management

- 10 Editors of GIS Information (Maintenance and Publication)
- 8 Super-users (*analysis/cartographic*)
- 350 Intranet Web mapping users
- Operations staff collecting and maintaining data in the field (Remote GIS applications)
- External Web mapping viewer

# Benefits



GIS and Asset Management

---

- Data integration
- Standardized and managed data access/storage
- More consistent access to data for all users
- Improved data security
- More efficient data distribution to external users
- Effectiveness improvements
- Heightened levels of customer service
- Operating and maintenance savings

# Benefits



GIS and Asset Management

- Normalized data model (**sewer**)
- 2 minutes vs. 15 minutes per parcel
- **(new maintenance processes and digital submissions)**
- 50% time gained utilizing new maintenance processes for sewer input
- Real time data publication (**all applications**)
- Direct linking to enterprise databases
- No intermediate files and processes
- Increased data integrity and accuracy
- Enhanced query capabilities
- Direct plotting and data export capabilities (**templates**)

Right Tool  
Right Desk  
Right Information



# Conclusion



GIS and Asset Management

## Regardless of size and jurisdiction you should:

- Wisely invest in resources
- Do a thorough business analysis prior to making any decisions **(the key to a great GIS is good strategy)**
- Think strategically to improve internal and external business processes/operations
- Encourage collaboration

# Wrap Up!



GIS and Asset Management

---

**Today's Technology  
Promotes Interoperability  
You simply need  
to Strategically  
Plan for it!**

**Thank you!**

# Questions?



GIS and Asset Management

---

**Karen Stewart, B.Tech, GISP  
Manager of Geomatics  
Township of Langley**

**[kstewart@tol.bc.ca](mailto:kstewart@tol.bc.ca)**