



# GIS for Asset Management

How Understanding

## **CAD to GIS Migration**

can Assist Asset Management

(Paper No. 1235)

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## PAPER ABSTRACT

- In an effort to leverage existing investments in our CAD systems, Harris County's Asset Management Team is attempting to utilize CAD functionality to tag asset features created in the CAD environment with asset information. This enables the tracking of asset costs from their inception in the CAD environment, through the asset's migration to the GIS core of the County Asset Management System (CAMS). Understanding the appropriate amount of effort to be expended on the CAD side of the equation versus the GIS side is essential. Preliminary tests indicate that even with data interoperability software in place and an easy CAD to GIS migration that a substantial amount of the heavy lifting happens on the GIS side and an essential key lies in developing GIS appropriate CAD standards. As a solution to this issue the development of a web based "real time, live" distribution system for our CAD standard is underway.



## PRESENTATION OVERVIEW

1. CAMS Introduction
  - A. Mission and Vision Statement/ Asset Life Cycle
  - B. Asset Classes/ CAD to GIS Application
2. CAD to GIS Migration (*Using Saums Road Project*)
  - A. Current Issues
    - i. No CAD Standards are available
    - ii. CAD Drawings does not contain “*attributes*” and are not “*geo-referenced*”
    - iii. CAD Drawings are used in GIS for reference only
  - B. Goal
    - i. Utilize web-based GIS appropriate CAD standards (with attributes and georeferenced)
    - ii. Initiate asset tracking from their inception in the CAD Environment
    - iii. CAD to GIS Interoperability



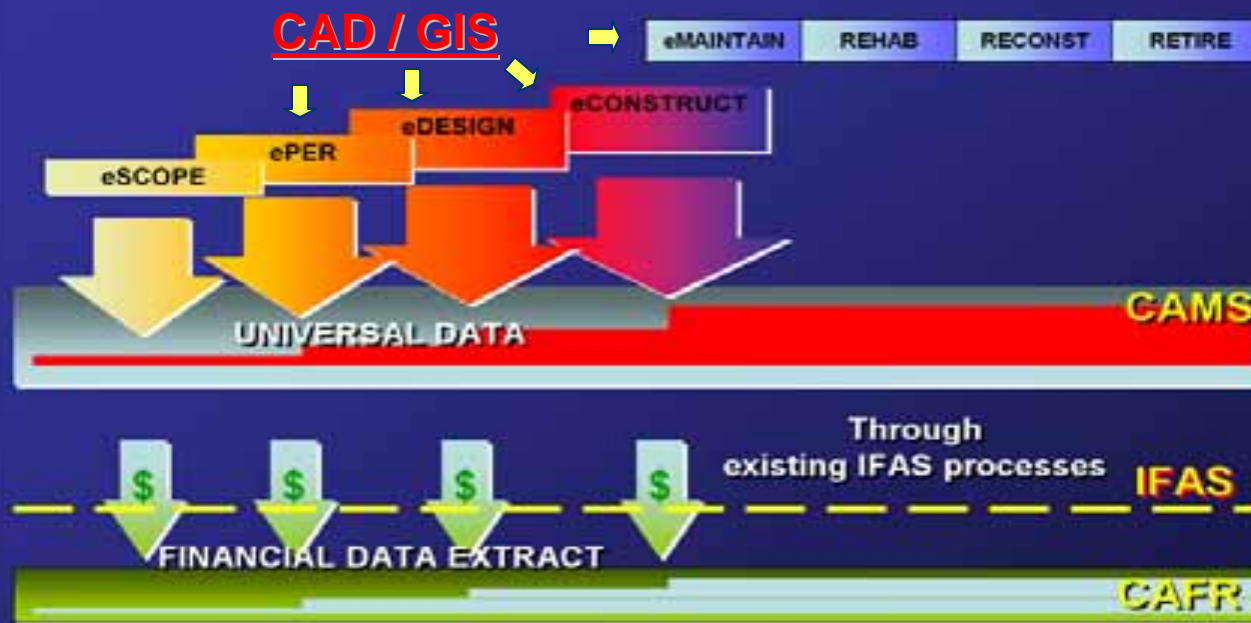
## CAMS MISSION STATEMENT

- **In June 2004, during the Capital Improvements Hearing, Harris County Commissioners' Court authorized;**
  - ***“Management Services and PID to develop an asset management system for tracking of infrastructure. Included will be a centralized system for recording all county owned land including historic cost and values. These records will assist the County Auditor in preparation of the county’s financial statements.”***



## CAMS VISION

### The CAMS Vision based on the Asset Life Cycle



UNIVERSAL DATA = All Physical, Technical, Sensory & Financial Data



## ASSET CLASSES

- Land/ Land Improvements/ Right-of-Way
- Building and Building Improvements
- Park Improvements and Facilities
- Easements
- Infrastructure
  - Roads
  - Bridges
  - Storm Sewers
  - Lighting
  - Tunnels
  - Flood Control
- Construction in Progress

*INITIAL PHASE*

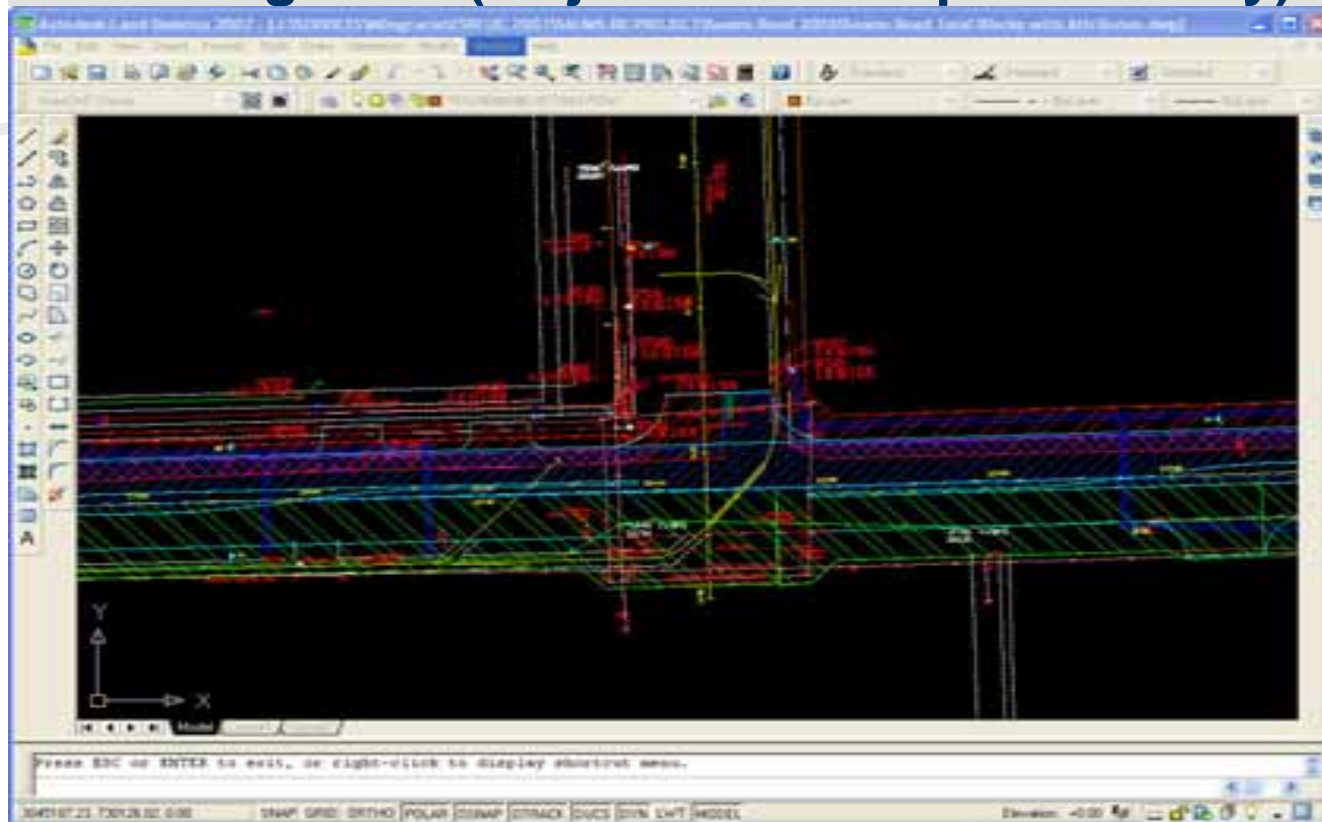
**CAD to GIS Migration**



# CAD DRAWING WITHOUT ATTRIBUTES

## SAUMS ROAD PROJECT

- CAD Drawing Files (Objects and Properties Only)

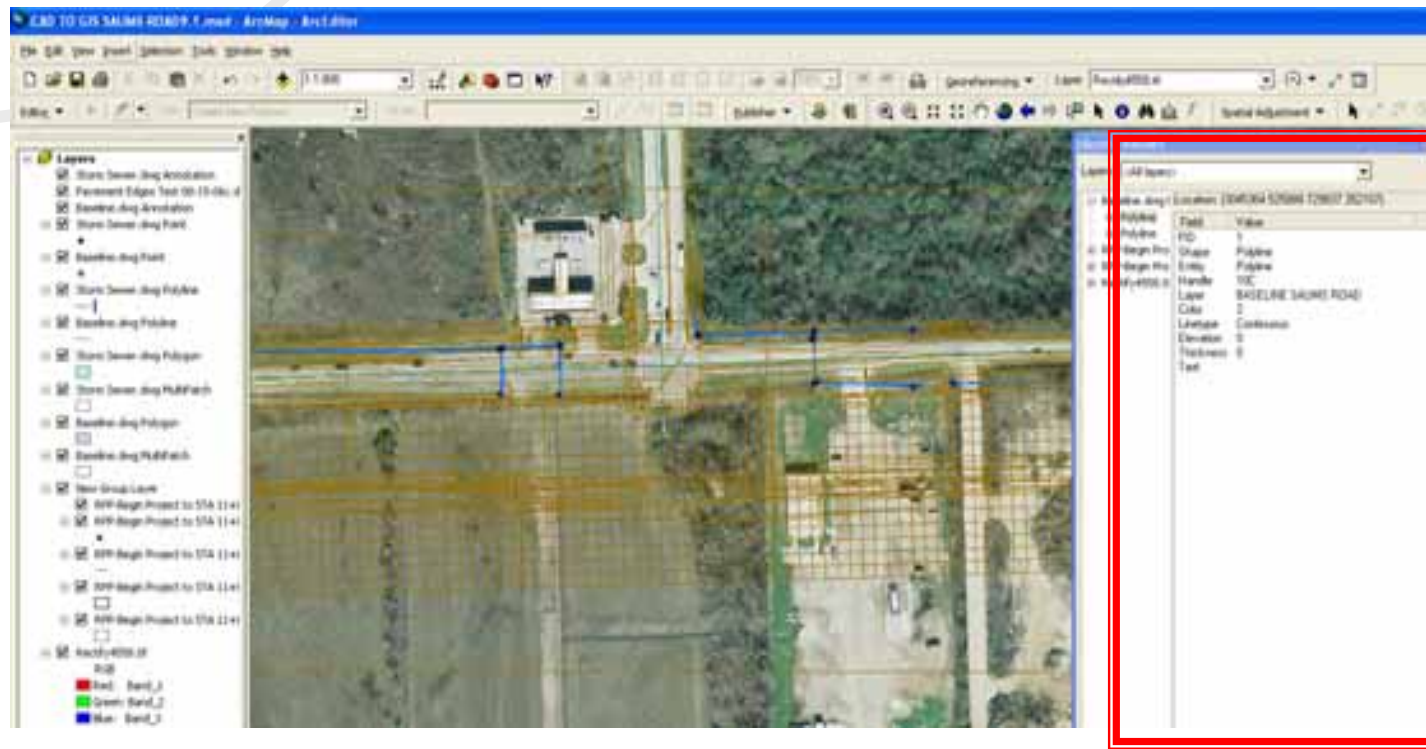






## CAD TO GIS MIGRATION (NO ATTRIBUTES)

- Using ArcGIS 9.1 (Direct Read)



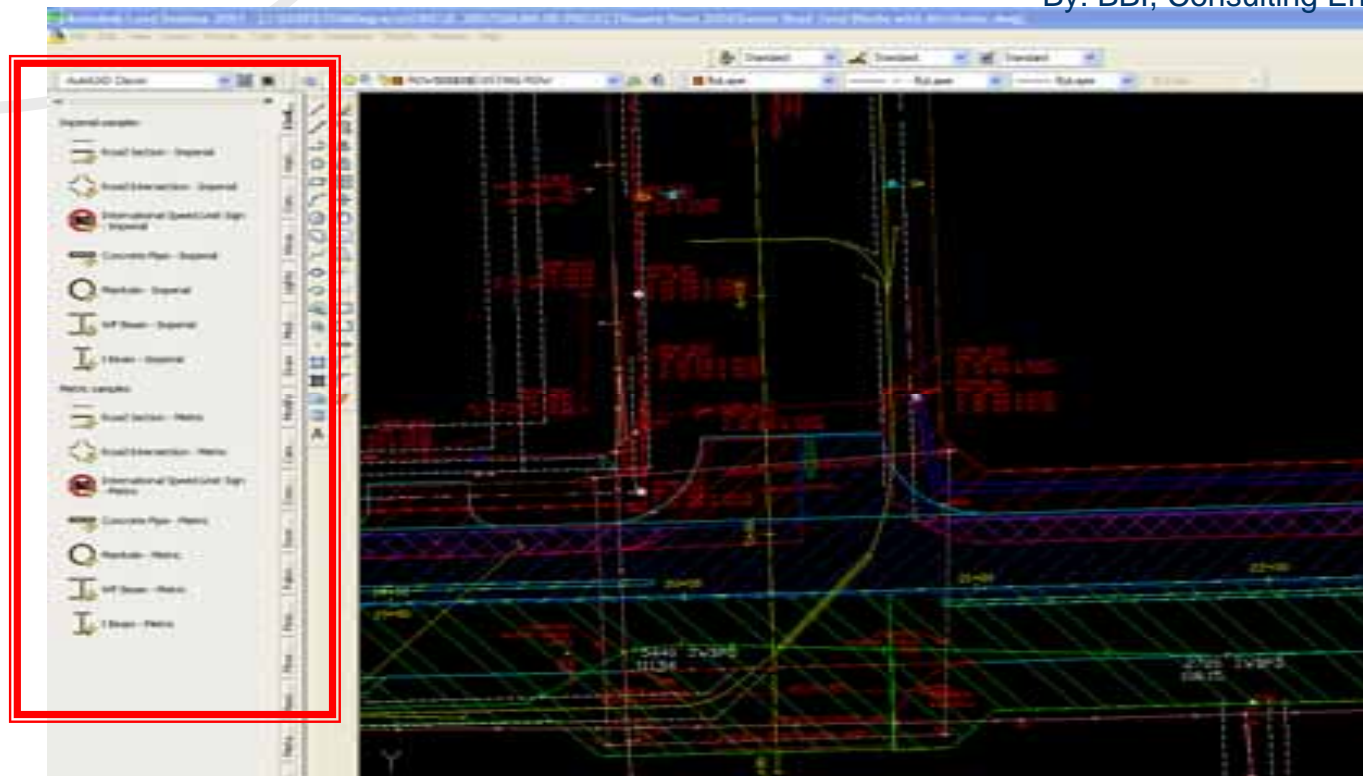




## USING WEB-BASED CAD STANDARDS

- **Web-based Tool Palettes – with attributes for CAMS**

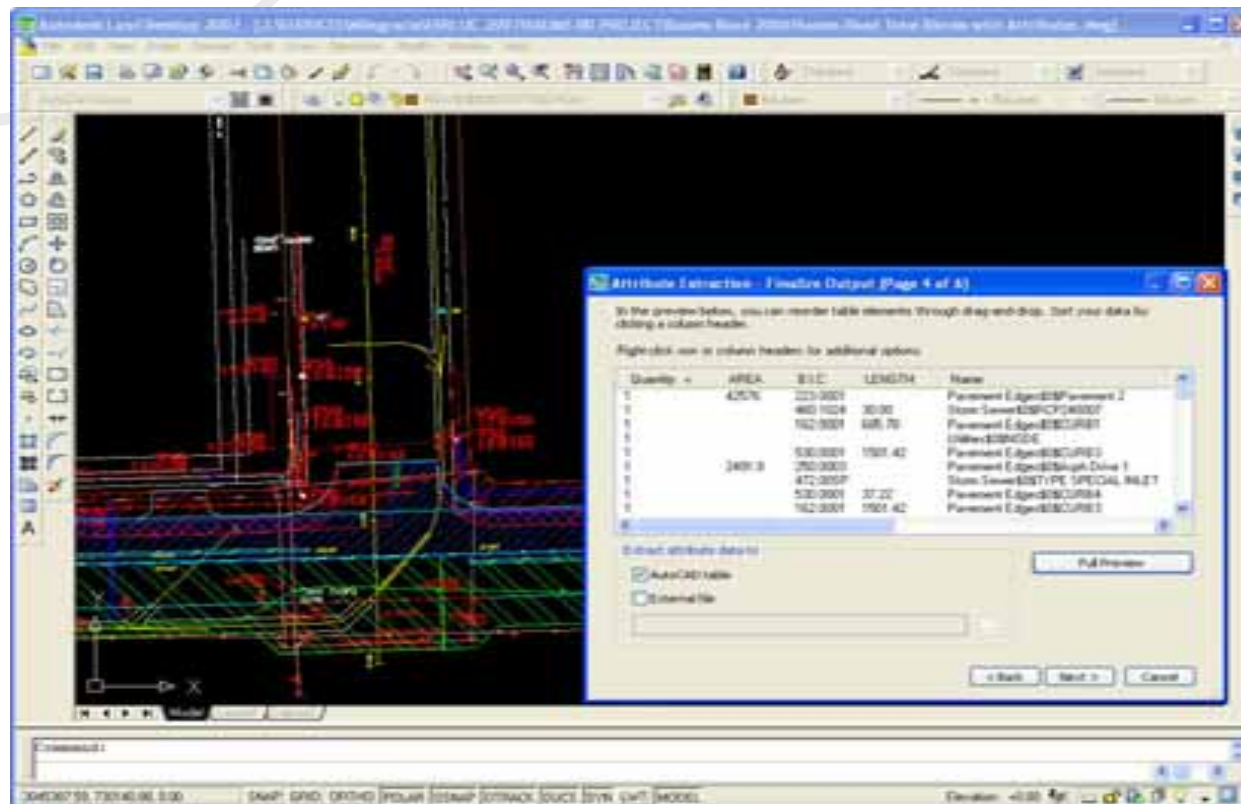
By: BBI, Consulting Engrs





## CAD DATA EXTRACTION IN AUTOCAD

- Using Attribute Extraction Tool





# CAD DATA EXTRACTION IN AUTOCAD

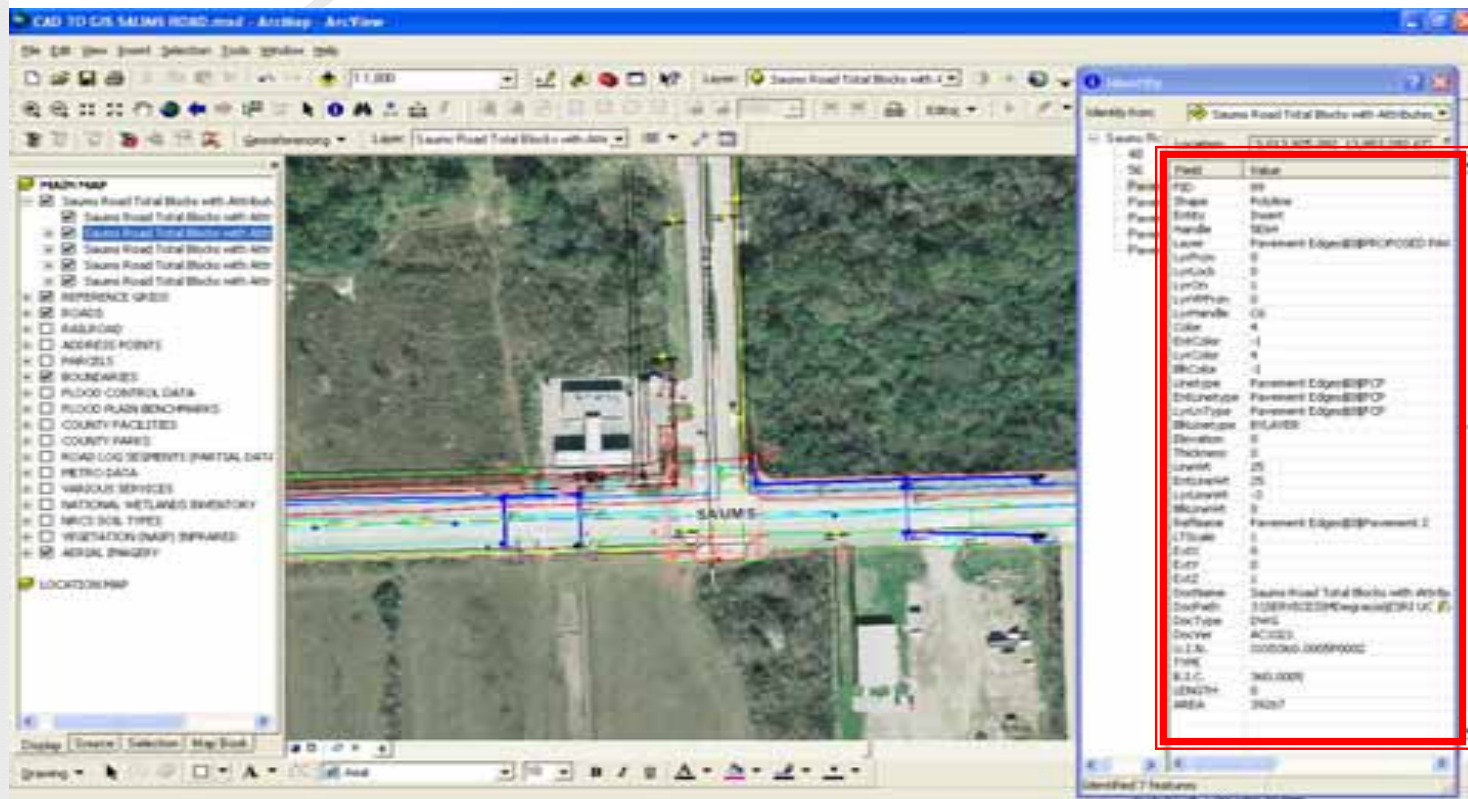
- **CAD Data Extraction Output (table)**
  - Sample Data extracted from CAD (.csv, .xls, .mdb, .txt)

Quantity	AREA	B.I.C.	LENGTH	Name	Position X	Position Y	Position Z	TYPE	U.I.N.
1	2491.9	340.0002		Pavement Edges\$0\$Asph Drive 1	3045302.365	729767.6224	0		XXX0340.0002P0001
1	2491.9	250.0003		Pavement Edges\$0\$Asph Drive 1	3045302.365	729767.6224	0		XXX0250.0003P0001
1	2491.9	340.0005		Pavement Edges\$0\$Asph Drive 1	3045302.365	729767.6224	0		XXX0340.0005P0001
1	580.42	340.0005		Pavement Edges\$0\$Asph Drive 2	3046195.686	729810.5206	0		XXX0340.0005P0002
1	580.42	250.0003		Pavement Edges\$0\$Asph Drive 2	3046195.686	729810.5206	0		XXX0250.0003P0002
1	580.42	340.0002		Pavement Edges\$0\$Asph Drive 2	3046195.686	729810.5206	0		XXX0340.0002P0002
1	16163	250.0003		Pavement Edges\$0\$Black Base 1	3045860.427	729882.9542	0		XXX0250.0003P0001
1	16163	250.0003		Pavement Edges\$0\$Black Base 2	3045862.588	729820.9918	0		XXX0250.0003P0002
1	700	360.0008		Pavement Edges\$0\$Conc Drive 1	3045085.726	729876.0726	0		XXX0360.0008P0001
1	696.9	360.0008		Pavement Edges\$0\$Conc Drive 2	3045171.17	729878.5855	0		XXX0360.0008P0002
1	2690.1	360.0008		Pavement Edges\$0\$Conc Drive 3	3045298.604	729898.4494	0		XXX0360.0008P0003
1	1377.8	360.0008		Pavement Edges\$0\$Conc Drive 4	3045593.201	729786.9482	0		XXX0360.0008P0004
1	1040.7	360.0008		Pavement Edges\$0\$Conc Drive 5	3045778.983	729792.0449	0		XXX0360.0008P0005
1		162.0001	685.78	Pavement Edges\$0\$CURB1	3044911.836	729821.1045	0		XXX0162.0001P0002
1		530.0001	685.78	Pavement Edges\$0\$CURB1	3044911.836	729821.1045	0		XXX0530.0001P0001
1		162.0001	622.52	Pavement Edges\$0\$CURB2	3045656.481	729844.8214	0		XXX0162.0001P0003
1		530.0001	622.52	Pavement Edges\$0\$CURB2	3045656.478	729844.9008	0		XXX0530.0001P0002
1		162.0001	1501.42	Pavement Edges\$0\$CURB3	3044124.138	729797.7705	0		XXX0162.0001P0001
1		530.0001	1501.42	Pavement Edges\$0\$CURB3	3044124.138	729797.7705	0		XXX0530.0001P0003
1		530.0001	37.22	Pavement Edges\$0\$CURB4	3045304.664	729898.649	0		XXX0530.0001P0004
1	18502	165.0001		Pavement Edges\$0\$Median1	3044124.138	729797.7705	0		XXX0165.0001P0001
1	2264	165.0001		Pavement Edges\$0\$Median2	3044911.84	729820.9369	0		XXX0165.0001P0002
1	1780	165.0001		Pavement Edges\$0\$Median3	3045656.481	729844.8214	0		XXX0165.0001P0002
1	39347	360.0005		Pavement Edges\$0\$Pavement 1	3044430.654	729846.5484	0		XXX0360.0005P0001



# CAD TO GIS MIGRATION WITH ATTRIBUTES

- Using ArcGIS 9.2 (Direct Read)





# CAD IMPORT SUBTYPES



## Line Subtypes

-  Asphalt
-  Ditches
-  Easements
-  Fences
-  Landscape
-  Lanes
-  LongitudinalBarrier
-  Median
-  Overhead Pole
-  Pavement
-  ROW
-  Reinforced Concrete Pipe
-  Sanitary Sewer
-  Storm Sewer Pipe
-  Stripping
-  Utilities

## Point Subtypes

-  Building
-  Lighting
-  Mailbox
-  Overhead Sign
-  Poles
-  Signals
-  Signs
-  Storm Sewer Inlet
-  Storm Sewer Junction Box
-  Storm Sewer Manhole
-  Storm Sewer Outfall

## Polygon Subtypes

-  Temporary Pavement
-  Traffic Lanes







# USING GIS TO INTEGRATE ACCOUNTING DATA WITH CAD DATA

The screenshot displays the ArcMap interface with a map of a road area. A data table is overlaid on the map, showing the following data:

SEWERID	SewerId-Lite.LITEPCODE	SewerId-Lite.COST
472 0001	Asph	500
472 0001	Asph	500
472 0001	Asph	500
472 0001	Asph	500
472 0001	Asph	500

Red arrows point to the 'SewerId-Lite.LITEPCODE' and 'SewerId-Lite.COST' columns in the table.





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- Binkley and Barfield, Inc. Consulting Engineers



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