



# Construction Infrastructure Management

Kevin Jackson, Technical Director  
Transportation and Local Infrastructure

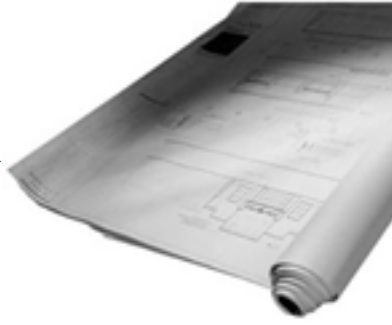


# What is Corridor Infrastructure Management?



Highways and Railways have become an increasingly complex industry. The world's reliance has increased on these efficient transportation modes that must run with limited resources, on constrained corridors, with increasing traffic. These demands can only be met by effective management of immense amounts of data and the extraction of excellent information during design and maintenance. The use of project collaboration tools, geospatially referenced data searches, interference detection, thematic mapping and other technologies provide the designer or maintainer with a wealth of information at their fingertips.

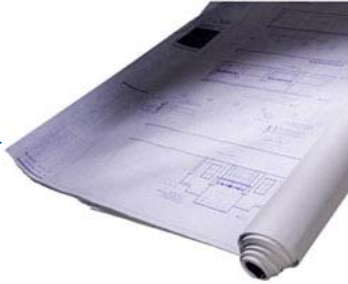
# Historically



Manual Transfer of Information



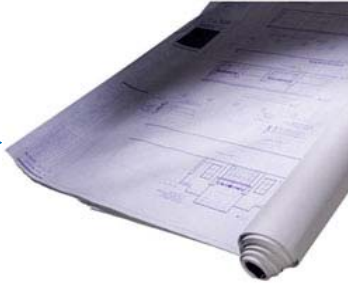
# Historically early 1980s



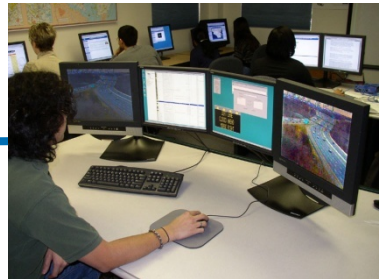
Manual Transfer of Information



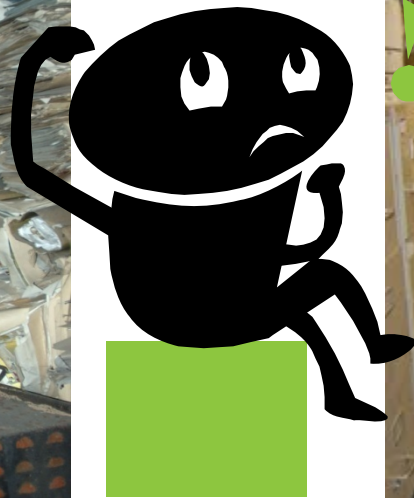
# Historically late 1980s



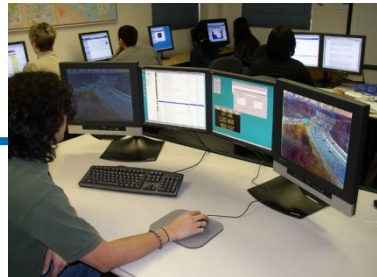
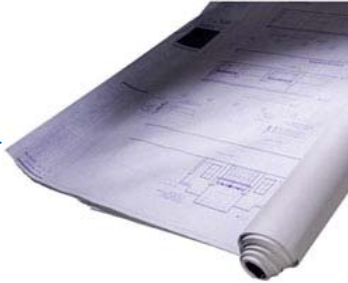
Manual Transfer of Information



# If you can't find it you can't use it!



# Today



Electronic Transfer of Information



# Corridor Infrastructure Management



**Operations & Maintenance**

**Planning**

**As-Built**

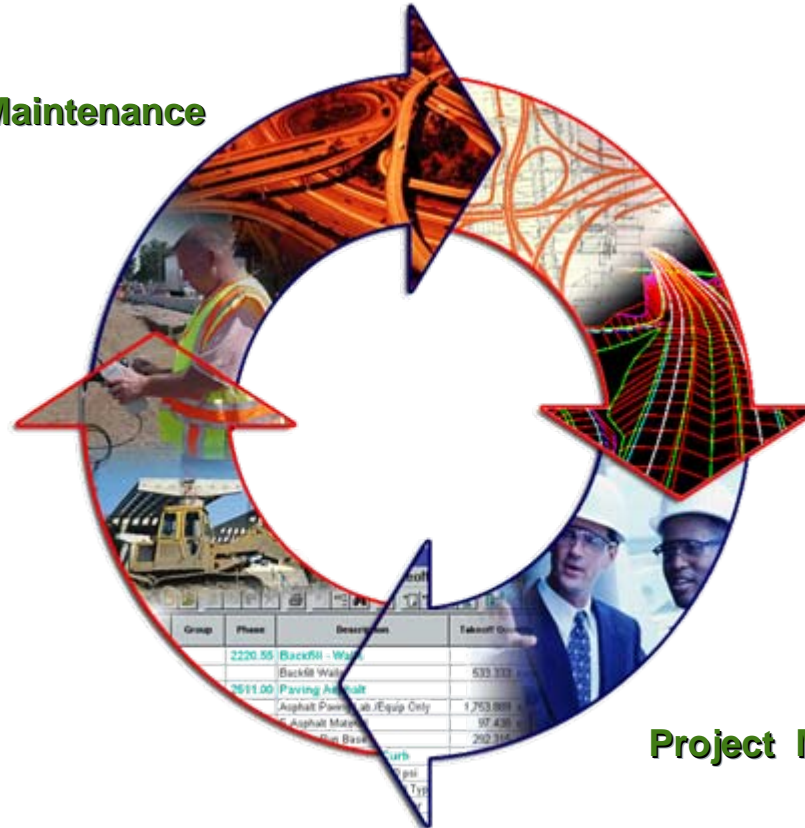
**Design**

**Inspection**

**Estimating**

**Construction**

**Project Management**





# Corridor Infrastructure Management



- What is needed
  - Infrastructure
    - Internet/Intranet
    - Wireless capability
  - Electronic Data Flow
    - File
    - Wire or wireless transfer
  - Repository
    - Search Capabilities
    - Integration with solutions
    - User friendly

# Corridor Infrastructure Management



- Infrastructure
  - Most everyone today has internet or intranet
  - Wireless data transfer is more prevalent than ever!
    - Wireless network
    - Cell network
    - Satellite network

# Corridor Infrastructure Management



- Electronic Data Flow
  - Everyone uses a computer today for design
  - Everyone uses electronic survey equipment
    - Total Stations
    - GPS
  - Electronic machine control gaining popularity
    - Grading
    - Pavement
    - Trenching
  - Stakeout and Inspection records can be recorded electronically
  - All can be transferred from design to construction to design

# Corridor Infrastructure Management



- Repository
  - Some have repository
  - All aspects of design and construction need access
  - Data flow and archival capabilities
  - Link to GIS
  - Project collaboration server
  - Electronic serve up plots, archives and presentation

# Guess What? All is available today!



## Operations & Maintenance

Plan sheets,  
project data,  
maintenance records,  
GIS data,  
clash detection

## As-Built

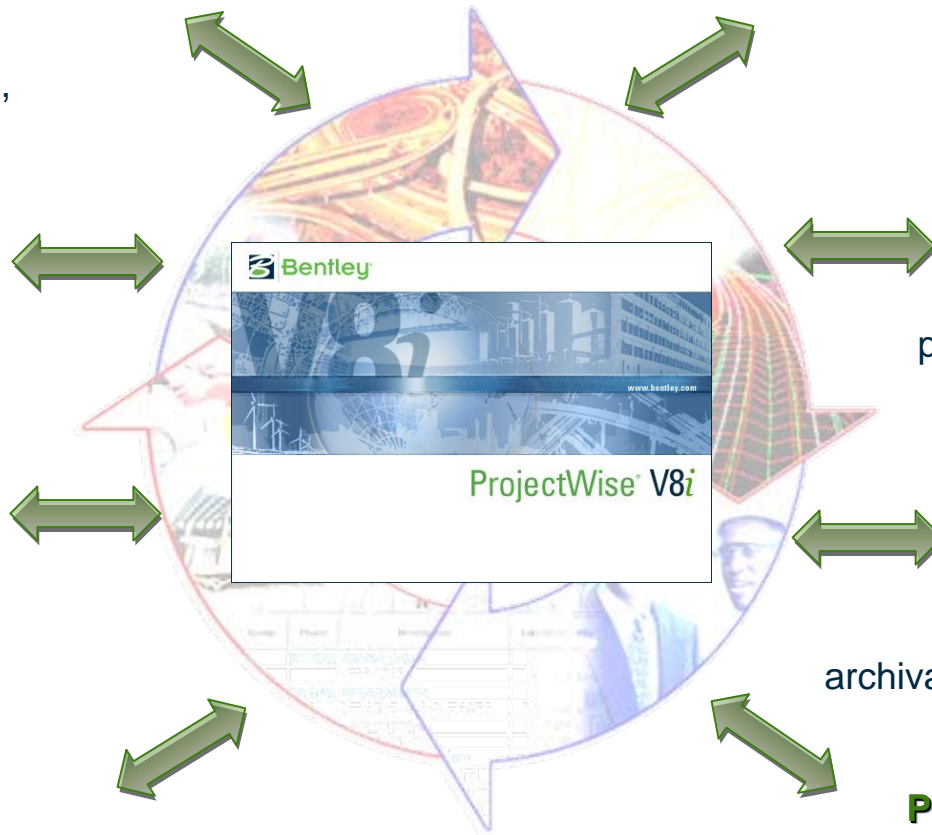
Redlines,  
staking location,  
inspection locations,  
plan sheets

## Inspection

Inspection records,  
redlines,  
project records,  
plan sheets

## Construction

Project data, redlines,  
staking data, records,  
plan sheets  
clash detection



## Planning

Archival records,  
past projects,  
as-builts,  
GIS data,  
clash detection

## Design

Existing data,  
past project data and  
records,  
clash detection

## Estimating

Payitems,  
project data,  
archival estimating records

## Project Management

Project data,  
records,  
correspondence

# Guess What? All is available today!



## Operations & Maintenance

Bentley Map, SuperLoad, BrIM, PW Navigator, ESRI, Office, etc...

## As-Built

Bentley OnSite  
InterPlot  
Trimble, Leica, Topcon, etc...

## Inspection

Bentley OnSite,  
InterPlot  
Trimble, Leica, Topcon, etc...

## Construction

InRoads, GEOPAK,  
PW Navigator,  
Bentley OnSite, Trimble, Leica,  
Topcon, etc...

## Planning

InRoads,  
GEOPAK,  
Bentley Map,  
ESRI,  
info Tech, etc...

## Design

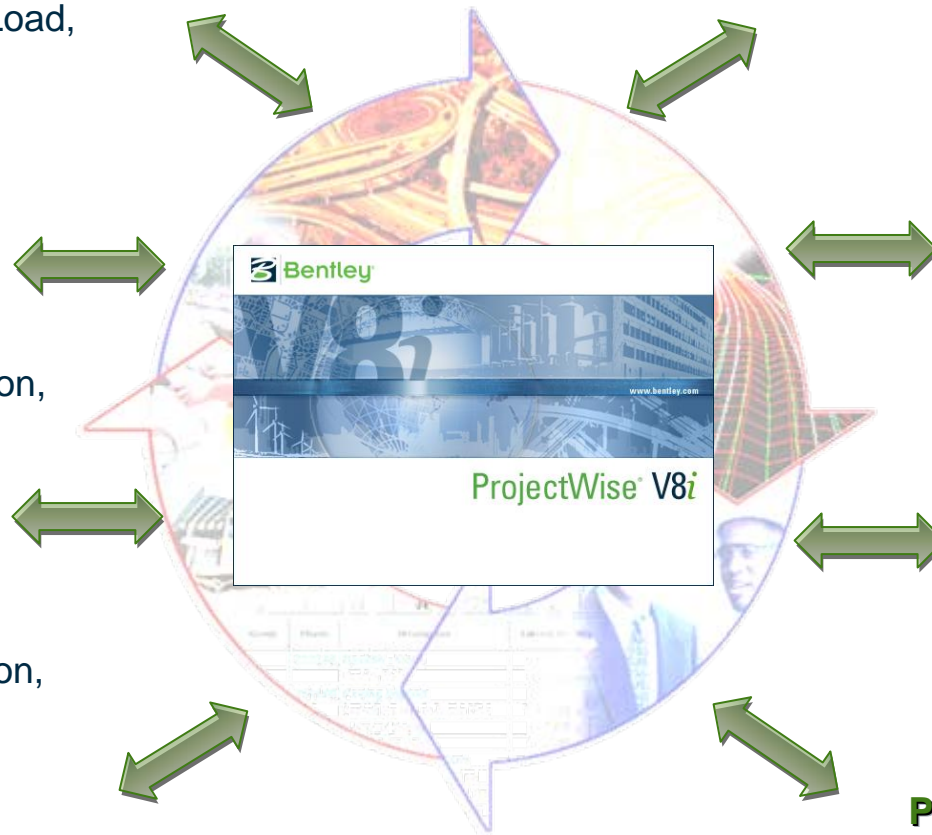
InRoads,  
GEOPAK,  
PW Navigator,  
Others, etc...

## Estimating

InRoads,  
GEOPAK,  
Info Tech, etc...

## Project Management

Bentley Map,  
Info Tech,  
Office, etc...



# But if you can't find it you can't use it!



# Searching Capability



- Document Attribute Capability
  - Metadata
    - Project data (i.e. number, county, route, stations, etc...)
    - Design engineer
    - Consultant
- Full Text Search Capability
  - Correspondence
  - Documents
  - Project data
    - DGN
    - DWG
  - Other

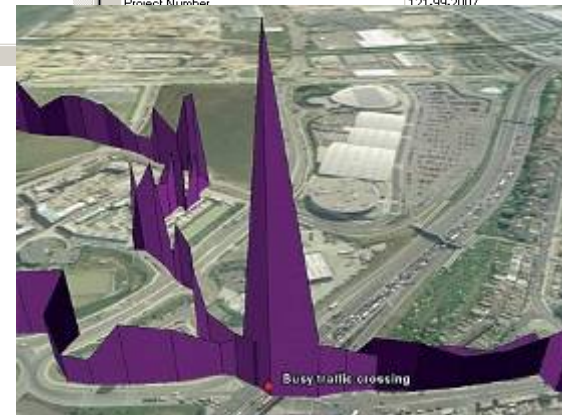
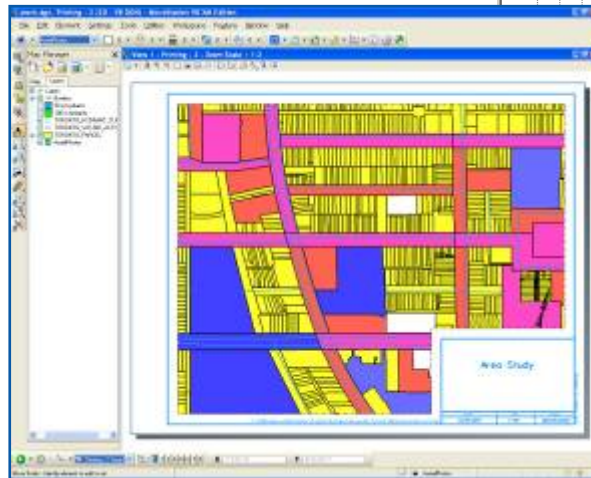
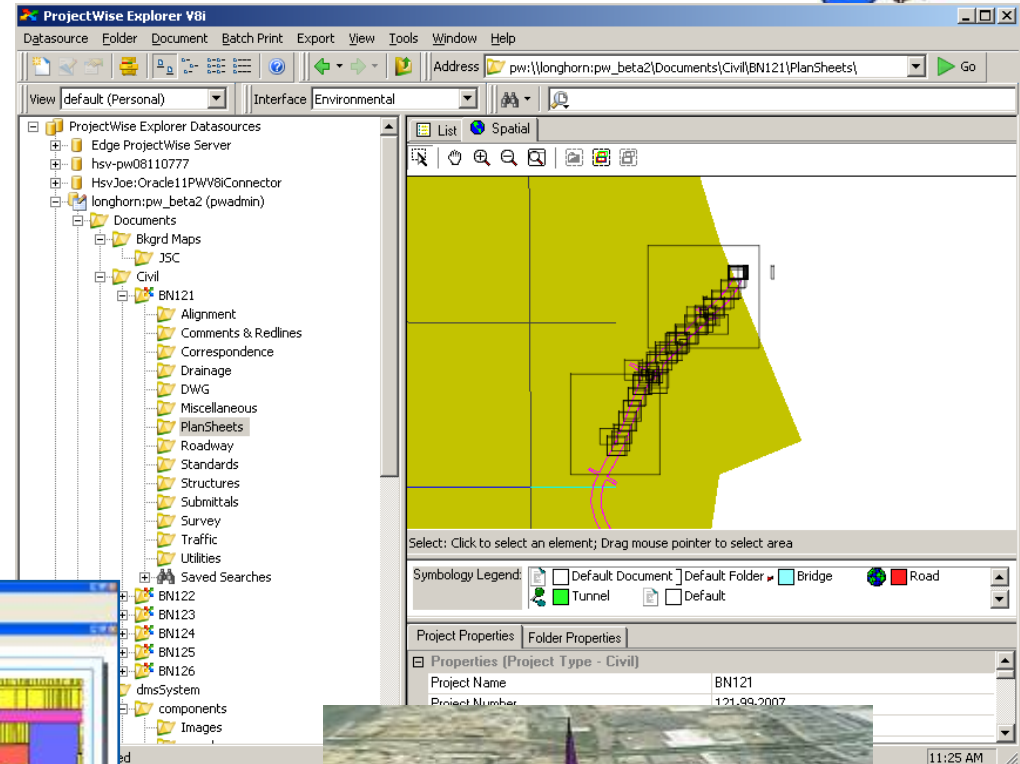


# Geographic Search



## Search by location

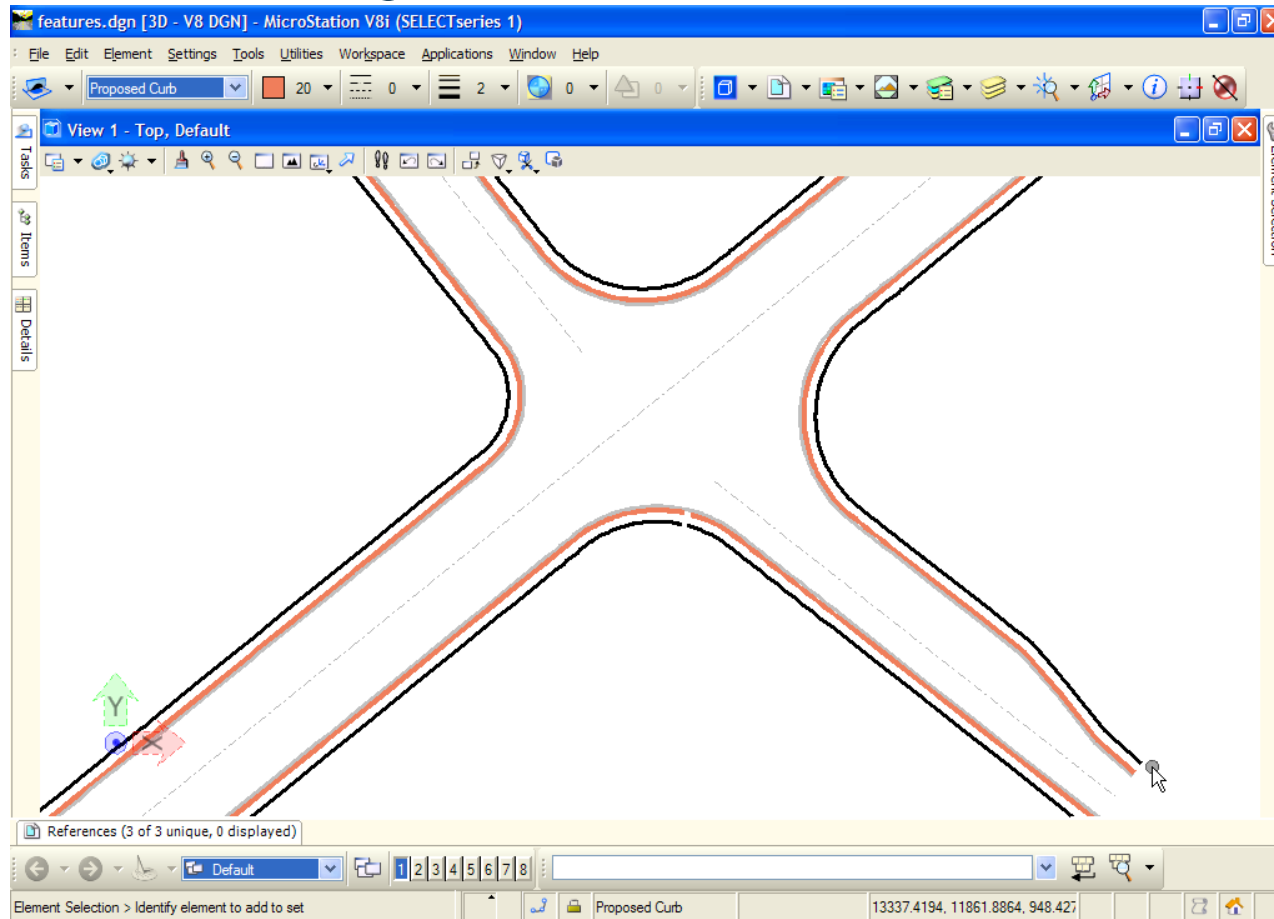
- Easy to use map
- Easy to use interface
- Thematic



# Spatial Search



Search spatially for conflicts with ProjectWise Navigator.

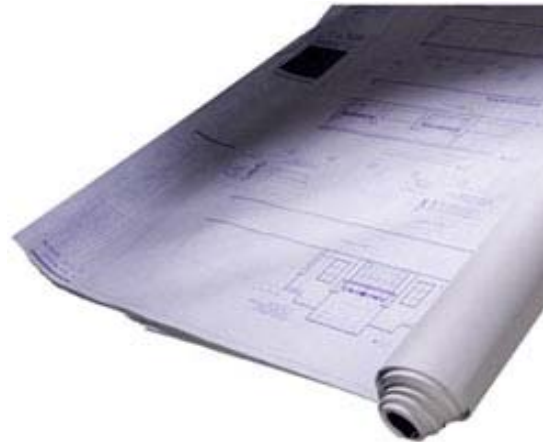


# Wait a minute!!!



- Contract Documents
  - Bid documents
  - Specs

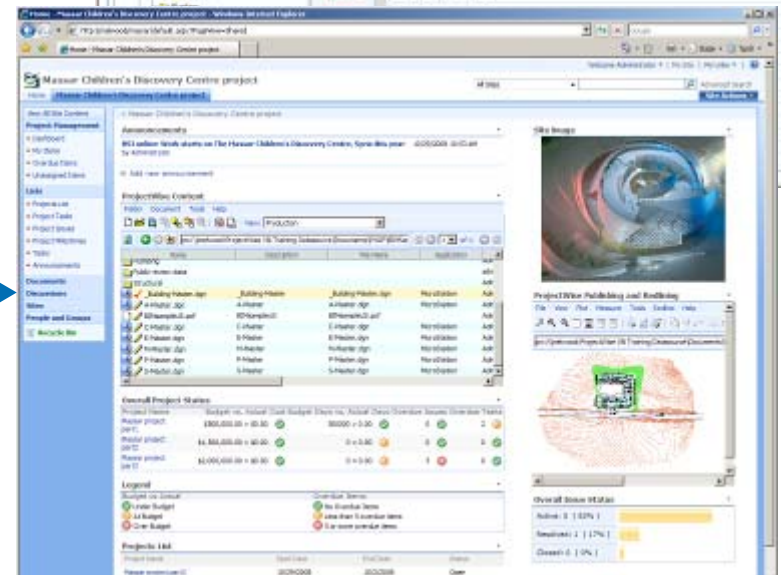
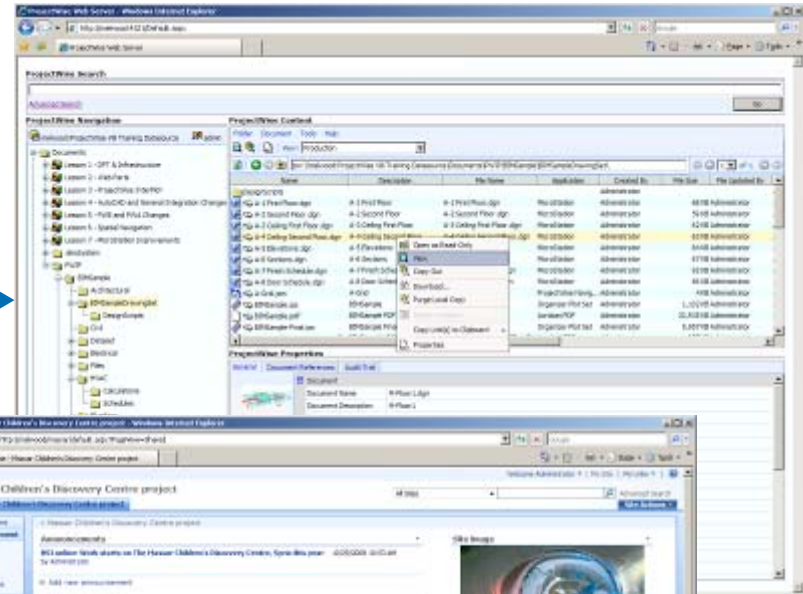
# They're still hardcopy!



# Electronic Bid Documents



- Common format
  - PDF
  - TIFF
- Internet Delivery Mechanism
  - ProjectWise Web Interface
  - Info Tech Bid Express
  - Custom web interface



# I still want to write on my paper plans.

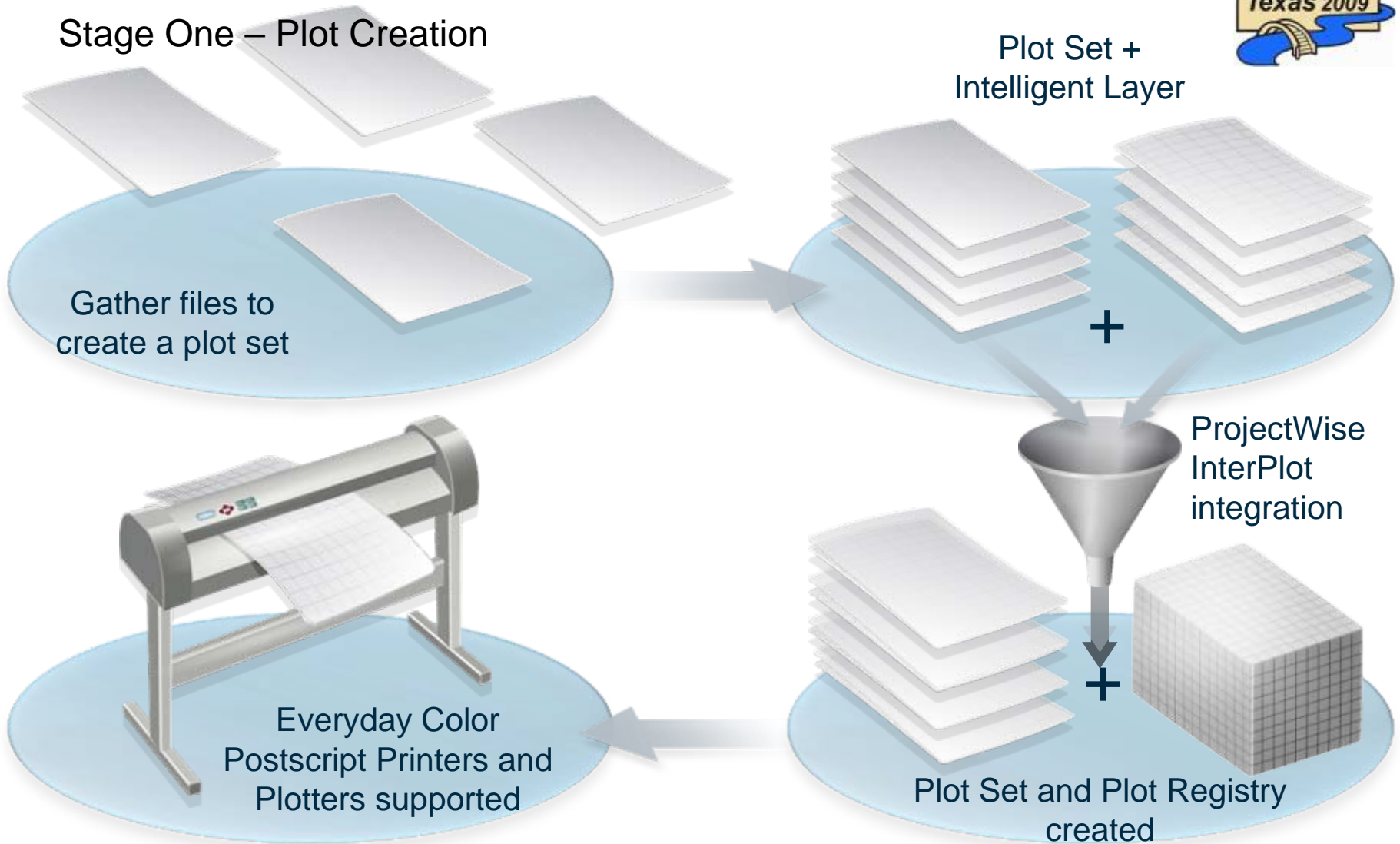


- Dynamic Plotting
  - Write on the paper
  - Automatically digitizes it
  - Automatically associates with drawings original electronic files

# ProjectWise Dynamic Plot Workflow



Stage One – Plot Creation

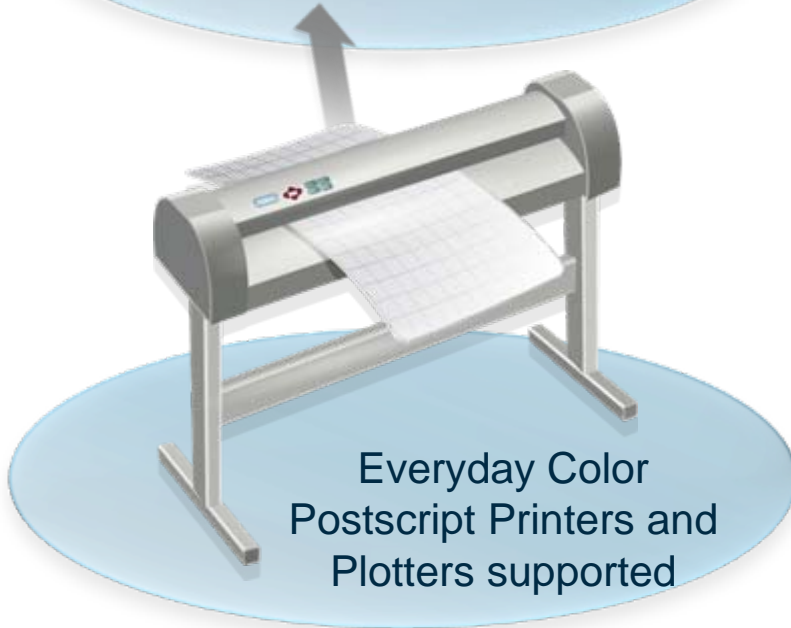
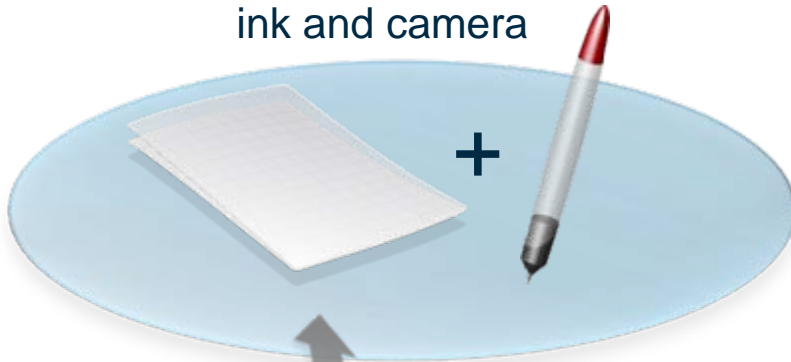


# ProjectWise Dynamic Plot Workflow



## Stage Two – Plot Markup

Digital Pen with  
ink and camera



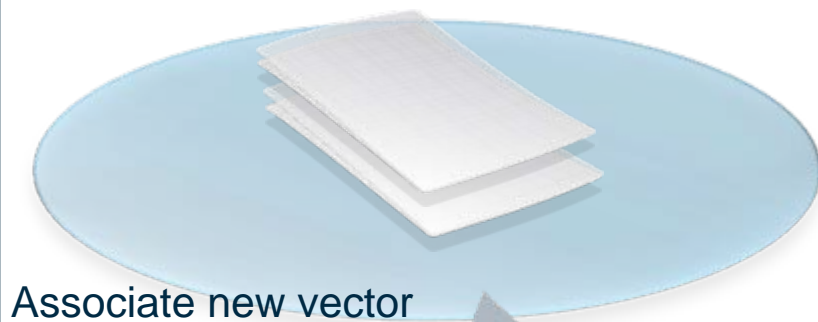
Everyday Color  
Postscript Printers and  
Plotters supported



Markup drawing and  
capture markups  
digitally with  
Digital Pen

# ProjectWise Dynamic Plot Workflow

## Stage Three – Markup Synchronization



Associate new vector files with originals

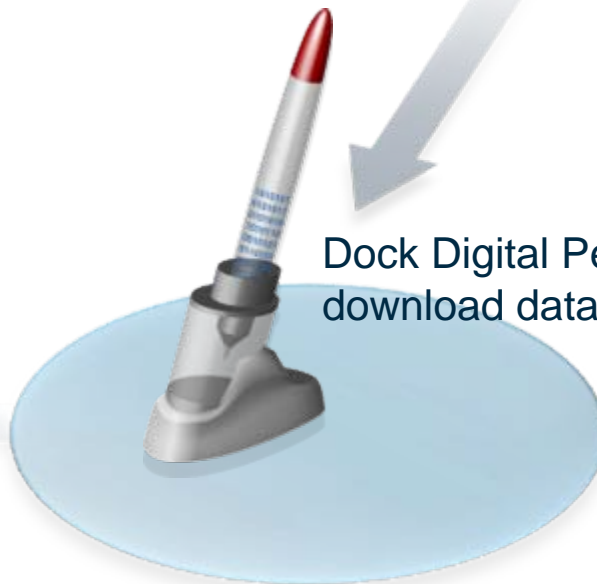
Capture markups...



Convert data into vectors...



Dock Digital Pen and download data





# Dynamic Plot Demo



The screenshot displays the Bentley ProjectWise interface. The 'ProjectWise Explorer' window shows a tree view of project files, with 'Road.ips' selected. The 'Road.ips - ProjectWise InterPlot Organizer' window is open, showing a table of plot settings.

Plot Name	File	Model	New Group	Plot Area	Design Script	Plot Pen Table	Color Table	Paper Size
SR7 section.dgn	SR7 Section.dgn	Default	Default W...	Fence	NONE	NONE	default attache...	Tabloid
SR7 section.tbl	SR7 section.dgn	Default	Defa & W...	Fence	NONE	NONE	default attache...	Tabloid

At the bottom of the InterPlot Organizer window, it displays 'Ready', 'Printer: (usboklab)P901C', and '2 plots (1 selected)'.

# In Summary



**It all exists today!**

# Questions?





Thank you!

Kevin Jackson, Technical Director  
Transportation and Local Infrastructure

