Digital As-Built Submittal Requirements

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Westfield Public Works Department (WPWD)

October 19, 2007

Westfield Public Works Department

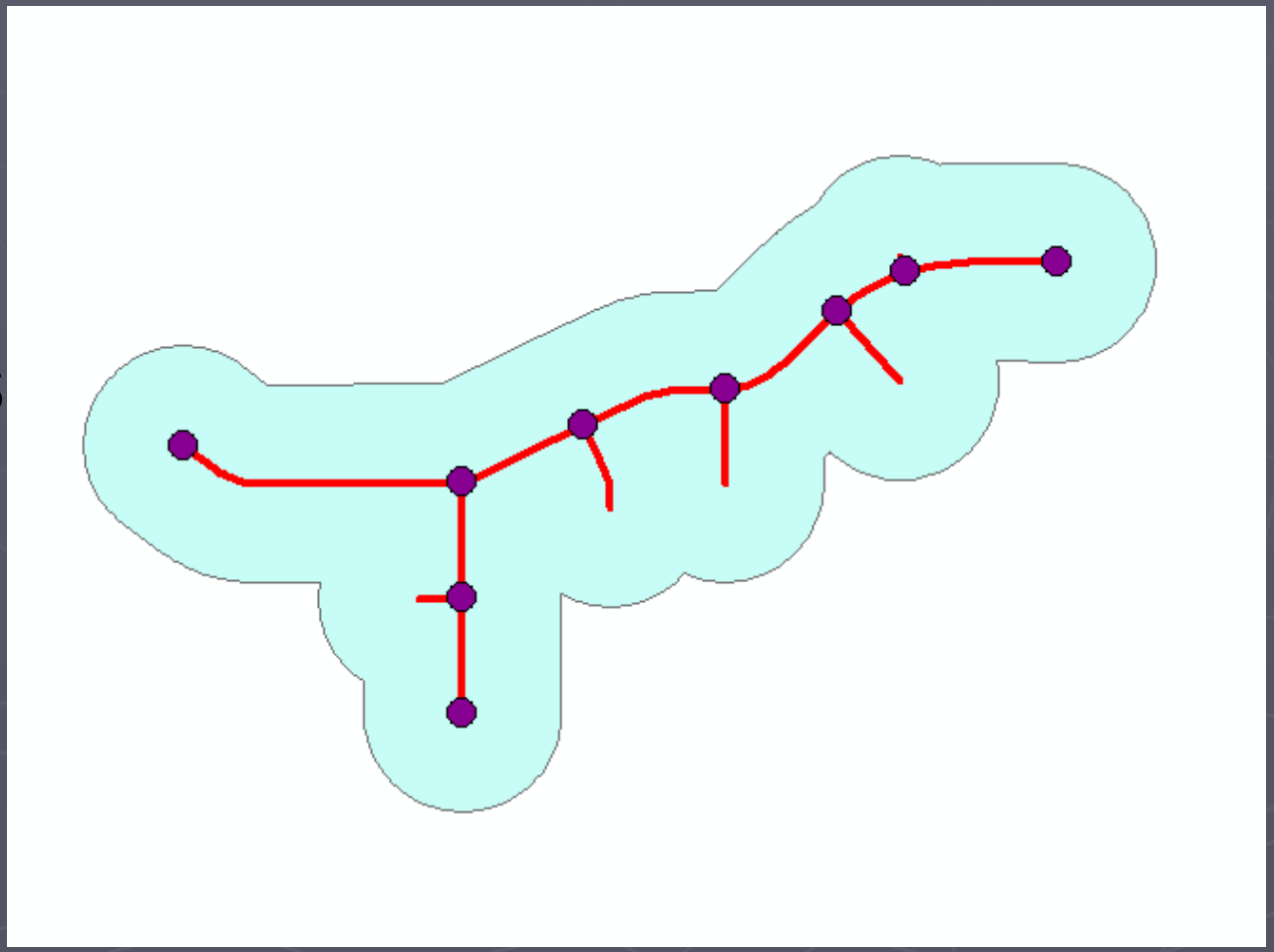
Digital As-Built Submittal Requirements

- **Presentation Outline**

1. What is GIS
2. What / Who / Why / When – Digital Specs Origin
3. Digital Project Life Cycle
4. Overview of the Submittal Requirements Items
5. Overview of the Submittal Spreadsheets
6. Overview of the CAD to GIS Conversion Process
7. Questions & Answers

Geographic Information System (GIS) Feature Types

- Points
- Lines
- Polygons



Geographic Information System (GIS) Feature Types Attribute Tables

- All - Point, Line and Polygon Features
  - Feature Attribute Tables
    - Points
      - Hydrant – ID, Make, Model, Nozzle Size, year, Stortz (Y/N)
    - Lines
      - Line – ID, Type, Material, Diameter, Length, Install Date
    - Polygons
      - Project Area – ID, Names, Boundaries, Tracking Status

What / Who / Why / When – Digital Specs Origin

<u>What</u>

A Set of

Standards, Specifications, and Templates For Submitting Digital

Water and Sewer Digital As-Built Data

What / Who / Why / When – Digital Specs Origin

Who

GIS

Westfield PUBLIC WORKS

Parks • Utilities • Streets

HagTag

Hamilton County Local Government GIS Technical Advisory Group

Carmel • Fishers • Noblesville • Westfield • Hamilton County

What / Who / Why / When – Digital Specs Origin

Why

- Create a very detailed and accurate GIS
- GASB 34
- Stormwater Phase II

What / Who / Why / When – Digital Specs Origin

When

- Westfield Public Works - 2004
- HAGTAG – 2005

Westfield Public Works Department Digital As-Built Submittal Requirements Life Cycle

- TAC – Technical Advisory Committee
  - Engineering Firm / Developer meets with the Public Works
    - WPWD provides feedback pertaining to:
      - The Town of Westfield Ordinances
      - WPWD Construction Specifications and Standards
- Plans are updated per TAC and approved
- Digital construction plans
  are delivered on CD to WPWD – GIS

Westfield Public Works Department Digital As-Built Submittal Requirements Enforcement

Leverage

- Performance Bonds
  - Beginning stage of construction
  - Bond 110% of Estimated Cost
- Maintenance Bonds
  - After project is complete
  - Bond 10% of Actual Cost

Westfield Public Works Department Digital As-Built Submittal Requirements Life Cycle

- Construction plans should include the following:
  1. Lot Lines
  2. Subdivision Section (drawn with a closed polyline)
  3. Street Centerlines
  4. Annotation for the Street Name
  5. Annotation for Lot Numbers

- Once the project is constructed, Digital As-Built Submittal Requirements take effect

Overview of the Submittal Requirements Items

- 1.0 General
- 2.0 As-Built - Infrastructure
- 3.0 Secondary Plats

Westfield Public Works Department Requires As-Built Submittals

Digital As-Built Submittal Requirements

Overview of the Submittal Requirements Items
1.0 General

1.2 - Files must be submitted on a CD-ROM

1.3 - The CD label shall include the following:

- Engineering Company Name
  with prepared by statement
- Project Name
- Date that data is burnt onto CD
- Designate CD as As-Built, Construction Plan or Other

Overview of the Submittal Requirements Items
1.0 General

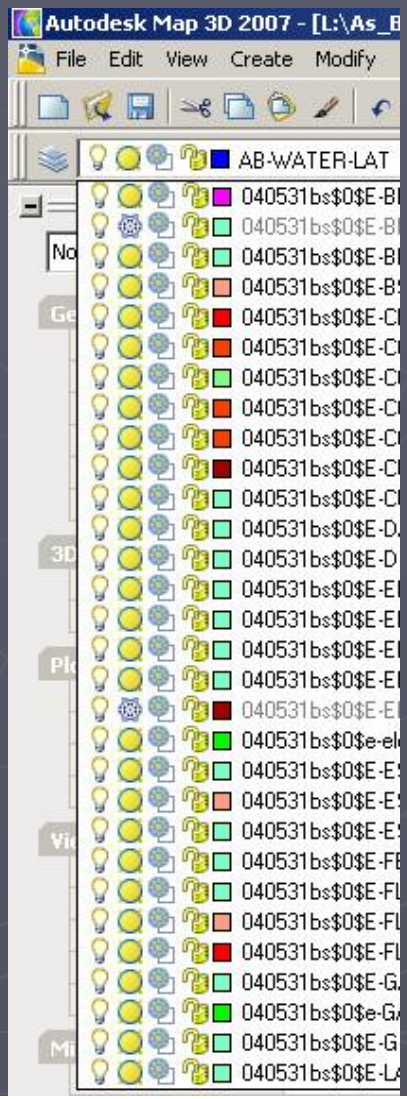
1.4 Files must be submitted in DWG format.

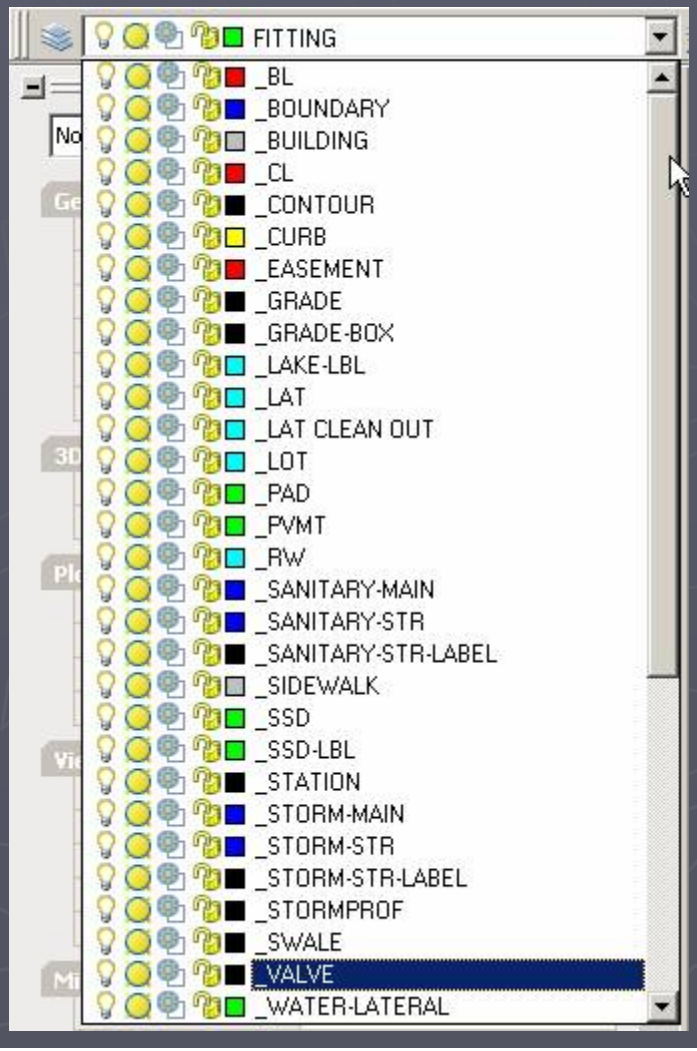
1.5. Each file should be for one section of development.

1.6. If multiple sections are being submitted, files shall be placed in separate directories

Overview of the Submittal Requirements Items 1.0 General

1.7. File names should make sense





Overview of the Submittal Requirements Items
1.0 General

1.8. All elements reside in the primary drawing file
No cells, blocks, or x-refs attached to drawing

1.9. Separate layers for relevant elements
with a logical description

1.10. Projection shall be referenced to
Indiana State Plane Coordinate System

Overview of the Submittal Requirements Items

1.0 General

1.11. Tie into section corners in the Indiana State Plane Coordinate System

1.12. Easements shall be drawn as closed polylines

Overview of the Submittal Requirements Items
1.0 General

1.14. Open Ditches will be As-Built

1.14.1	Flow line, toe of slope, top of bank, and sediment basins
1.14.2	Cross sections
1.14.3	Outlet pipes
1.14.4	Surface Pipes
1.14.5	Special Structures
1.14.6	Tributaries - 100 feet upstream
1.14.7	Filter Strips
1.14.8	Utilities
1.14.9	Easements

Overview of the Submittal Requirements Items
2.0 As-Built Infrastructure

2.1. An Excel spreadsheet populated with As-Built data following the layout standard provided

2.2. All Stormwater Structure BMP's must be listed in the Excel spreadsheet

Overview of the Submittal Requirements Items

2.0 As-Built Infrastructure

2.5. The exact As-Built location of the following items:

2.5.1. Storm Water Manholes, Inlets, End Sections, Risers, Pipes

2.5.2. Detention-Retention Ponds

2.5.3. Sub-Surface Drains

2.5.4. Flow line of swales and ditches

2.5.5. Sanitary Manholes, Lines, Lift Stations, Force Mains, Wyes

2.5.6. Air Relief

2.5.7. Lateral markers

2.5.8. End of stubs

2.5.9. Hand holes and pavement loops

2.5.10. Pipe casing

2.5.11. Water Main lines, laterals constructed, hydrants, and valves

Overview of the Submittal Requirements Items
2.0 As-Built Infrastructure

2.8. All storm water and sanitary structures will have top of castings and invert elevations.

2.9. Structures will have an appropriate Structure ID i.e. SAN_STR_NU

2.10. All Infrastructure pipes will have a length, pipe size (in inches) and material listed

Overview of the Submittal Requirements Items
2.0 As-Built Infrastructure

2.11. Infrastructure line work must be continuous polylines

With a beginning and ending at a structure insertion point connecting only two structures per line

Lines must be drawn with the direction of flow

Overview of the Submittal Requirements Items 2.0 As-Built Infrastructure

2.12. PDF of the signed paper As-Built documents.

It must be legible,
contain all As-Built data
including the profile sheets,
and be reproducible to scale.

The files must be a minimum of 300 dpi,
rotated properly,
and be stored in a separate folder on the CD.

Overview of the Submittal Requirements Items 2.0 As-Built Infrastructure

3.0 Secondary Plats

3.1. Layers that need to be included in the file must include but not limited to:

3.1.1. Lot Dimensions

3.1.2. Lot Numbers

3.1.3. Parcel Lines

3.1.4. Perimeter Boundary Lines

3.1.5. Right of Way Lines

3.1.6. Curve Data & Line Table

3.1.7. Easements

3.1.8. Road Center Lines

3.1.9. Lots Square Feet

3.1.10. Street Names

3.1.11. Monumentation

3.2. The digital file needs to match exactly the plat that is submitted for recording.

3.3. Monuments in and on perimeter of the development

3.4. A PDF file of the recorded Plat with the recording stamp.

Overview of the Submittal Spreadsheets

Directions

1	**Overall Directions**
2	***(Please note that some sample data can be found in the top cells of the data as noted in parentheses and italicized.)***
3	This spreadsheet is designed to be linked to the exported CAD files to provide accurate GIS information.
4	There are two cell formulas embedded into the structure sheet for your use to ease calculations.
5	**Do not use ft** or **in** symbols when filling out the tables
6	Do not rename any of the column headings
7	The sheet is set up to print multiple pages repeating top and/or left side columns as necessary.
8	These can be adjusted as required.
9	**It is imperative that the structures and pipe runs be entered in the sheets in the same order.**
10	
11	**Structure Sheet Directions**
12	This sheet is set up to handle a maximum of 8 inverts into a structure
13	Structure Number (XXX-STR_NU) -Your identifier number (attribute information in CAD).
14	Structure Type (XXX_STR_TY)-Manhole, Beehive Inlet, Curb Inlet, Inlet, Catch Basin (regardles of casting type), End section
15	Storm Structure BMP Type (STO_BMP_TY) - Populate ID from BMP Types Tab
16	Top of Casting (TOP_OF_CAST)- Elevation at rim or top of casting
17	Casting type (CAST_TYPE) - Neenah or Jordan Ironworks number
18	Sump Inv (SUMP_INV)-Invert of sump
19	Drop Manhole (DROP_MH_YN)- Yes/No
20	Invert directions are calculated on 8 compass points
21	Invert 1 will be N, if there is a North, and progress in a clockwise fashion
22	In order N,NE,E,SE,S,SW,W,NW
23	In the event that 2 inverts share the same direction, the shallowest invert shall be listed first
24	In the event of a drop pipe, the shallowest invert shall be listed first
25	It is suggested that pipe runs be separated by a blank row
26	Structures may need to appear more than once if they are common to more than one profile (just copy the information as needed)
27	As an example, str 104 is in the main profile and also the furthest downstream structure in a secondary run (this is usually the case when there are more than 3 inverts)
28	The Top of casting for end sections should be shown as NA
29	
30	**Pipe Sheet Directions**
31	Pipe runs must be listed in the same order as the structures including skipped lines
32	Sheet must be filled out going from upstream to downstream
33	Material- RCP, PVC, PE, DI only, class goes in next column
34	Class- Class #, SDR-35, SDR-26 and so on
35	Note: The formula for the avg. depth will have to be adjusted slightly for each pipe run.
36	Note: The slope check formula can be used as an aid to verify slope and the entered invert values. It can be copied directly to the pipe slope column if necessary.

Overview of the Submittal Spreadsheets
Directions

38	**Water Node**
39	WAT_NOD_ID - Unique feature ID
40	NODE_TYPE - I.E. Valve, Reducer, Tee, Cross, Reducers, Corp Stops (Bends are not required)
41	NODE_SUB_TYP - I.E. System (Valve), Hydrant (Valve), 6x6x6
42	DATE_INSTA - Date Installed - yyyy-mm-dd
43	
44	**Water_Hydrant**
45	WAT_NOD_ID - Unique feature ID
46	HYD_MAKE - Maufacturer of the Hydrant
47	HYDR_MODEL - Model of the Hydrant
48	HYDR_PUMSZ - Size of connection
49	HYD_YEAR - Year of Hydrant make
50	FDC - Fire Department Connection (Y/N)
51	STORTZ - Stortz connection (Y/N)
52	DATE_INSTA - Date Installed - yyyy-mm-dd
53	
54	**Water Line**
55	FROM_NO_ID
56	TO_NODE_ID
57	PIPE_TYPE - I.E. Distribution
58	MATER - I.E. DI for Ductile Iron
59	DIAM - I.E. 6
60	PIPE_LEN - xxx.xx
61	DATE_INSTA - Date Installed - yyyy-mm-dd
62	BACKFIL_YN - Y or N for Yes or No
63	
64	**BMP**
65	BMP Non Structure Tab - Populate ID (BMP_NON_ID) from BMP Types Tab (Optional)

Overview of the Submittal Spreadsheets

San_Structure

Storm Structure

	A	B	C	D	E	F	G	H	I	J	K	L
1	Row	SAN_STR_NU	SAN_STR_TY	TOP_OF_CAST	CAST_TYPE	DROP_MH_YN	NUM_OF_INV	I1_INV_ELE	I1_DIR	I1_DIA	I1_MAT	I2_INV_ELE
2	1	(119)	(MANHOLE)	(898.25)	(EJ 1022-2)	(N)	(2)	(890.77)	(E)	(8)	(PVC)	(890.73)
3	2											
4	3											
5	4											
6	5											

Directions | San_Structure | San_Pipe | Storm_Structure | Storm_Pipe | BMP_Non_Structure | BMP_Typ

Ready NUM

	A	B	C	H	I	J	K	L	M
1	Row	STO_STR_NU	STO_STR_TY	NUM_OF_INV	I1_INV_ELE	I1_DIR	I1_DIA	I1_MAT	I2_INV_ELE
2	1	(510)	(BEEHIVE INLET)	(1)	(896.14)	(E)	(12)	(RCP)	
3	2								
4	3								
5	4								
6	5								
7	6								

Directions | San_Structure | San_Pipe | Storm_Structure | Storm_Pipe | BMP_Non_Structure

Overview of the Submittal Spreadsheets

San_Pipe

Storm_Pipe

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Row	UPS_STR_ID	DOW_STR_ID	SLOPE	DIAM	PIPE_LEN	MATER	PIPE_CLASS	LEN_GRA_FI	AVG_DEPTH	UPST_INVER	DOWN_INVER	SLOPE_CHEC
2	1	(119)	(117)	(0.54%)	(8)	(175.64)	(PVC)	(SDR26)	(42)	441.13	(890.73)	(889.78)	0.0054
3	2									0.00			#DIV/0!
4	3									0.00			#DIV/0!
5	4									0.00			#DIV/0!
6	5									0.00			#DIV/0!
7	6									0.00			#DIV/0!

Directions | San_Structure | **San_Pipe** | Storm_Structure | Storm_Pipe | BMP_Non_Structure | BMP_Types | Water_Node | Water_Hyc

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Row	UPS_STR_ID	DOW_STR_ID	SLOPE	DIAM	PIPE_LEN	MATER	PIPE_CLASS	LEN_GRA_FI	AVG_DEPTH	UPST_INVER	DOWN_INVER	SLOPE_CHEC
2	1	(508)	(509)	(1.02%)	(12)	(36.37)	(RCP)	(III)	(27)	445.66	(895.31)	(894.94)	0.0102
3	2									0.00			#DIV/0!
4	3									0.00			#DIV/0!
5	4									0.00			#DIV/0!
6	5									0.00			#DIV/0!
7	6									0.00			#DIV/0!

Directions | San_Structure | San_Pipe | Storm_Structure | **Storm_Pipe** | BMP_Non_Structure | BMP_Types | Water_Node | Water_Hyc

Overview of the Submittal Spreadsheets
BMP_Non Structure

	A	B	C	D	E	F
1	*Row*	**BMP_NON_ID**	Site Design BMPs (Non-Structural)	Location	Description	Misc
2	*1*					
3	*2*					
4	*3*					
5	*4*					
6	*5*					
7	*6*					

Directions | San_Structure | San_Pipe | Storm_Structure | Storm_Pipe | **BMP_Non_Structure** | BMP_Types

Overview of the Submittal Spreadsheets
BMP Types - Structure BMP's

1	**Structural BMPs**	
2		
3	STO_BMP_TY	
4		
5	***A***	**Source Control BMPs**
6	A1	▪ Storm drain system stenciling and signage
7	A2	▪ Outdoor material and trash storage area designed to reduce or control rainfall runoff
8	A3	▪ Efficient irrigation system
9		
10		**Treatment Control BMPs**
11		
12	***B***	***Biofilters***
13	B1	▪ Grass swale
14	B2	▪ Grass strip
15	B3	▪ Wetland vegetation swale
16	B4	▪ Bioretention
17	***C***	***Detention Basins***
18	C1	▪ Extended/dry detention basin with grass lining
19	C2	▪ Extended/dry detention basin with impervious lining
20	C3	▪ Catch basin screens
21	***D***	***Infiltration Basins***
22	D1	▪ Infiltration basin
23	D2	▪ Infiltration trench
24	D3	▪ Porous asphalt
25	D4	▪ Porous concrete
26	D5	▪ Porous modular concrete block
27	***E***	***Wet Ponds and Wetlands***
28	E1	▪ Wet pond (permanent pool) without lining
29	E2	▪ Wet pond (permanent pool) with impervious lining
30	E3	▪ Constructed wetland
31	***F***	***Drainage Inserts***
32	F1	▪ Oil/Water separator
33	F2	▪ Catch basin insert
34	F3	▪ Storm drain inserts
35	***G***	***Filtration Systems***
36	G1	▪ Media filtration
37	***H***	***Continuous Flow Deflect***
38	H1	▪ Sand filtration ion/ Separation Systems
39	H2	▪ Swirl Concentrator

Overview of the Submittal Spreadsheets
BMP Types - Non Structure BMP's

43	**BMP_NON_ID**	
44		
45	***NSA***	***Minimizing Impervious Areas***
46	NSA1	▪ Reduce sidewalk widths and incorporate landscaped buffer areas between
47		sidewalks and streets.
48	NSA2	▪ Design residential streets for the minimum required pavement widths
49	NSA3	▪ Minimize the number of residential street cul-de-sacs and incorporate landscaped
50		areas to reduce their impervious cover.
51	NSA4	▪ Use open space development that incorporates smaller lot sizes
52	NSA5	▪ Increase building density while decreasing the building footprint
53	NSA6	▪ Reduce overall lot imperviousness by promoting alternative driveway surfaces and
54		shared driveways that connect two or more homes together
55	NSA7	▪ Reduce overall imperviousness associated with parking lots by providing compact
56		car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and
57		using pervious materials in spillover parking areas
58	***NSB***	***Increase Rainfall Infiltration***
59	NSB1	▪ Use permeable materials for private sidewalks, driveways, parking lots, and interior
60		roadway surfaces (examples: hybrid lots, parking groves, permeable overflow
61		parking, etc.)
62	NSB2	▪ Direct rooftop runoff to pervious areas such as yards, open channels, or vegetated
63		areas, and avoid routing rooftop runoff to the roadway or the urban runoff
64		conveyance system
65	***NSC***	***Maximize Rainfall Interception***
66	NSC3	▪ Maximizing canopy interception and water conservation by preserving existing
67		native trees and shrubs, and planting additional native or drought tolerant trees and
68		large shrubs.
69	***NSD***	***Minimize Directly Connected Impervious Areas (DCIAs)***
70	NSD1	▪ Draining rooftops into adjacent landscaping prior to discharging to the storm drain
71	NSD2	▪ Draining parking lots into landscape areas co-designed as biofiltration areas
72	NSD3	▪ Draining roads, sidewalks, and impervious trails into adjacent landscaping
73	***NSE***	***Slope and Channel Protection***
74	NSE1	▪ Use of natural drainage systems to the maximum extent practicable
75	NSE2	▪ Stabilized permanent channel crossings
76	NSE3	▪ Planting native or drought tolerant vegetation on slopes
77	NSE4	▪ Energy dissipaters, such as riprap, at the outlets of new storm drains, culverts,
78		conduits, or channels that enter unlined channels
79	***NSF***	***Maximize Rainfall Interception***
80	NSF1	▪ Foundation planting
81	***NSG***	***Increase Rainfall Infiltration***
82	NSG1	▪ Dry wells

Directions | San_Structure | San_Pipe | Storm_Structure | Storm_Pipe | BMP_Non_Structure | **BMP_Types**

Overview of the Submittal Spreadsheets

Water_Node
Water Hydrant
Water_Line

	A	B	C	D	E
1	Row	WAT_NOD_ID	NODE_TYPE	NODE_SUB_TYP	DATE_INSTA
2	1	(1)	(VALVE)	(HYDRANT)	(1/1/2006)
3	2				
4	3				
5	4				
6	5				

BMP_Types | **Water_Node** | Water_Hydrant | Water_Line

	Row	WAT_NOD_ID	HYD_MAKE	HYDR_MODEL	HYDR_PUMSZ	HYD_YEAR	FDC	STORTZ	OWNER
1									
2	1	(1)	(MUELLER)	(CENTURION)	(4.5)	(2006)	(Y/N)	(Y/N)	WPWD
3	2								
4	3								
5	4								

BMP_Types | Water_Node | **Water_Hydrant** | Water_Line

	Row	FROM_NO_ID	TO_NODE_ID	PIPE_TYPE	MATER	DIAM	PIPE_LEN	DATE_INSTA	BACKFIL_YN
1									
2	1	(1)	(2)	(DISTRIBUTION	(C900)	(8)	(23.85)	(10/7/2005)	(Y)
3	2								
4	3								
5	4								
6	5								

BMP_Types | Water_Node | Water_Hydrant | **Water_Line**

Leane O'Daniel
Westfield Public Works Department
GIS Technician

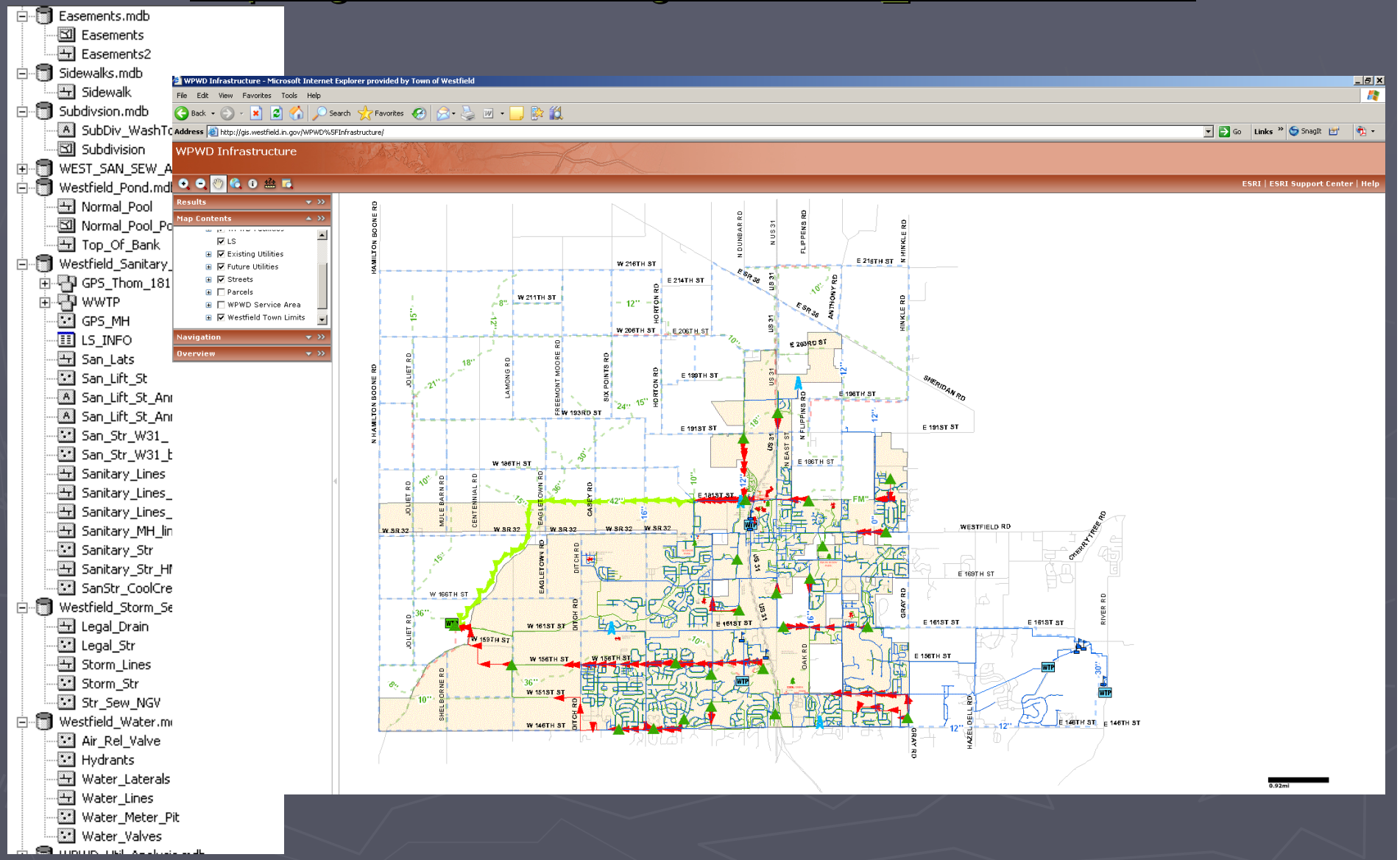
Overview of the CAD to GIS Conversion Process

- WPWD has 135 Commercial and Residential Projects in the pipeline since January 1, 2006

- 37 of those projects have completed the life cycle with conversion and acceptance of the As-Built submittals

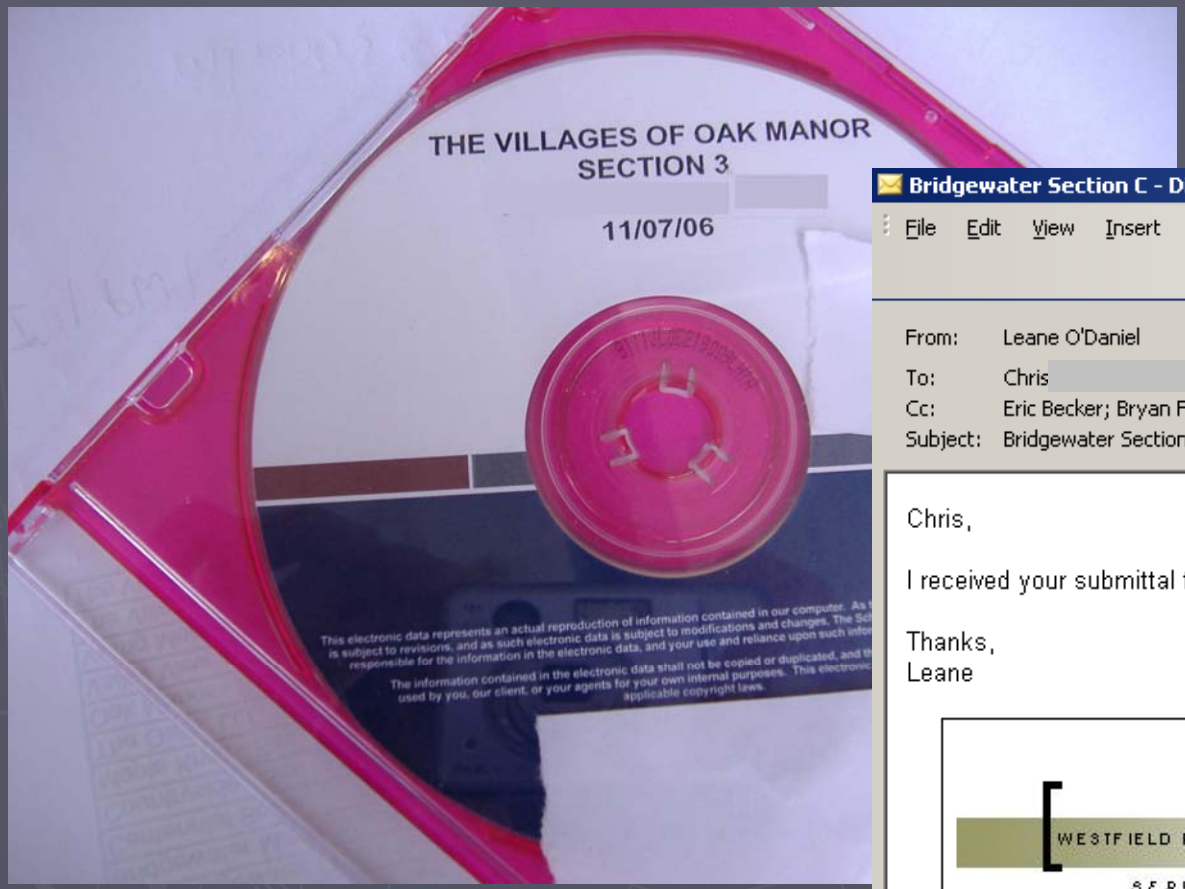
Ultimate goal – get the master GIS database populated with the As-Built submittal Information.

http://gis.westfield.in.gov/WPWD_Infrastructure



CD Submittal

Receive Digital Drawing and send confirmation letter...



Bridgewater Section C - Digital As-Built Submission (9/1/06) - Received - Message (HTML)

File Edit View Insert Format Tools Actions Help

From: Leane O'Daniel

To: Chris)

Cc: Eric Becker; Bryan Forkner;)

Subject: Bridgewater Section C - Digital As-Built Submission (9/1/06) - Received

Chris,

I received your submittal today.

Thanks,
Leane

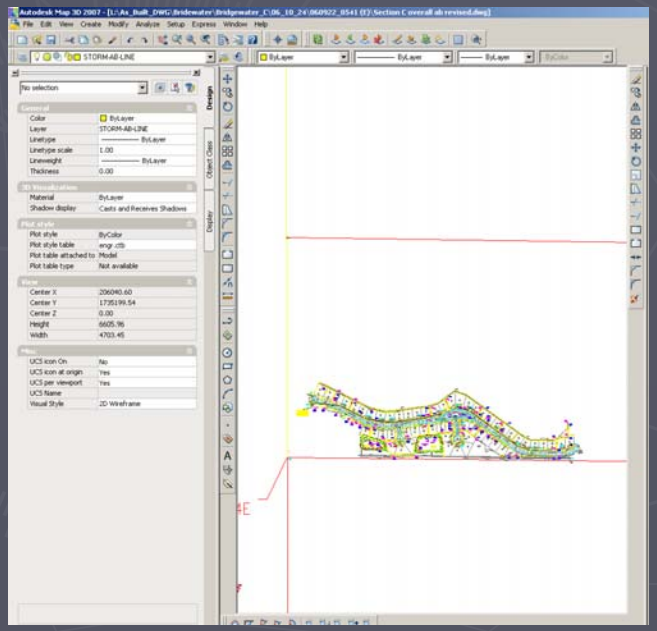
WESTFIELD PUBLIC WORKS

SERVING YOUR UTILITY NEEDS

Leane O'Daniel B.S., M.S.
Westfield Public Works
GIS/GPS Technician
lodaniel@westfield.in.gov
(317) 896-5452 x140

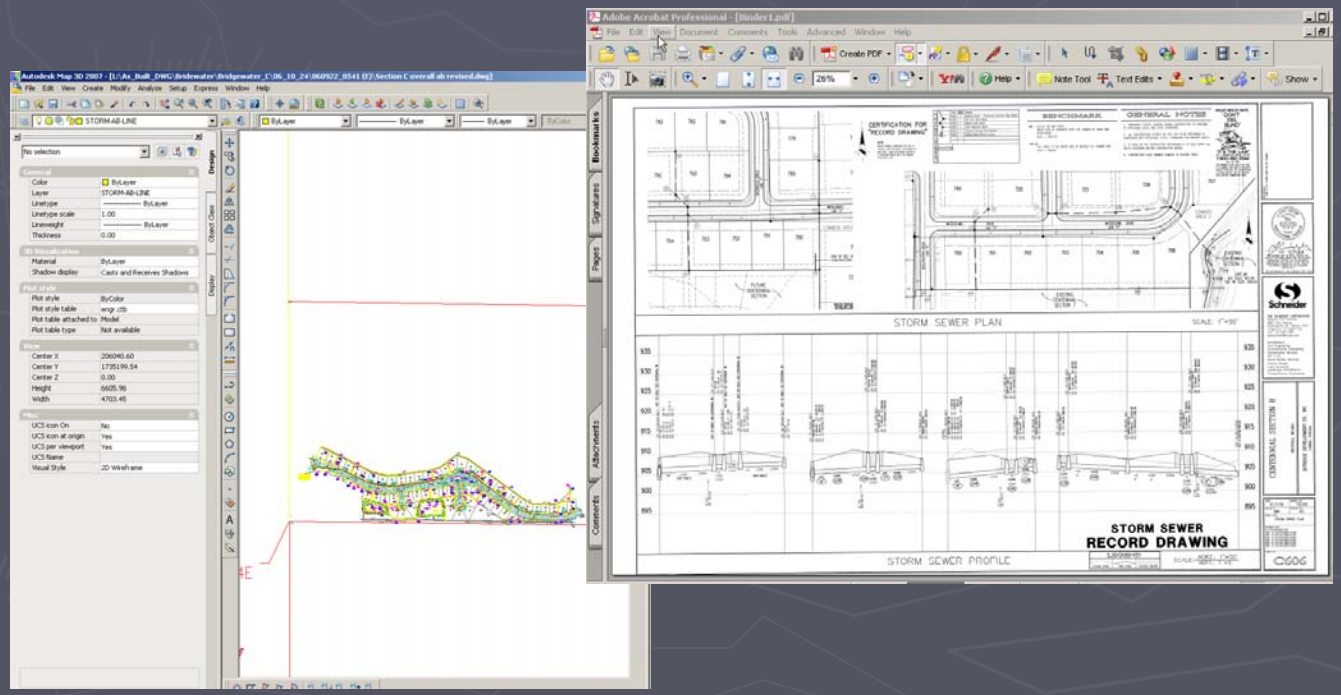
Three requirements for the Submittal

1. .dwg drawing



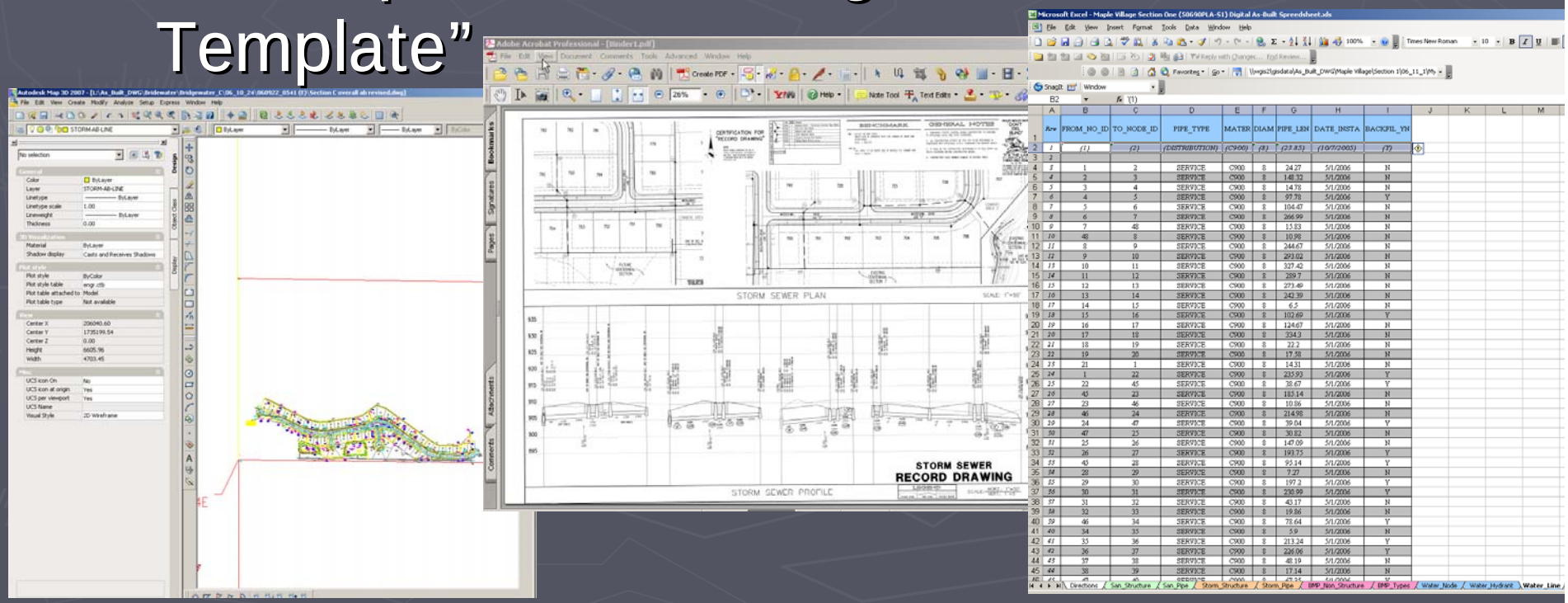
Three requirements for the Submittal

1. .dwg drawing
2. .pdf of As-Built's for development section



Three requirements for the Submittal

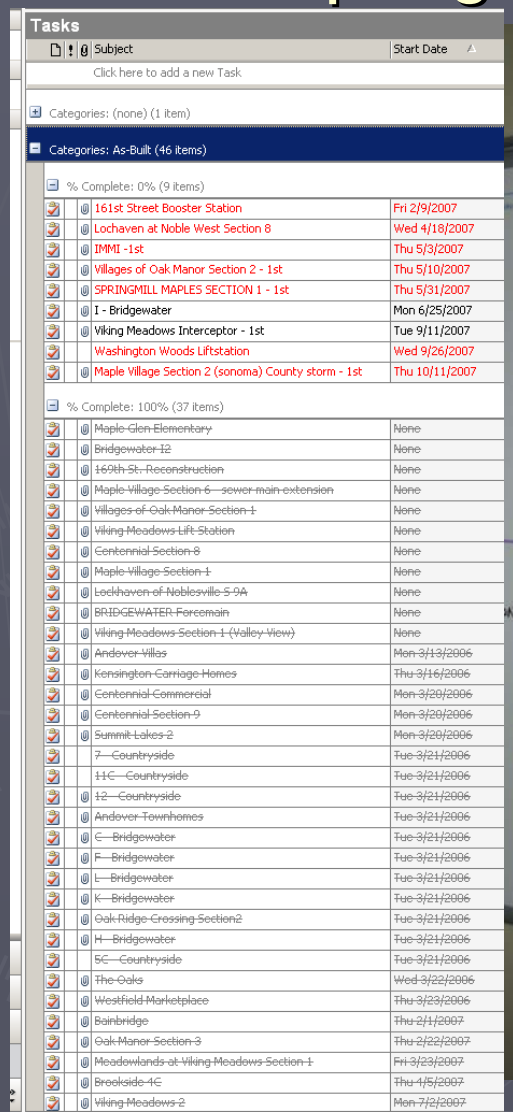
1. .dwg drawing
2. .pdf of As-Built's for development section
3. Excel Spreadsheet "Digital As-Built Table Template"



Added to FIFO cue...

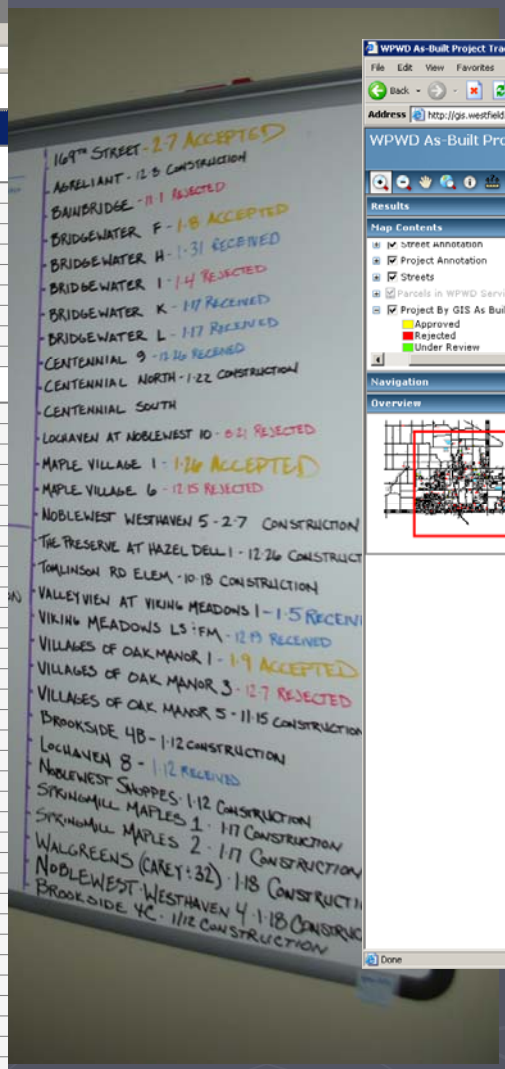
Projects are tracked via board and Westfield GIS Internet

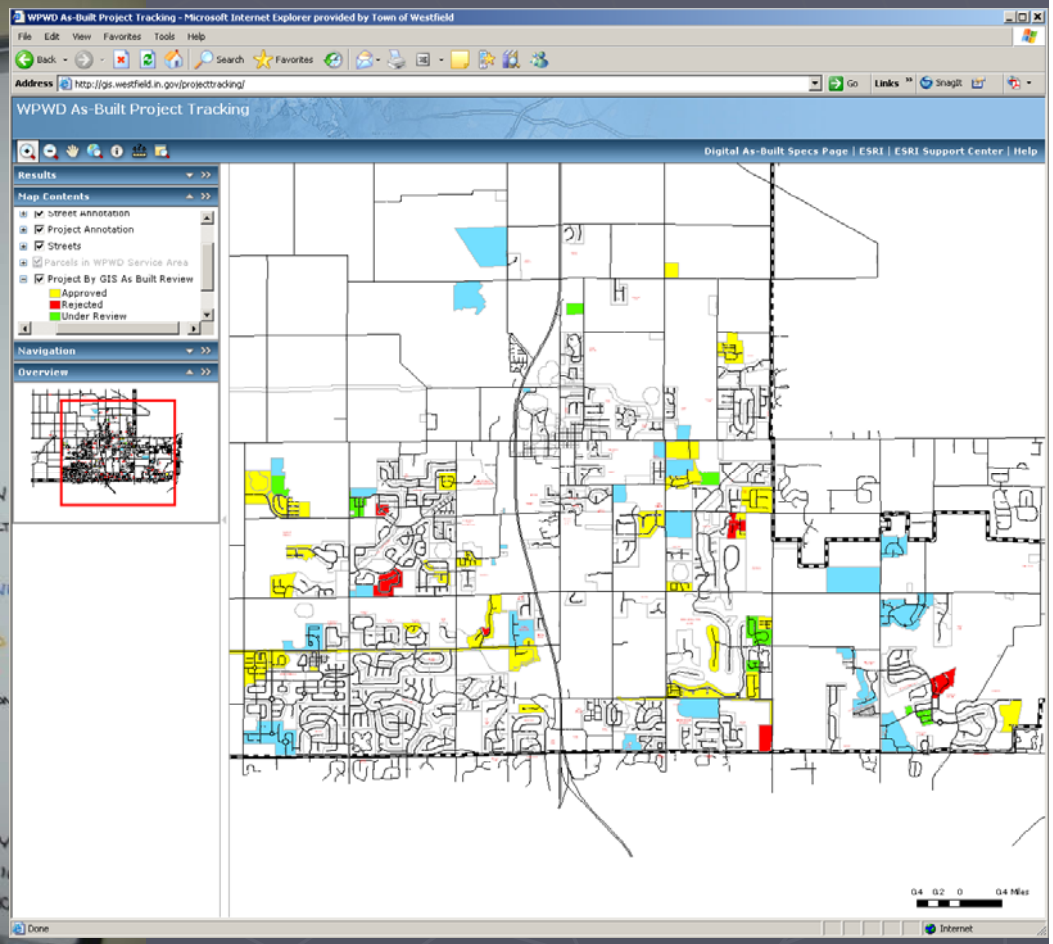
http://gis.westfield.in.gov/projecttracking/



Tasks

Subject	Start Date
Click here to add a new Task	
Categories: (none) (1 item)	
Categories: As-Built (46 items)	
% Complete: 0% (9 items)	
161st Street Booster Station	Fri 2/9/2007
Lochaven at Noble West Section 8	Wed 4/18/2007
IMMI -1st	Thu 5/3/2007
Villages of Oak Manor Section 2 - 1st	Thu 5/10/2007
SPRINGMILL MAPLES SECTION 1 - 1st	Thu 5/31/2007
I - Bridgewater	Mon 6/25/2007
Viking Meadows Interceptor - 1st	Tue 9/11/2007
Washington Woods Liftstation	Wed 9/26/2007
Maple Village Section 2 (sonoma) County storm - 1st	Thu 10/11/2007
% Complete: 100% (37 items)	
~~Maple Glen Elementary~~	None
~~Bridgewater 12~~	None
~~169th St. Reconstruction~~	None
~~Maple Village Section 6 - sewer main extension~~	None
~~Villages of Oak Manor Section 1~~	None
~~Viking Meadows Lift Station~~	None
~~Centennial Section 8~~	None
~~Maple Village Section 1~~	None
~~Lochhaven of Noblesville S 9A~~	None
~~BRIDGEWATER Forcemain~~	None
~~Viking Meadows Section 1 (Valley View)~~	None
~~Andover Villas~~	~~Mon 3/13/2006~~
~~Kensington Carriage Homes~~	~~Thu 3/16/2006~~
~~Centennial Commercial~~	~~Mon 3/20/2006~~
~~Centennial Section 9~~	~~Mon 3/20/2006~~
~~Summit Lakes 2~~	~~Mon 3/20/2006~~
~~7 - Countryside~~	~~Tue 3/21/2006~~
~~11C - Countryside~~	~~Tue 3/21/2006~~
~~12 - Countryside~~	~~Tue 3/21/2006~~
~~Andover Townhomes~~	~~Tue 3/21/2006~~
~~C - Bridgewater~~	~~Tue 3/21/2006~~
~~F - Bridgewater~~	~~Tue 3/21/2006~~
~~L - Bridgewater~~	~~Tue 3/21/2006~~
~~K - Bridgewater~~	~~Tue 3/21/2006~~
~~Oak Ridge Crossing Section2~~	~~Tue 3/21/2006~~
~~H - Bridgewater~~	~~Tue 3/21/2006~~
~~5C - Countryside~~	~~Tue 3/21/2006~~
~~The Oaks~~	~~Wed 3/22/2006~~
~~Westfield Marketplace~~	~~Thu 3/23/2006~~
~~Bainbridge~~	~~Thu 2/1/2007~~
~~Oak Manor Section 3~~	~~Thu 2/22/2007~~
~~Meadowlands at Viking Meadows Section 1~~	~~Fri 3/23/2007~~
~~Brookside 4C~~	~~Thu 4/5/2007~~
~~Viking Meadows 2~~	~~Mon 7/2/2007~~

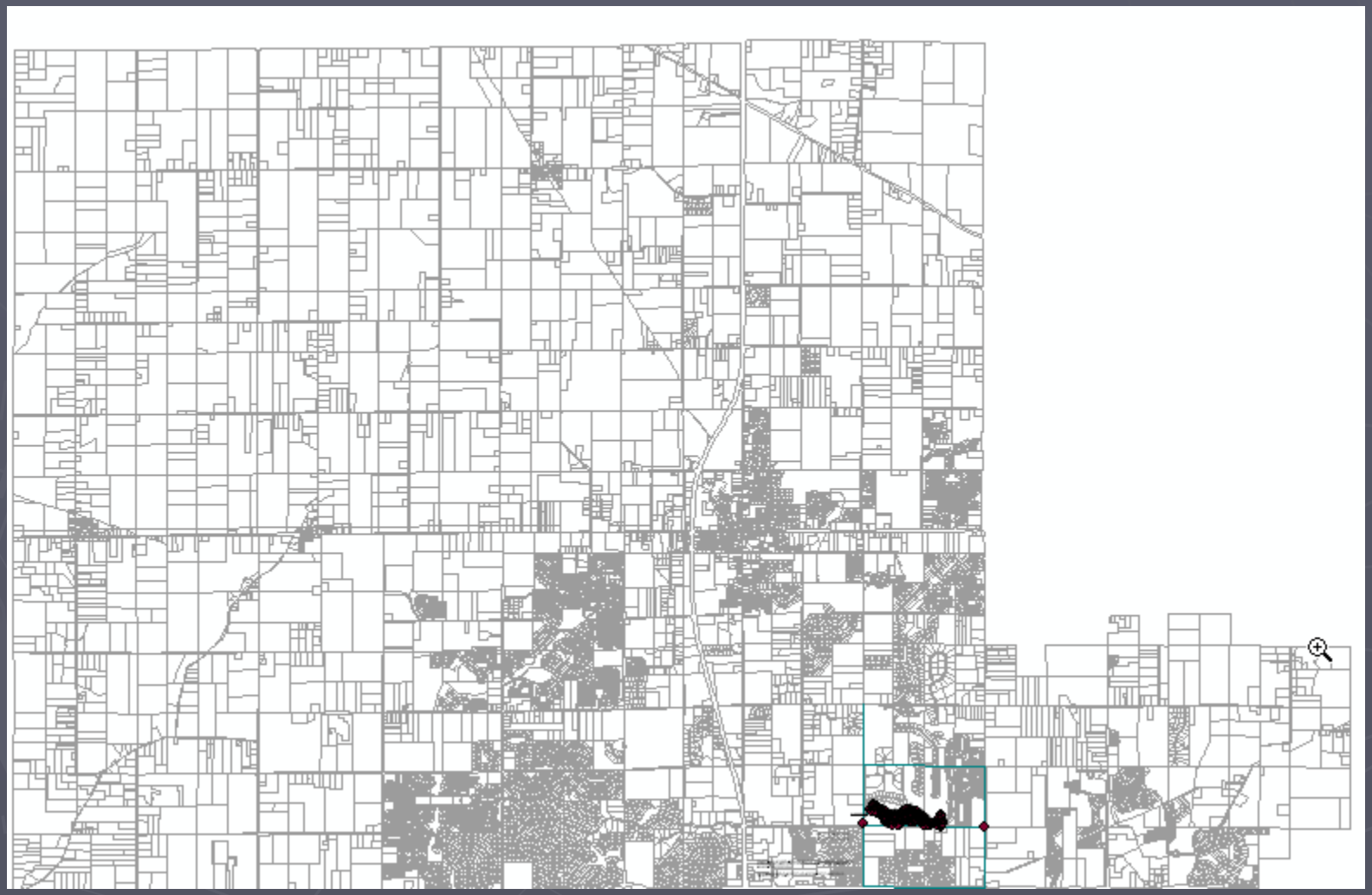




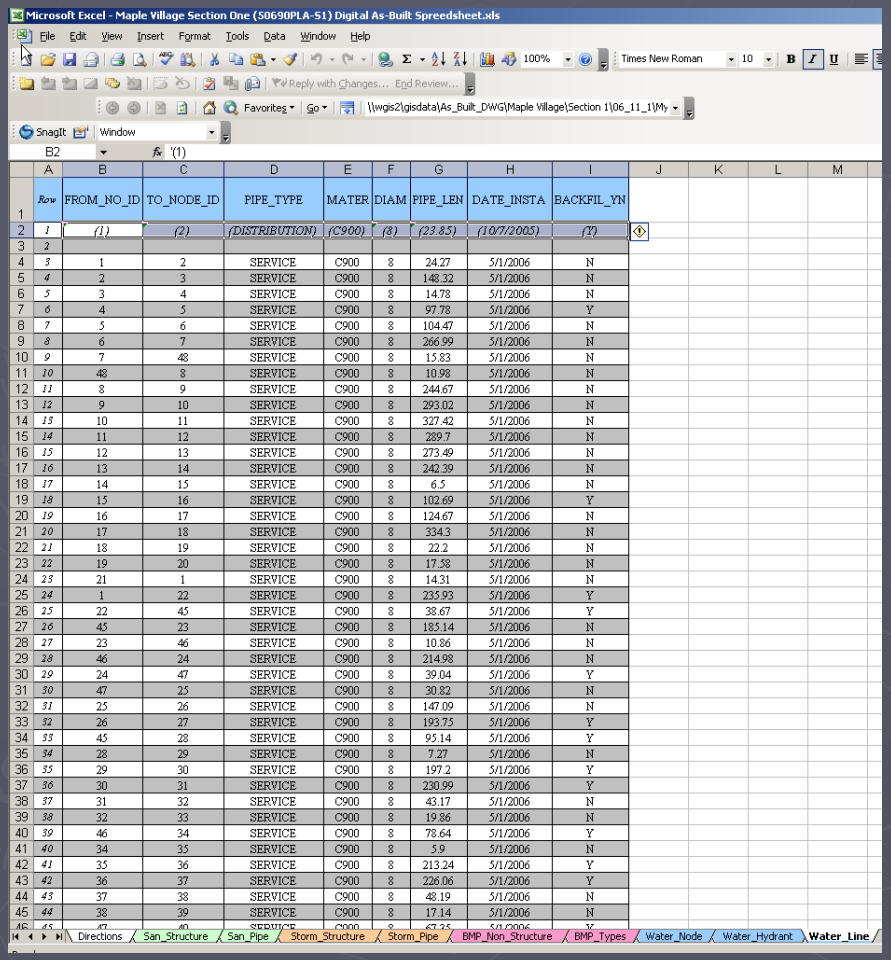
Review for Major Errors

- Coordinate System:
  - NAD83, Indiana State Plane Coordinate System, East Zone, using U.S. Survey Feet, Hamilton County datum.
- Digital As-Built Table Template (Excel)
  - Missing Data
- GPS Quality Control
  - Distance check – horizontal and vertical

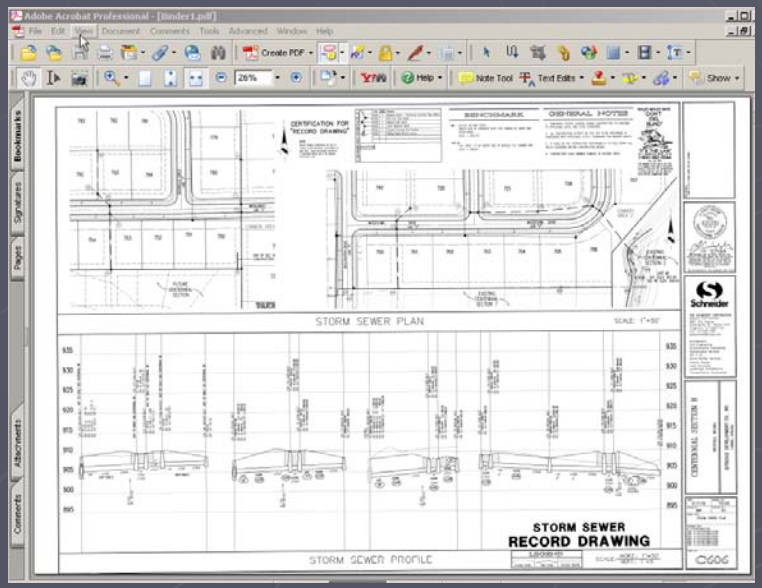
Check for correct coordinate system – NAD83, Indiana State Plane, East



Check Digital As-Built table template for missing information and vs. the .pdf As-Built Drawing

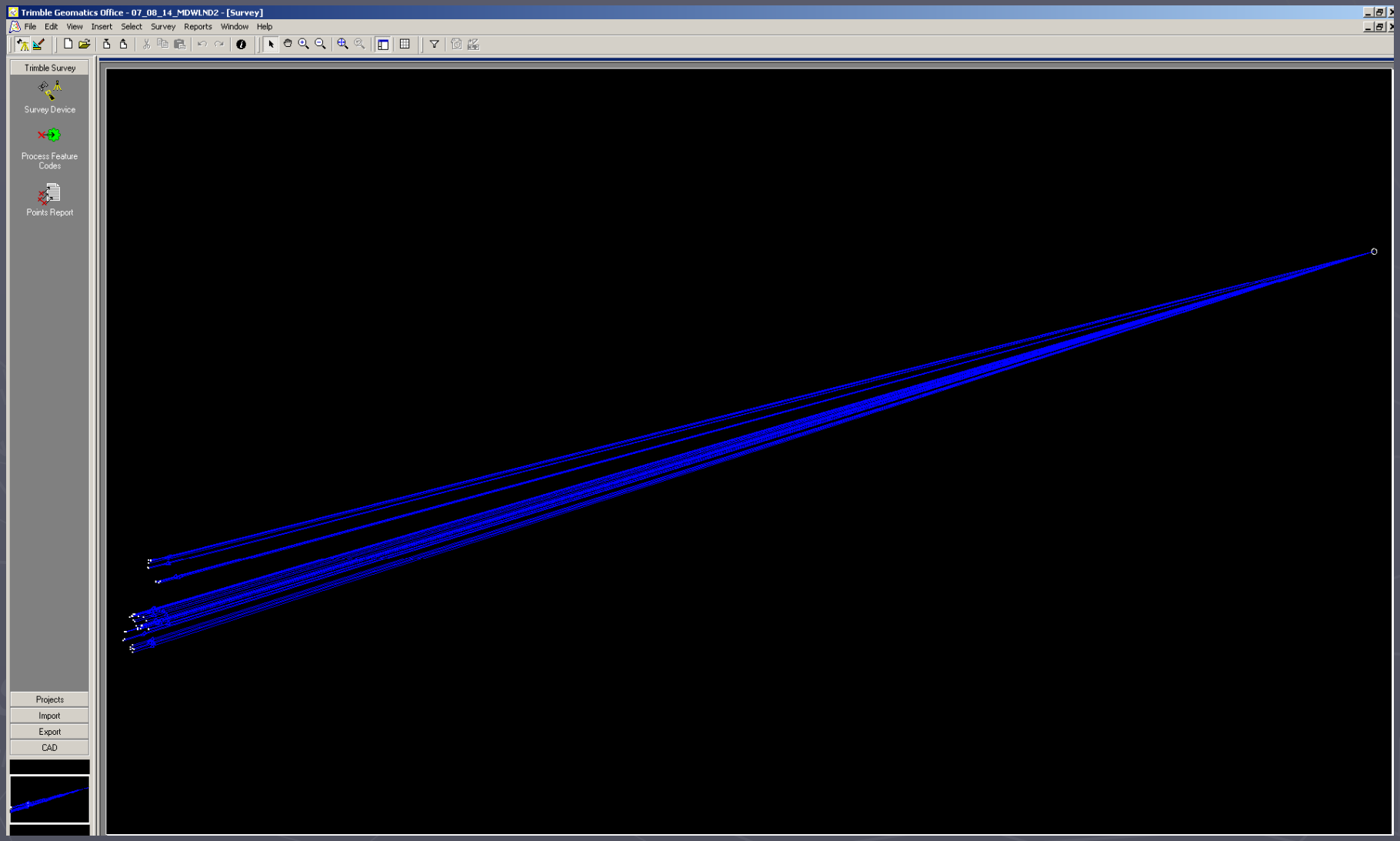


Row	FROM_NO_ID	TO_NODE_ID	PIPE_TYPE	MATER	DIAM	PIPE_LEN	DATE_INSTA	BACKFIL_YN
1	(1)	(2)	(DISTRIBUTION)	(C900)	(8)	(23.85)	(10/7/2005)	(Y)
2								
3	1	2	SERVICE	C900	8	24.27	5/1/2006	N
4	2	3	SERVICE	C900	8	148.32	5/1/2006	N
5	3	4	SERVICE	C900	8	14.78	5/1/2006	N
6	4	5	SERVICE	C900	8	97.78	5/1/2006	Y
7	5	6	SERVICE	C900	8	104.47	5/1/2006	N
8	6	7	SERVICE	C900	8	266.99	5/1/2006	N
9	7	48	SERVICE	C900	8	15.83	5/1/2006	N
10	48	8	SERVICE	C900	8	10.98	5/1/2006	N
11	8	9	SERVICE	C900	8	244.67	5/1/2006	N
12	9	10	SERVICE	C900	8	293.02	5/1/2006	N
13	10	11	SERVICE	C900	8	327.42	5/1/2006	N
14	11	12	SERVICE	C900	8	289.7	5/1/2006	N
15	12	13	SERVICE	C900	8	273.49	5/1/2006	N
16	13	14	SERVICE	C900	8	242.39	5/1/2006	N
17	14	15	SERVICE	C900	8	6.5	5/1/2006	N
18	15	16	SERVICE	C900	8	102.69	5/1/2006	Y
19	16	17	SERVICE	C900	8	124.67	5/1/2006	N
20	17	18	SERVICE	C900	8	334.3	5/1/2006	N
21	18	19	SERVICE	C900	8	22.2	5/1/2006	N
22	19	20	SERVICE	C900	8	17.58	5/1/2006	N
23	21	1	SERVICE	C900	8	14.31	5/1/2006	N
24	1	22	SERVICE	C900	8	235.93	5/1/2006	Y
25	22	45	SERVICE	C900	8	38.67	5/1/2006	Y
26	45	23	SERVICE	C900	8	185.14	5/1/2006	N
27	23	46	SERVICE	C900	8	10.86	5/1/2006	N
28	46	24	SERVICE	C900	8	214.98	5/1/2006	N
29	24	47	SERVICE	C900	8	39.04	5/1/2006	Y
30	47	25	SERVICE	C900	8	30.82	5/1/2006	N
31	25	26	SERVICE	C900	8	147.09	5/1/2006	N
32	26	27	SERVICE	C900	8	193.75	5/1/2006	Y
33	45	28	SERVICE	C900	8	95.14	5/1/2006	Y
34	28	29	SERVICE	C900	8	7.27	5/1/2006	N
35	29	30	SERVICE	C900	8	197.2	5/1/2006	Y
36	30	31	SERVICE	C900	8	230.99	5/1/2006	Y
37	31	32	SERVICE	C900	8	43.17	5/1/2006	N
38	32	33	SERVICE	C900	8	19.86	5/1/2006	N
39	46	34	SERVICE	C900	8	78.64	5/1/2006	Y
40	34	35	SERVICE	C900	8	5.9	5/1/2006	N
41	35	36	SERVICE	C900	8	213.24	5/1/2006	Y
42	36	37	SERVICE	C900	8	226.06	5/1/2006	Y
43	37	38	SERVICE	C900	8	48.19	5/1/2006	N
44	38	39	SERVICE	C900	8	17.14	5/1/2006	N

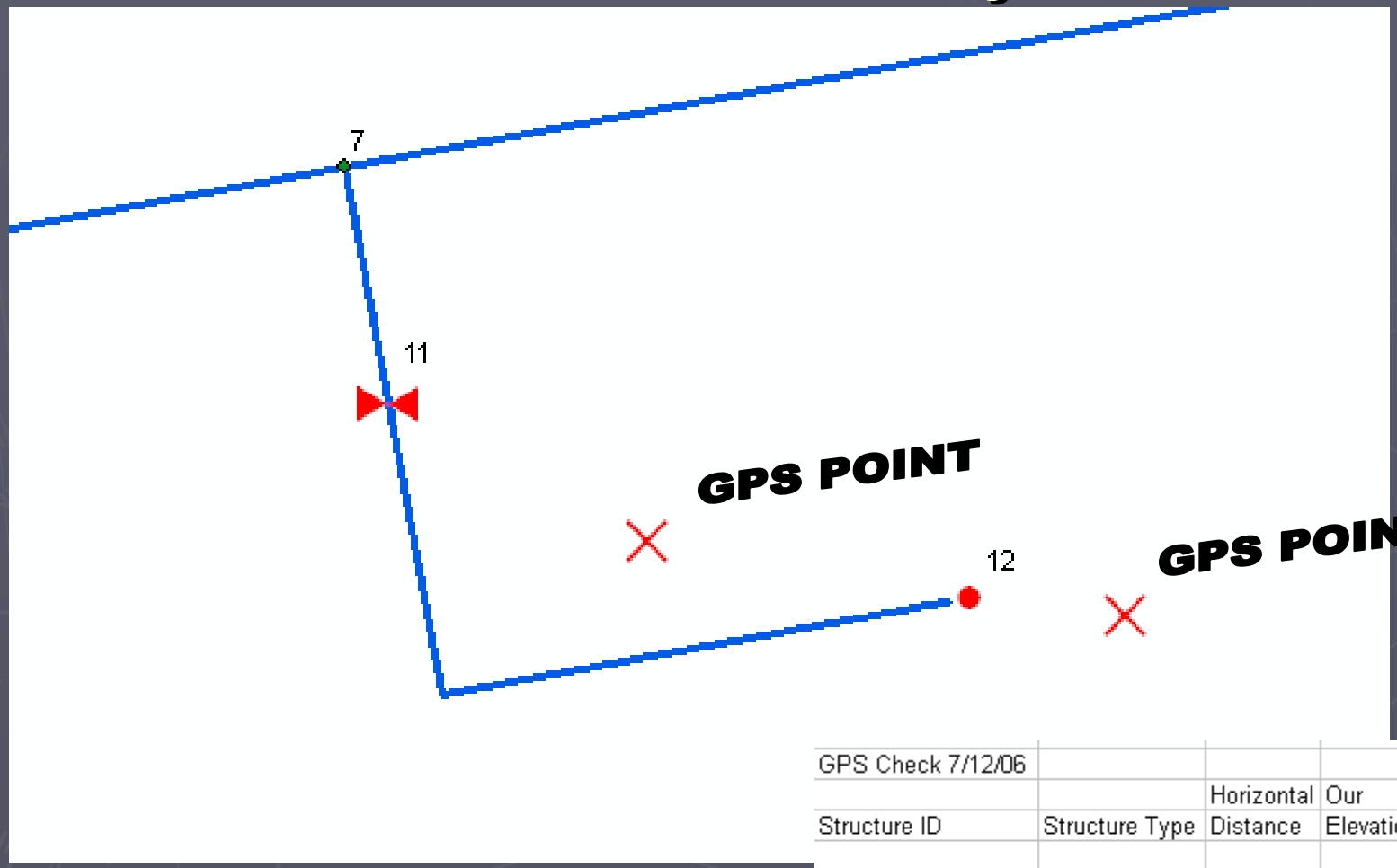


Approx. 10% of infrastructure gathered via Survey Grade GPS

Download points from GPS



Check for GPS vs. Feature Horizontal, Vertical Distance Accuracy



GPS Check 7/12/06					
		Horizontal	Our	Their	
Structure ID	Structure Type	Distance	Elevation	Elevation	Difference
719	Sanitary MH	0.49	862.67	862.81	-0.14
129	Gate Valve	0.34			

If Issues - Send Rejection

November 22, 2006

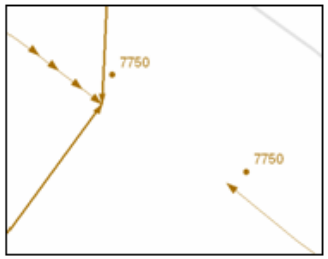
RE Section "C" (Redelivery 10/24/06) – Digital As-Built Submission – Rejected 11/22/06

John Smith
1234 Miahqueah Ct.
Indianapolis, IN 46216

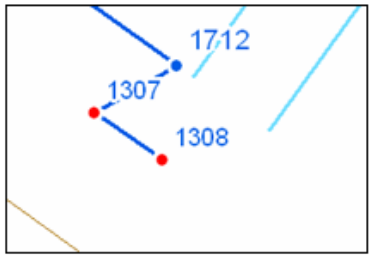
John,

Thank you for your submitted drawings for section "C" dated October 24, 2006. We have reviewed the drawings and please note that your drawing will need to be resubmitted – with the following being a list that we have found that does not comply with the Westfield Department of Public Works Digital Submittal Requirements.

1. Storm Structure 7750 – drawn twice on the "San-As-Built-LINE layer and infrastructure isn't connected between storm mains.

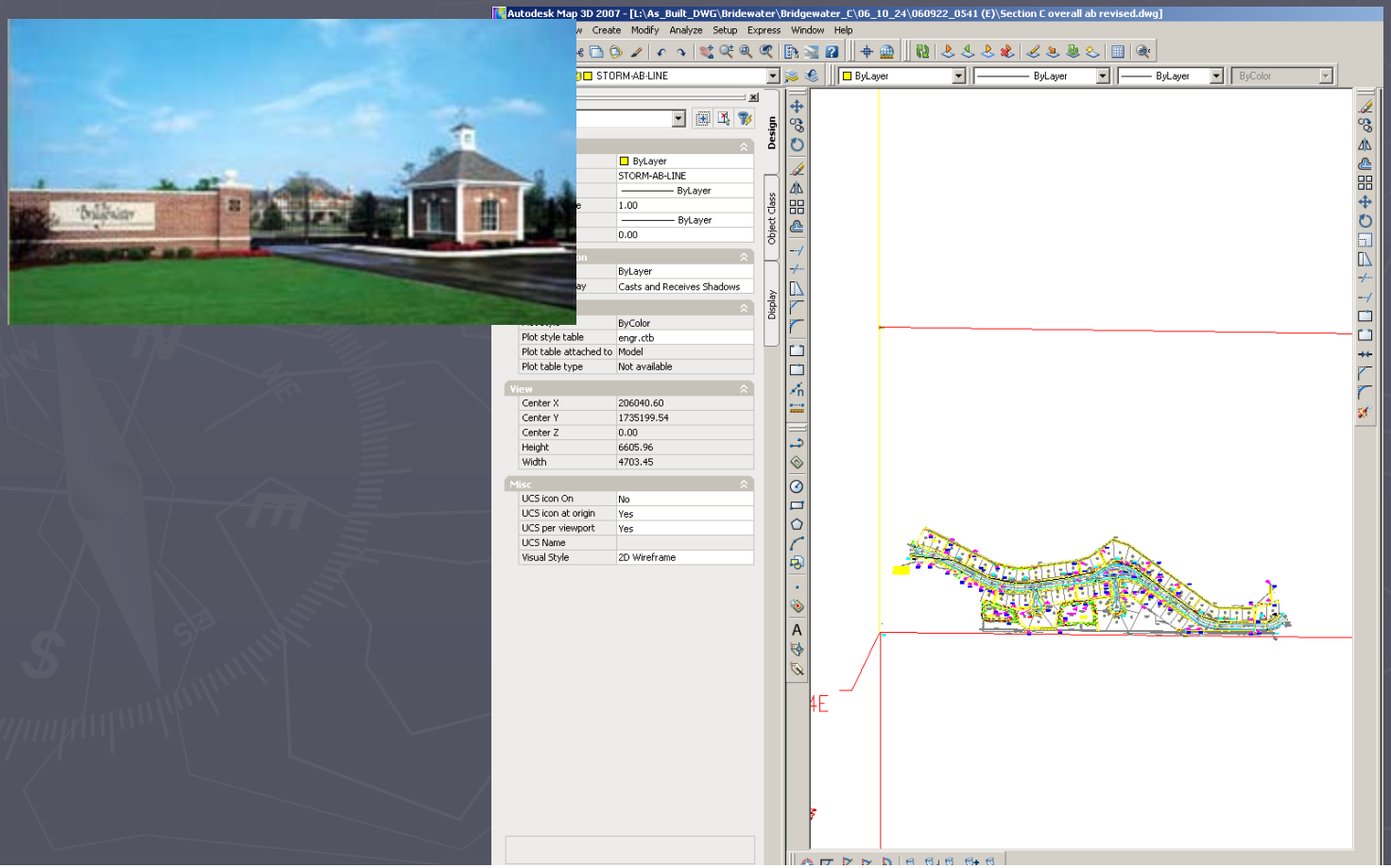


2. Water laterals not connected to water main near water feature 1307.

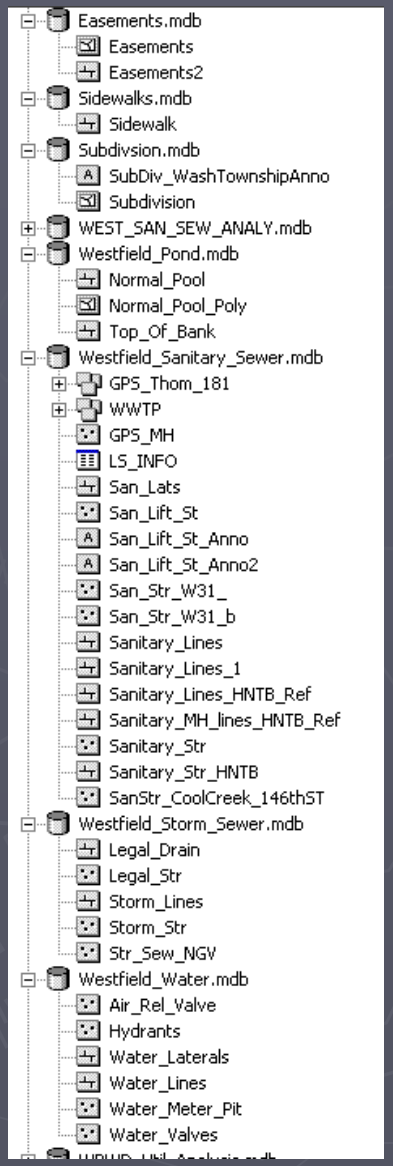


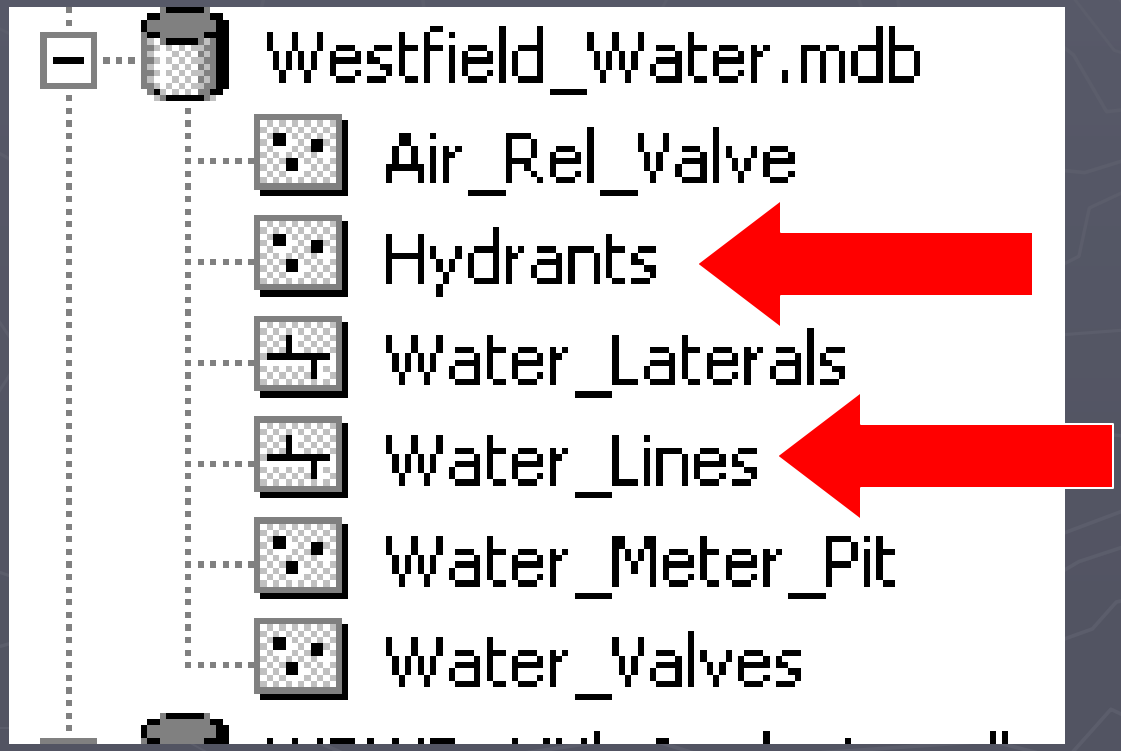
3. Double sanitary structures:

AutoCAD drawing for development section ready for processing

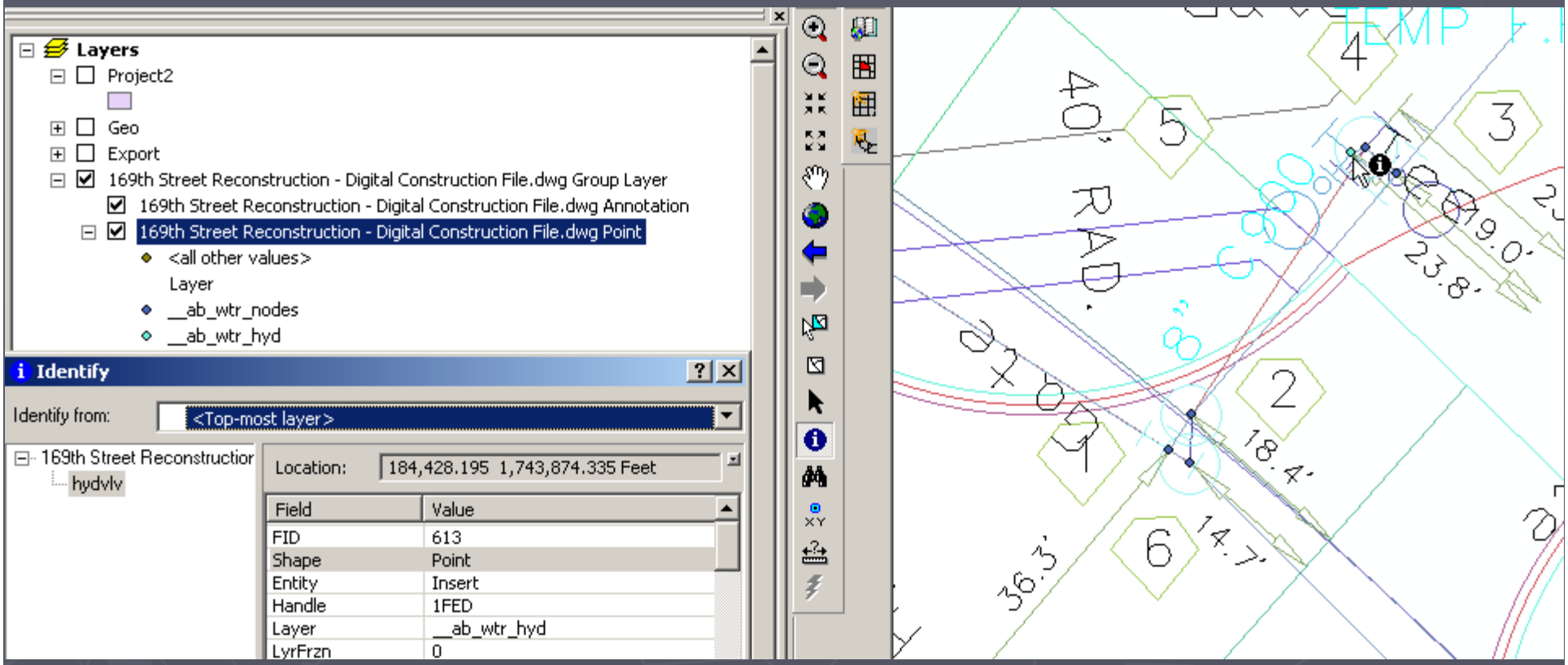


The WPWD master GIS database

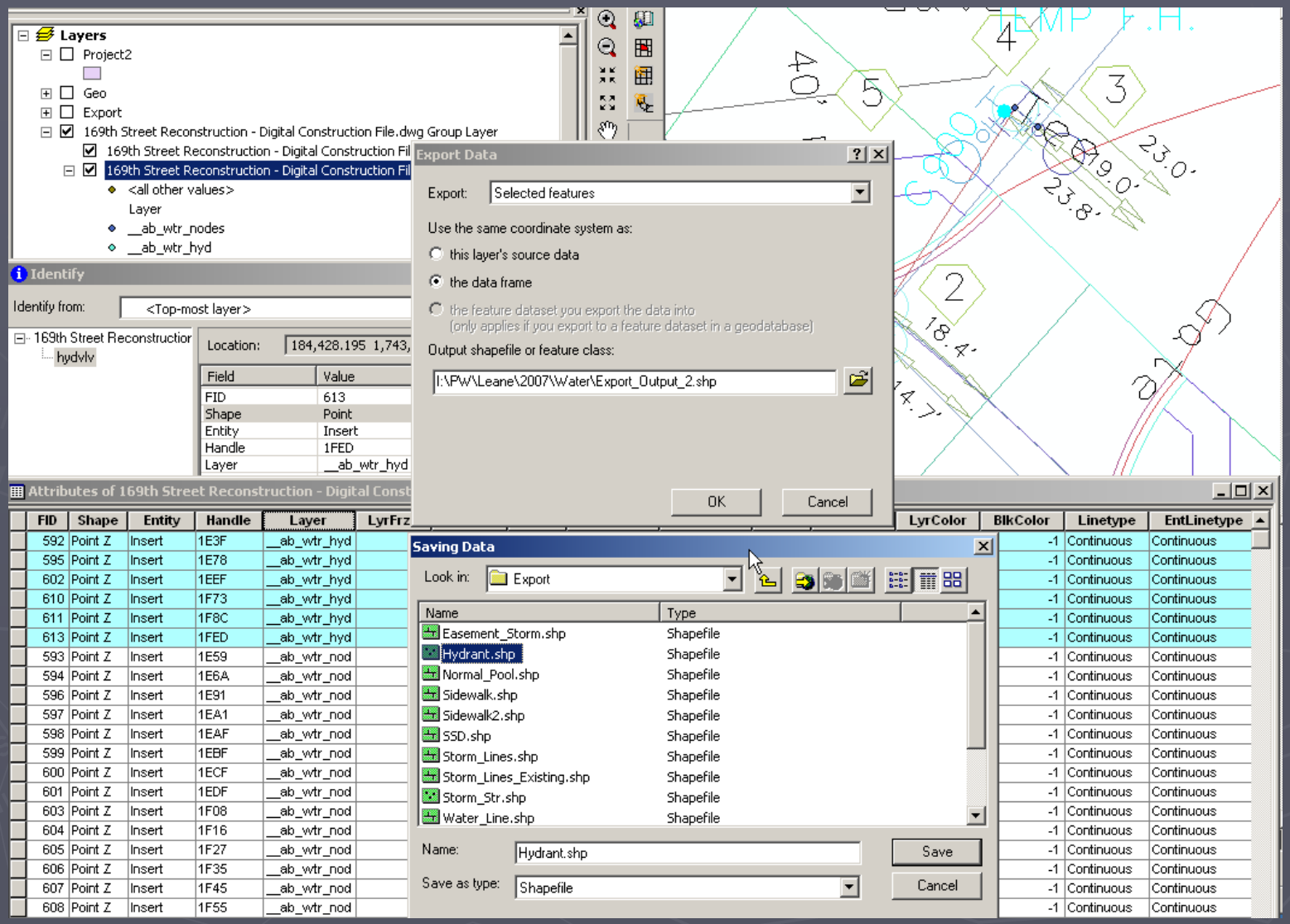




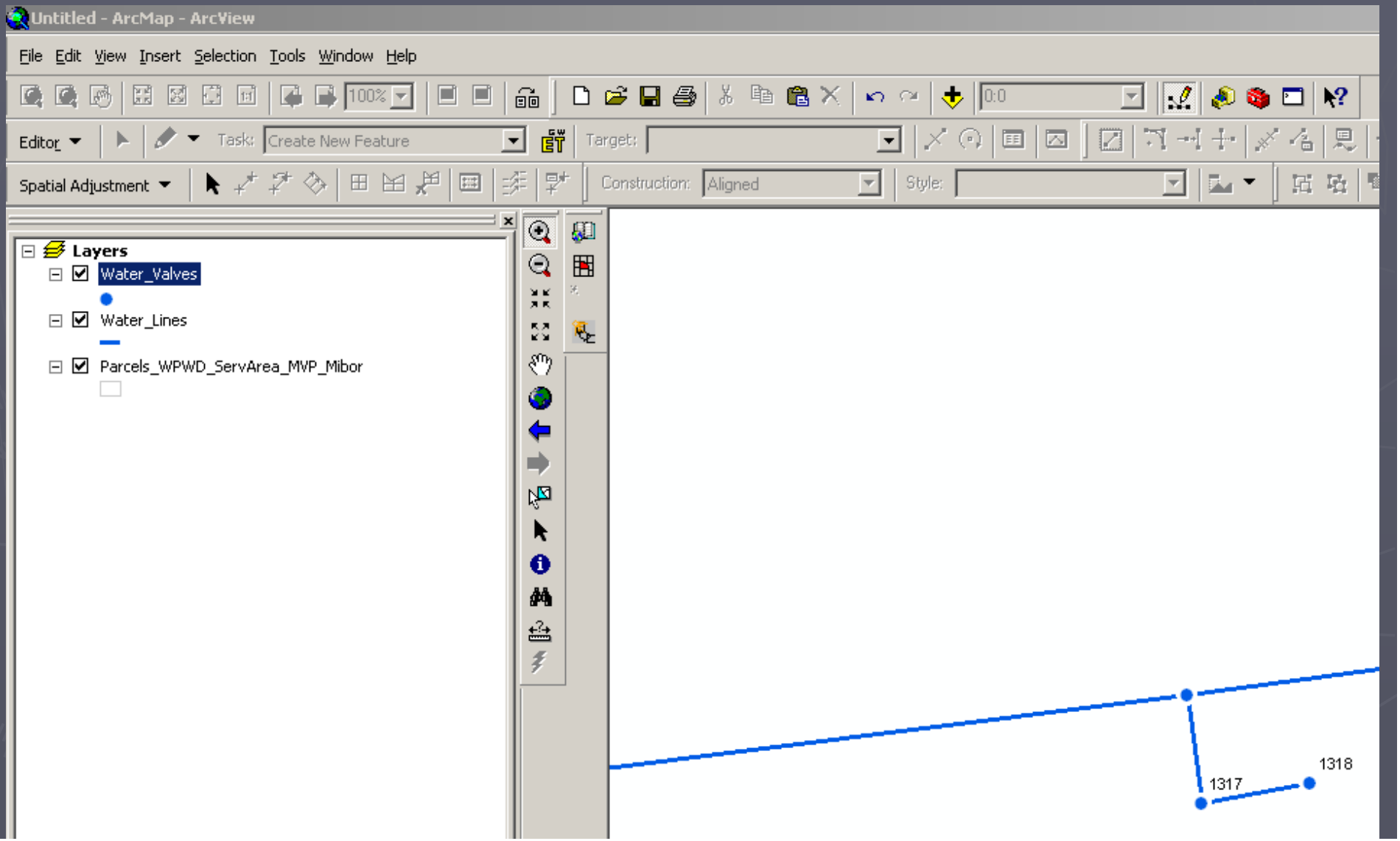
After adding the CAD drawing into GIS, identify the layer – Water Hydrants (Points).



Export that layer to a shapefile



Using GIS add the water hydrant shapefile (without attributes)…



Digital As-Built Table Template MS Excel contains the attributes needed.

Microsoft Office Excel 2003

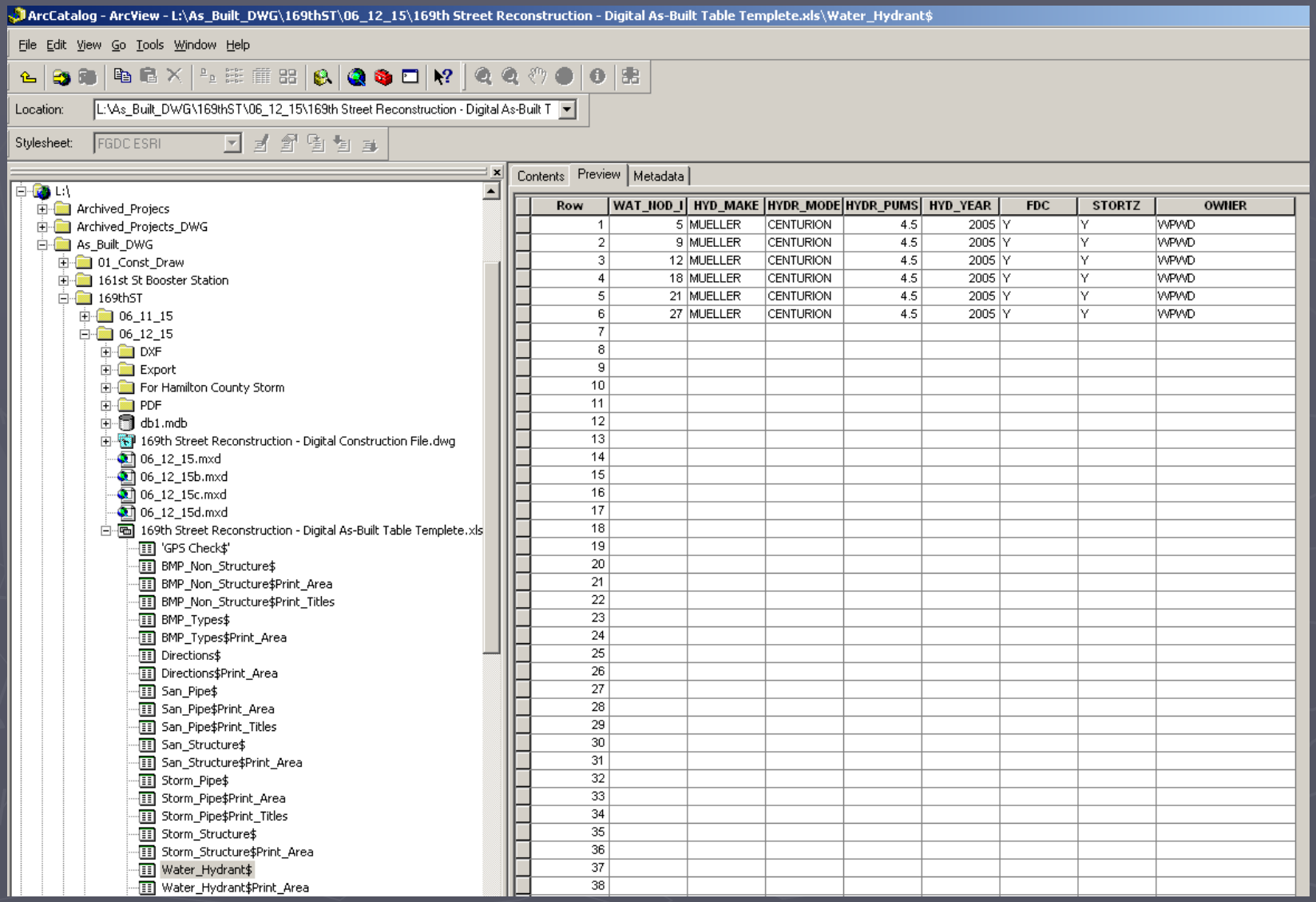
Looking at the Excel "Digital As-Built Table Template"

Microsoft Excel - Maple Village Section One (50690PLA-51) Digital As-Built Spreedsheet.xls

Row	FROM_NO_ID	TO_NODE_ID	PIPE_TYPE	MATER	DIAM	PIPE_LEN	DATE_INSTA	BACKFIL_YN
1								
2	*1*	*(1)*	*(2)*	*(DISTRIBUTION)*	*(C900)*	*(8)*	*(23.85)*	*(10/7/2005)*	*(Y)*
3	*2*							
4	*3*	1	2	SERVICE	C900	8	24.27	5/1/2006	N
5	*4*	2	3	SERVICE	C900	8	148.32	5/1/2006	N
6	*5*	3	4	SERVICE	C900	8	14.78	5/1/2006	N
7	*6*	4	5	SERVICE	C900	8	97.78	5/1/2006	Y

Directions / San_Structure / San_Pipe / Storm_Structure / Storm_Pipe / BMP_Non_Structure / BMP_Types / Water_Node / Water_Hydrant / Water

Using ArcCatalog to view the Excel



Row	WAT_NOD_I	HYD_MAKE	HYDR_MODE	HYDR_PUMS	HYD_YEAR	FDC	STORTZ	OWNER
1	5	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
2	9	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
3	12	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
4	18	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
5	21	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
6	27	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
7								
8								
9								
10								
11								
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14								
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16								
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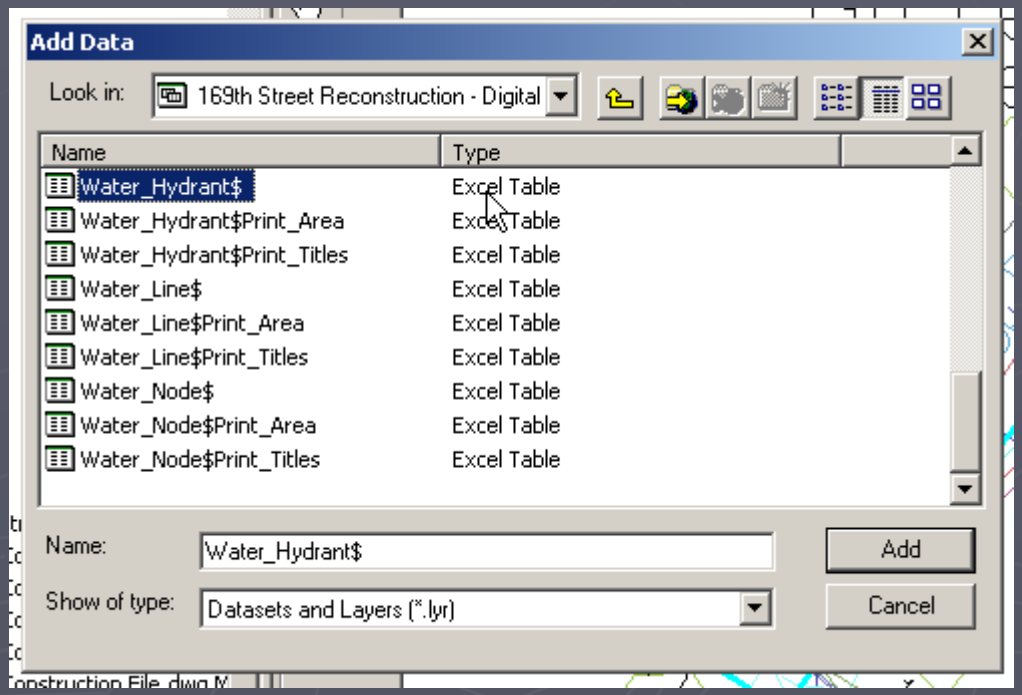
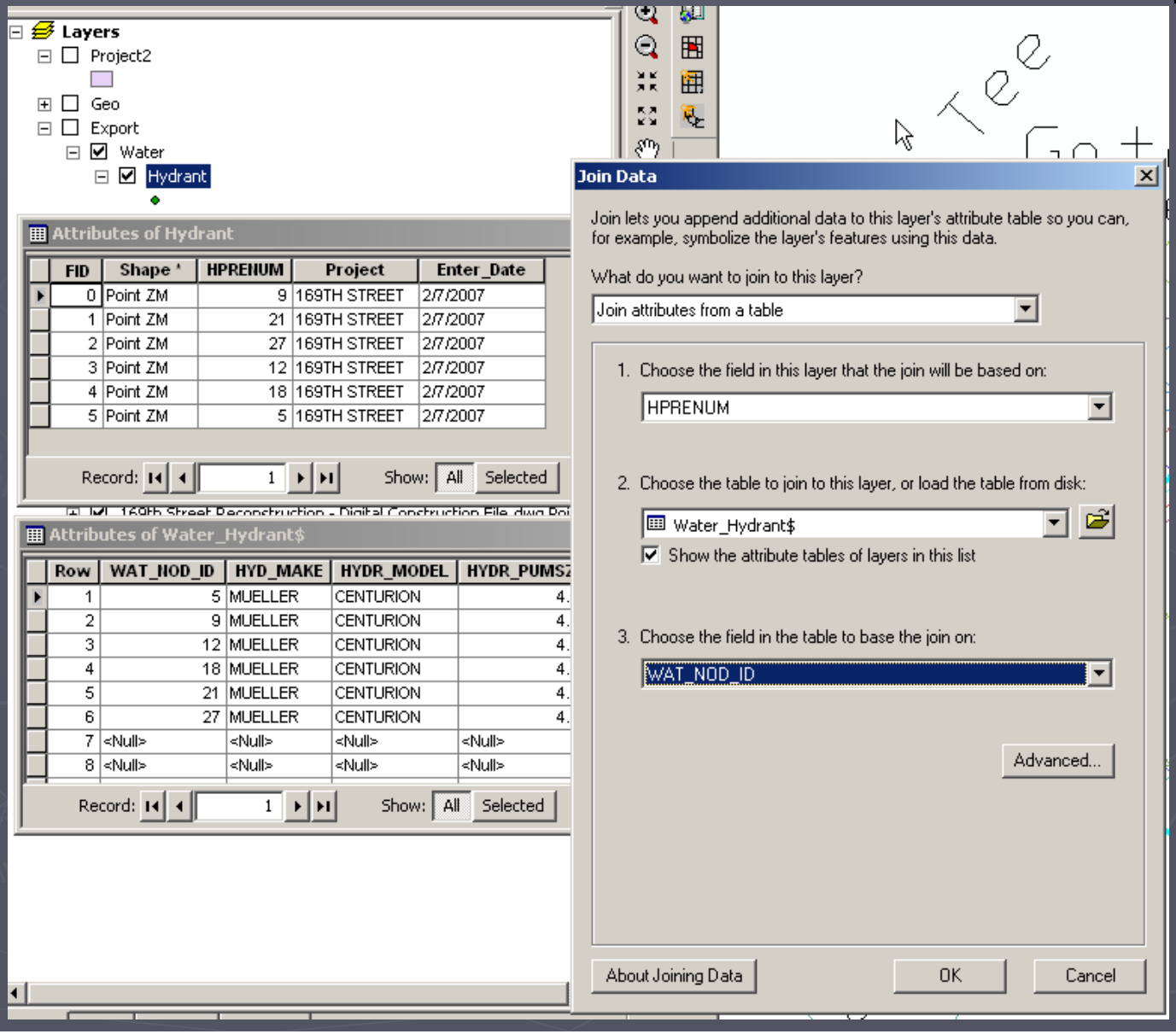
38								

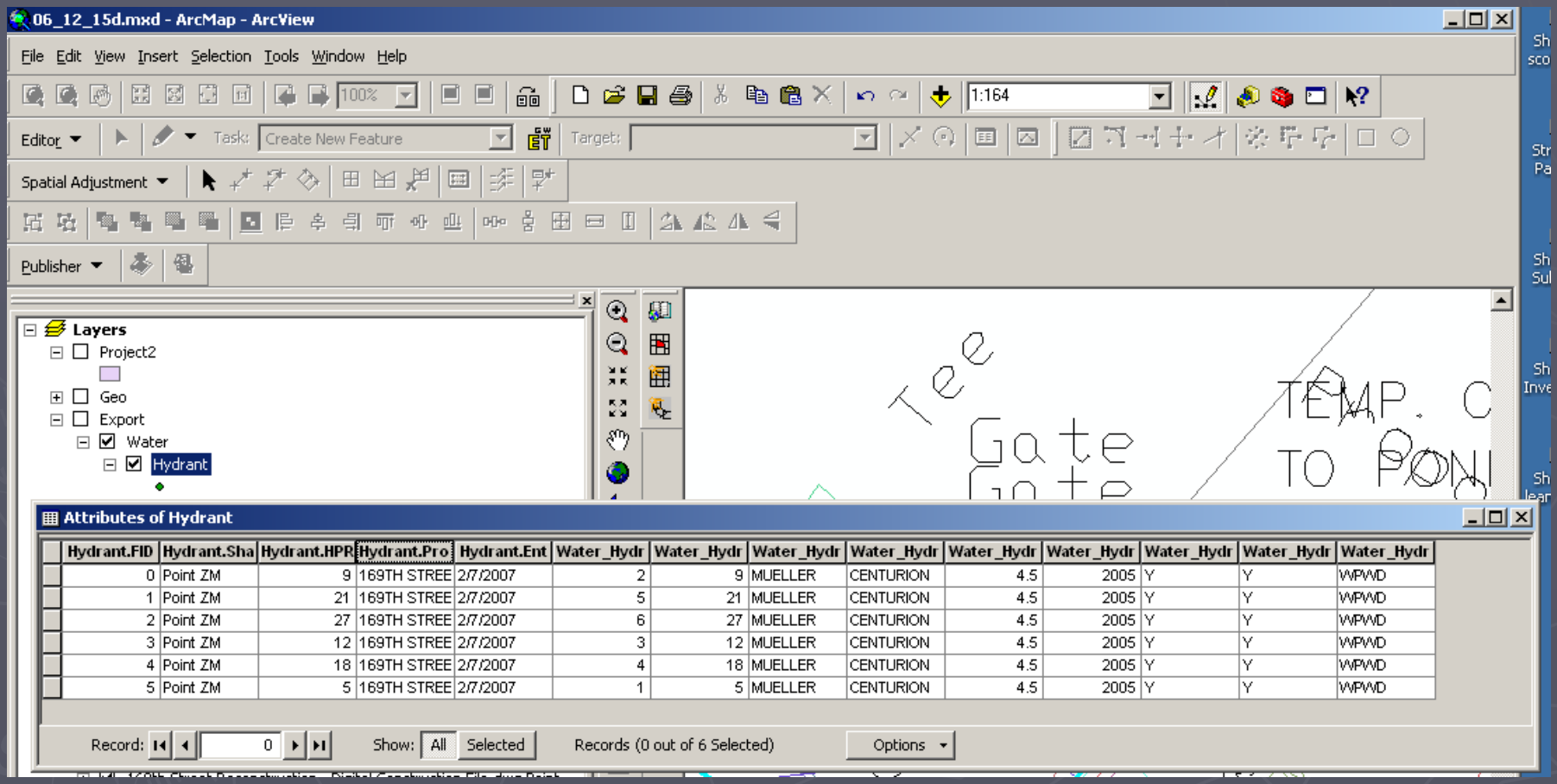
Add the Excel table to the map…



Open Both attribute tables and join.

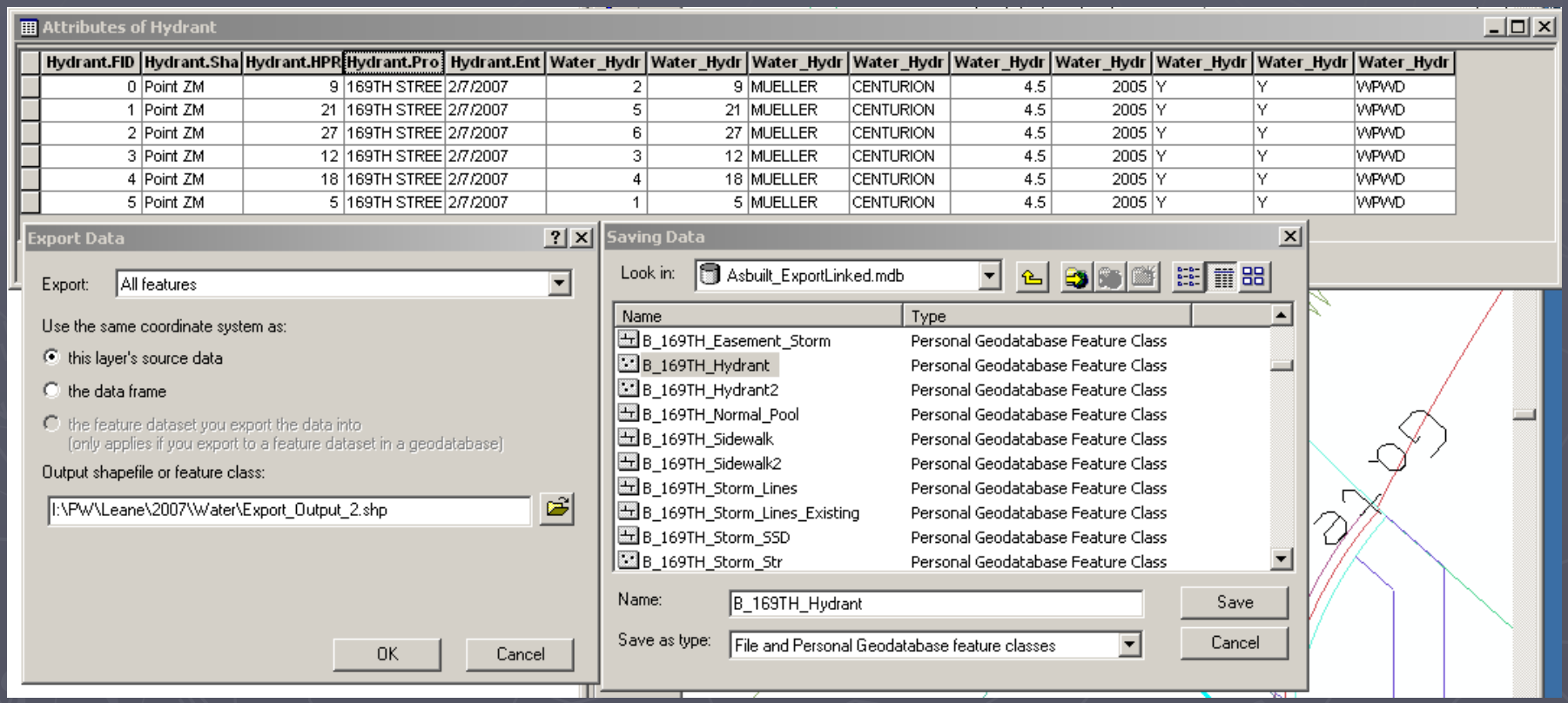


After the Join, all attributes are present in the shapefile.

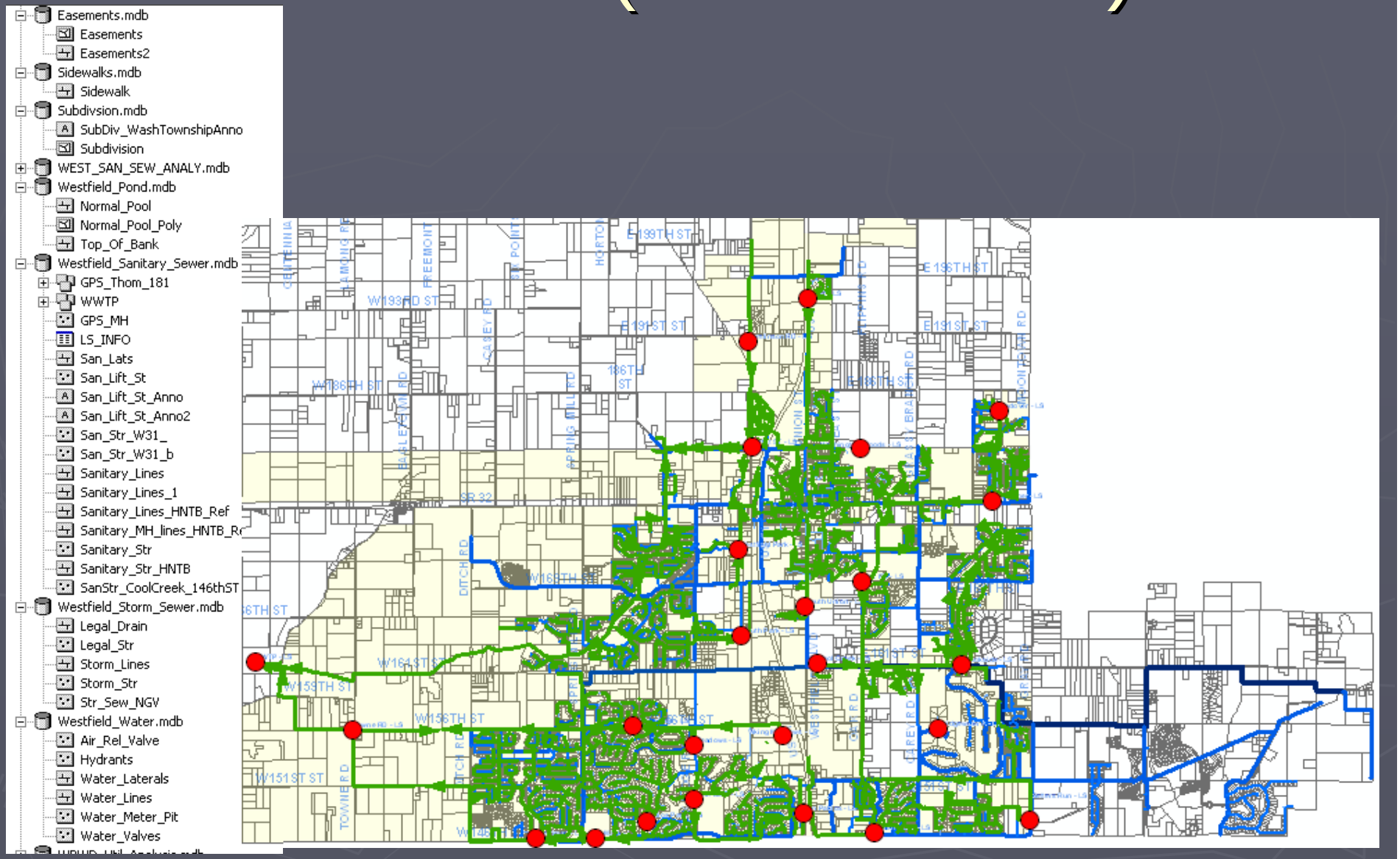


Hydrant.FID	Hydrant.Sha	Hydrant.HPR	Hydrant.Pro	Hydrant.Ent	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr	Water_Hydr
0	Point ZM	9	169TH STREE	2/7/2007	2	9	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
1	Point ZM	21	169TH STREE	2/7/2007	5	21	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
2	Point ZM	27	169TH STREE	2/7/2007	6	27	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
3	Point ZM	12	169TH STREE	2/7/2007	3	12	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
4	Point ZM	18	169TH STREE	2/7/2007	4	18	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD
5	Point ZM	5	169TH STREE	2/7/2007	1	5	MUELLER	CENTURION	4.5	2005	Y	Y	WPWD

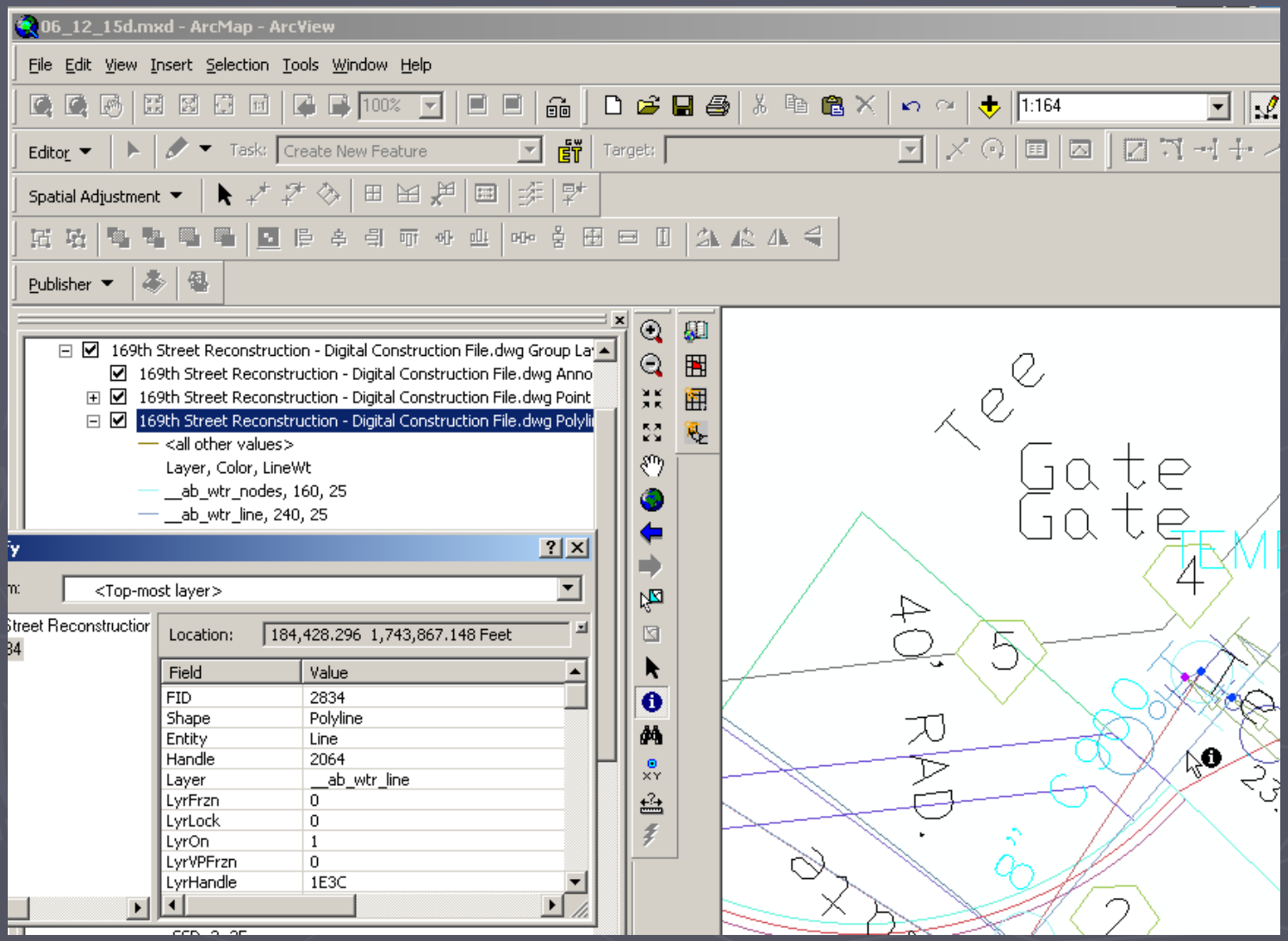
Export the shapefile (with attributes) to the As-Built geodatabase featureclass.



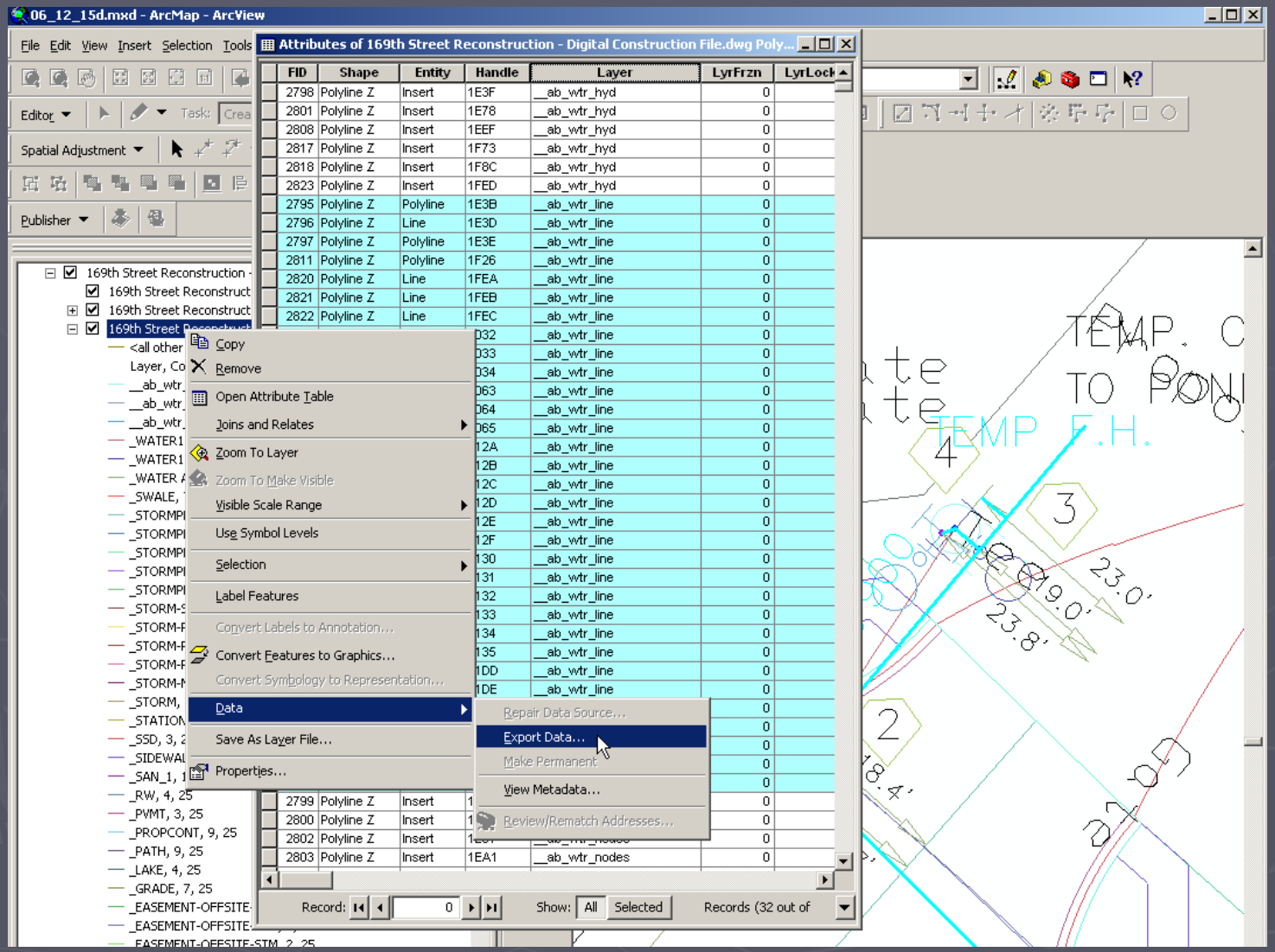
Ready to load into the Master GIS database. (Ultimate Goal)



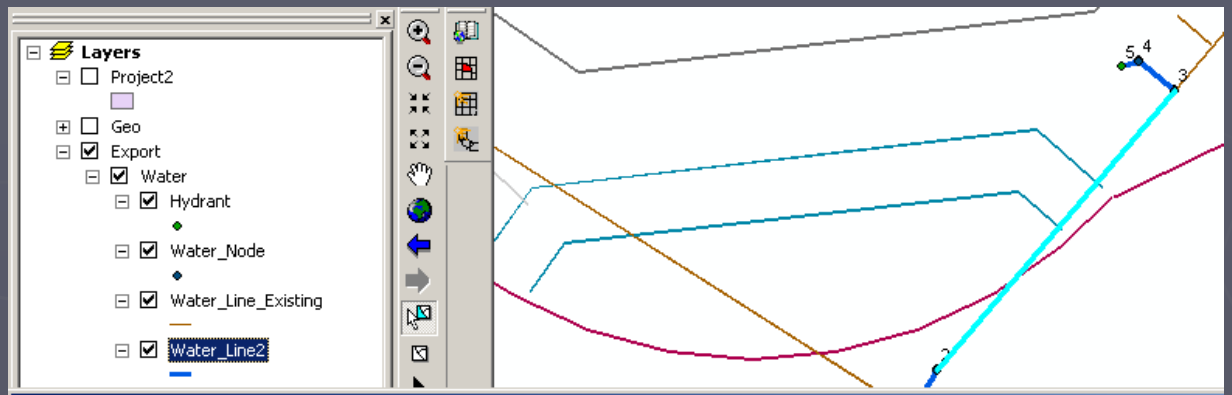
After adding the CAD drawing into GIS, identify the layer – Water Lines.



Select the layer, then export to a shapefile (without attributes).



Match the Line to the correct Row in the Excel Spreadsheet...



Attributes of Water_Line2

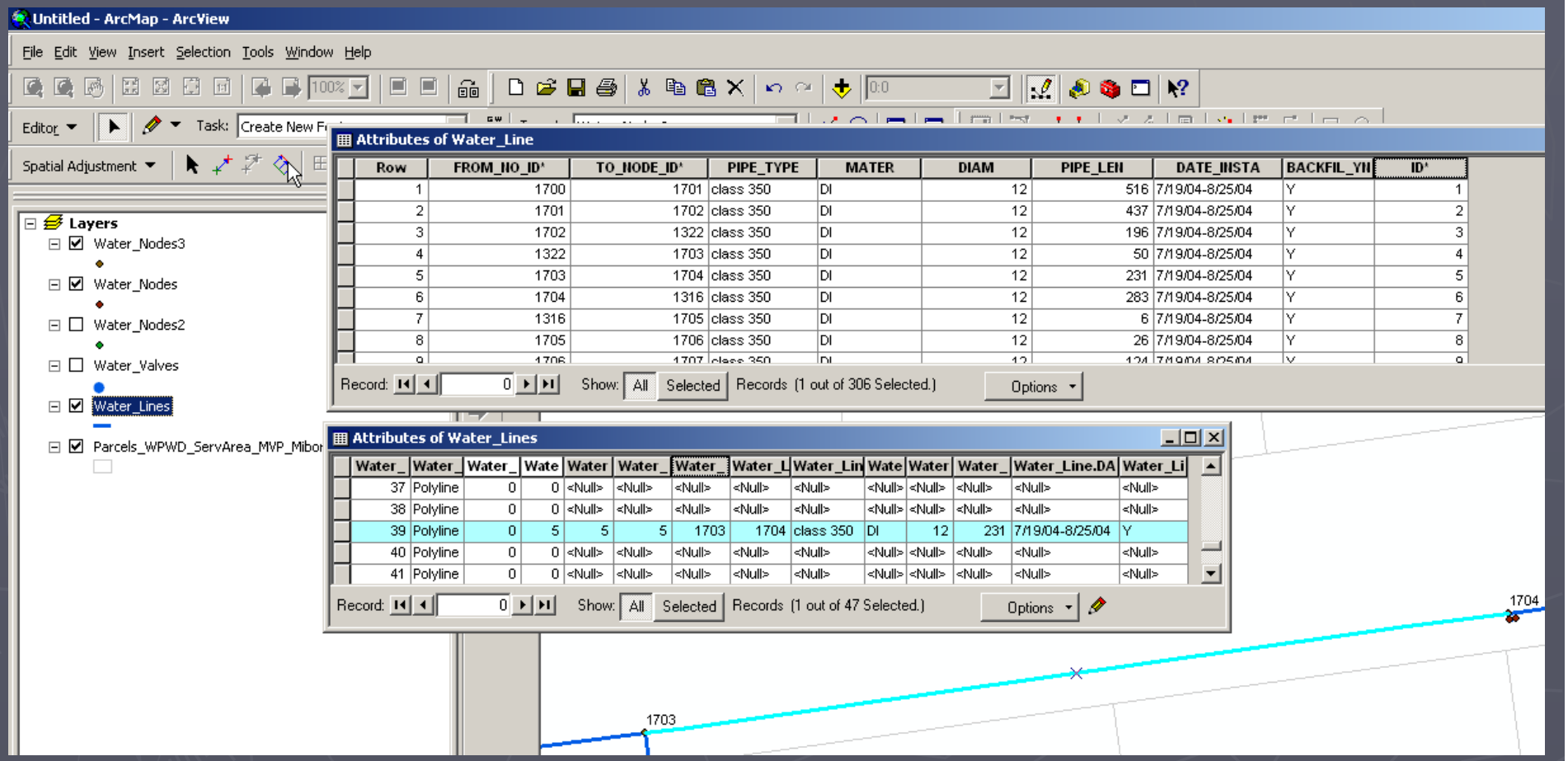
FID	Shape *	FID_	Entity	Handle	Layer	LyrFrzn	LyrLock	LyrOn	LyrVPFrzn	LyrHandle	Color	Ent
0	Polyline ZM	16	Line	1E3D	__ab_wtr_line	0	0	1	0	1E3C	240	
1	Polyline ZM	6	Polyline	1E3E	__ab_wtr_line	0	0	1	0	1E3C	240	
2	Polyline ZM	18	Line	1FEB	__ab_wtr_line	0	0	1	0	1E3C	240	
3	Polyline ZM	17	Line	1FEC	__ab_wtr_line	0	0	1	0	1E3C	240	
4	Polyline ZM	4	Line	2032	__ab_wtr_line	0	0	1	0	1E3C	240	
5	Polyline ZM	3	Line	2033	__ab_wtr_line	0	0	1	0	1E3C	240	
6	Polyline ZM	1	Line	2063	__ab_wtr_line	0	0	1	0	1E3C	240	
7	Polyline ZM	2	Line	2064	__ab_wtr_line	0	0	1	0	1E3C	240	
8	Polyline ZM	5	Line	212A	__ab_wtr_line	0	0	1	0	1E3C	240	
9	Polyline ZM	8	Line	212B	__ab_wtr_line	0	0	1	0	1E3C	240	
10	Polyline ZM	7	Line	212C	__ab_wtr_line	0	0	1	0	1E3C	240	
11	Polyline ZM	10	Line	212D	__ab_wtr_line	0	0	1	0	1E3C	240	
12	Polyline ZM	9	Line	212E	__ab_wtr_line	0	0	1	0	1E3C	240	
13	Polyline ZM	15	Polyline	212F	__ab_wtr_line	0	0	1	0	1E3C	240	
14	Polyline ZM	12	Line	2130	__ab_wtr_line	0	0	1	0	1E3C	240	
15	Polyline ZM	11	Polyline	2133	__ab_wtr_line	0	0	1	0	1E3C	240	
16	Polyline ZM	14	Line	2134	__ab_wtr_line	0	0	1	0	1E3C	240	

Record: 1 Show: All Selected Records (1 out of 24 Selected) Options

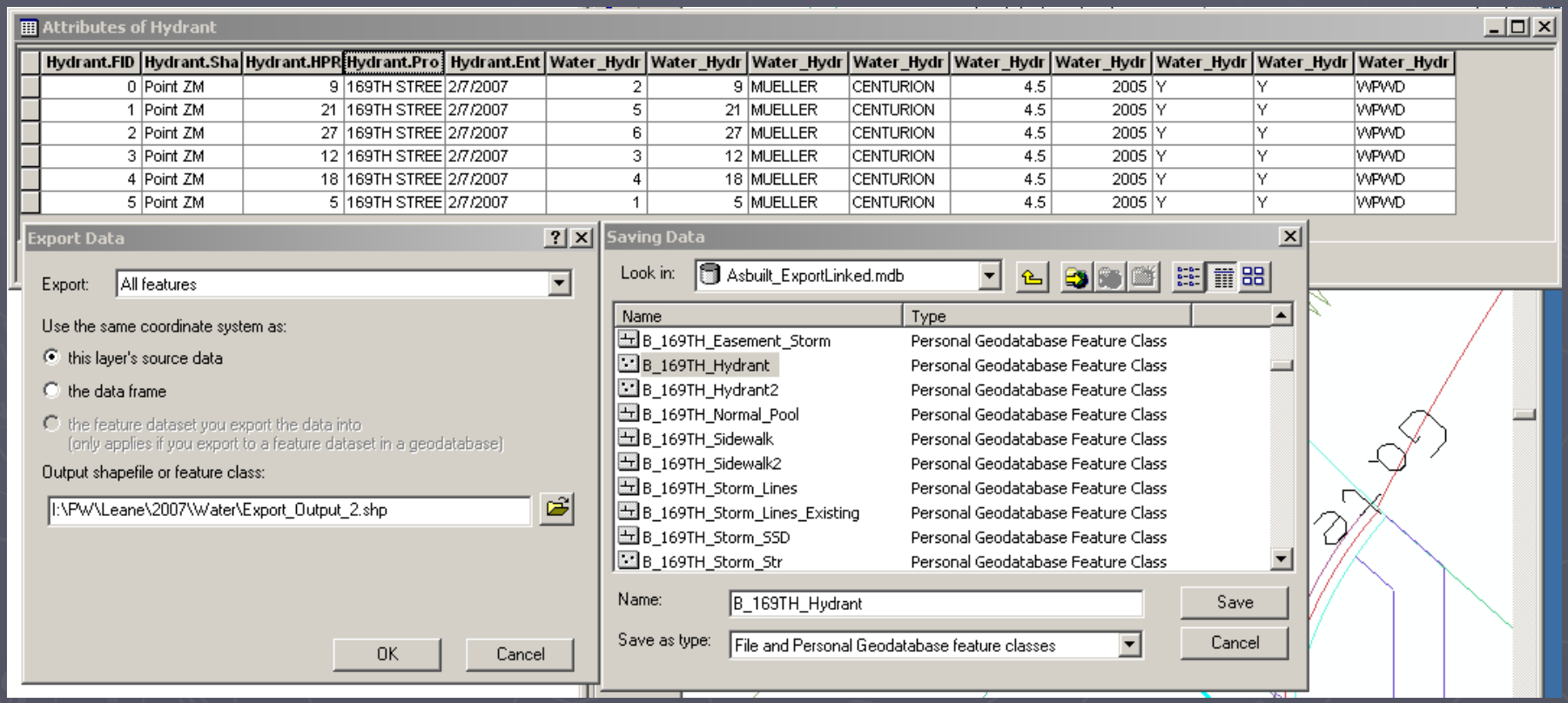
Attributes of Water_Line$

Row	FROM_NO_ID	TO_NODE_ID	PIPE_TYPE	MATER	DIAM	PIPE_LEN	DATE_INSTA	BACKFIL_YN
1	1	2	DISTRIBUTION	C900	8	4.17	11/1/2005	Y
2	2	3	DISTRIBUTION	C900	8	31.25	11/1/2005	Y
3	3	4	DISTRIBUTION	C900	8	3.93	11/1/2005	Y

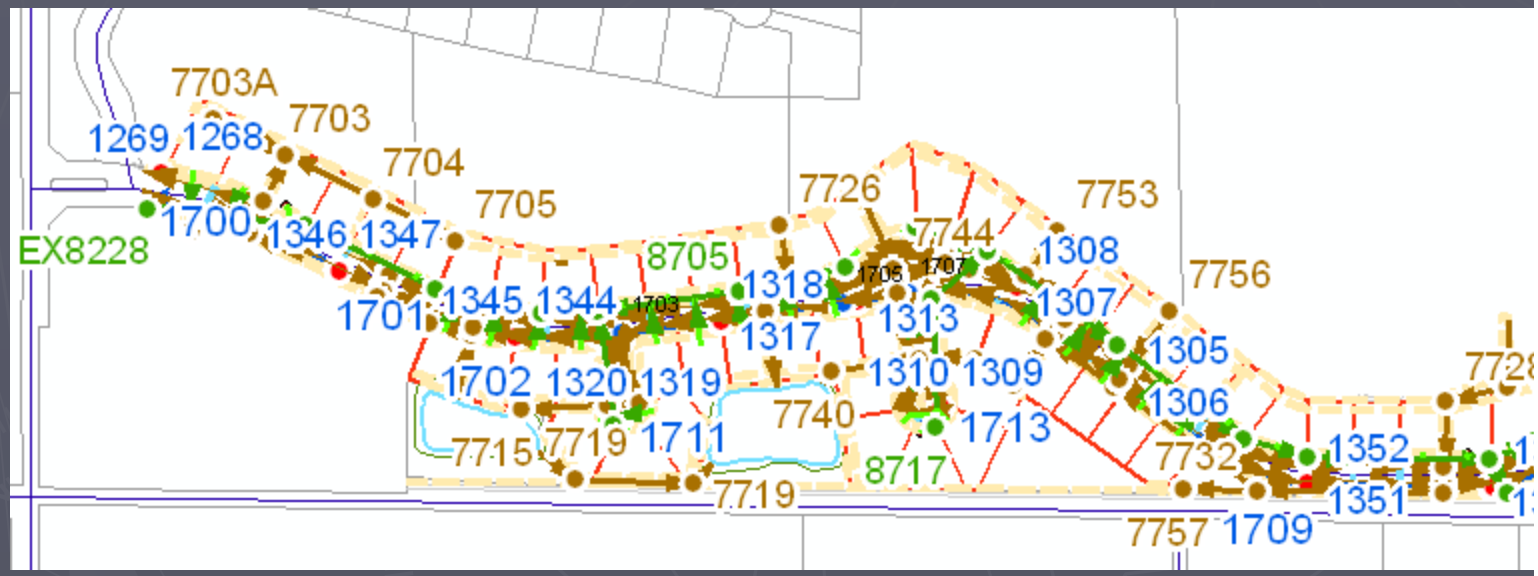
Ready for a join...

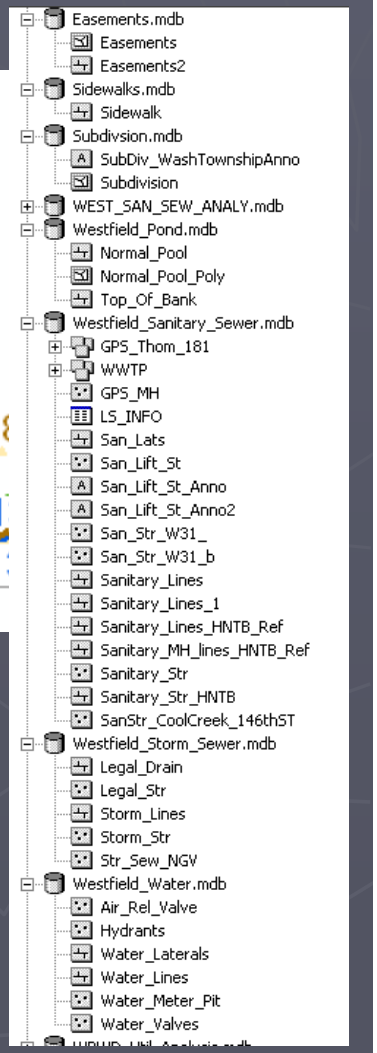


Export the shapefile (with attributes) to the As-Built geodatabase featureclass.

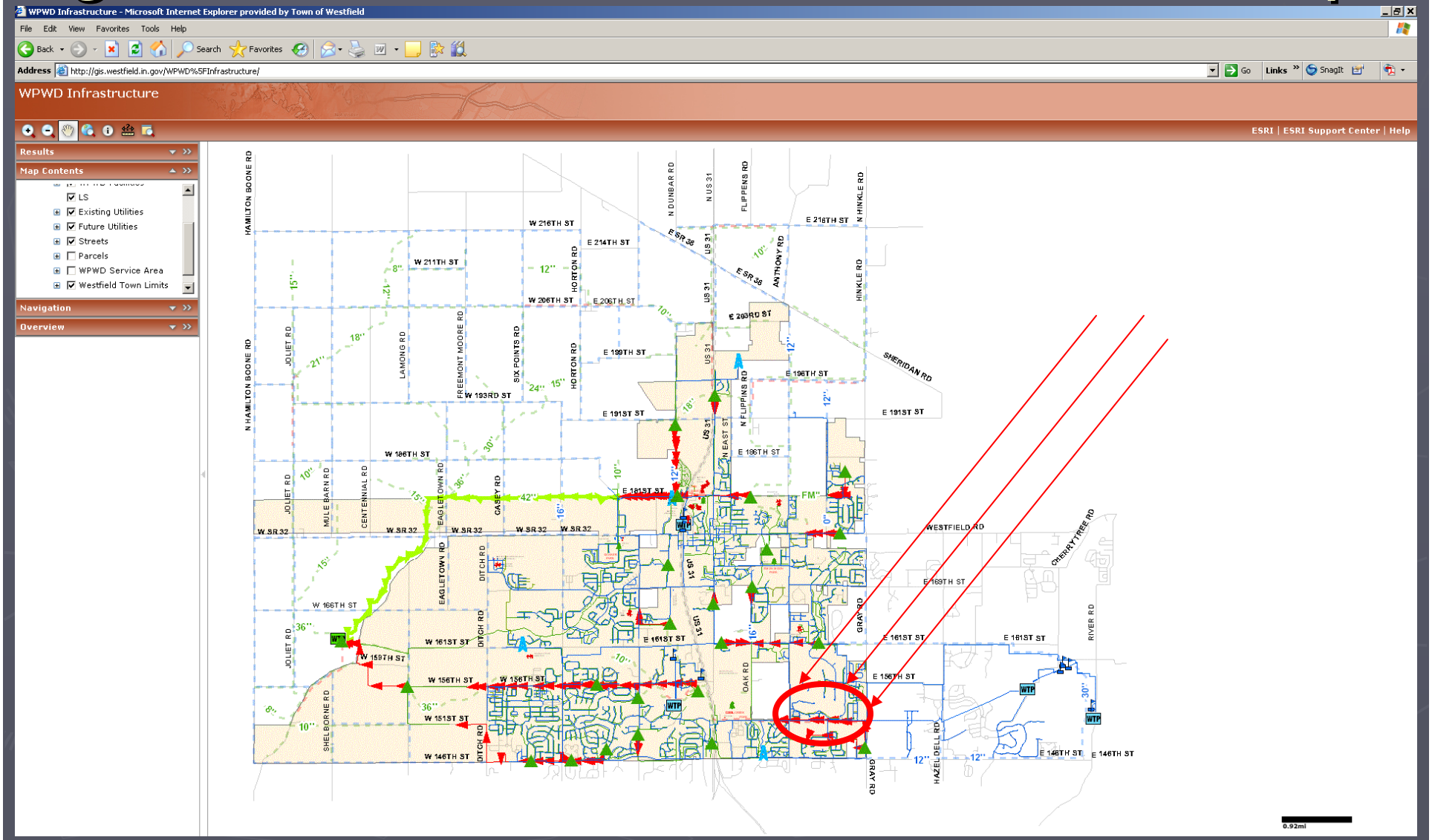


The As-Built geodatabase featureclasses are now ready to be loaded into the Master GIS database.





After loaded into the master GIS geodatabase...linked to a Server map



Zooming into the Server map

May provide useful with orthophotography

Send Acceptance Letter

July 25, 2006

RE: Andover Townhomes (Redelivery #6) – Digital As-Built Submission – Approved 7/25/06

Kevin Sumner
Stoeppelwerth & Associates, Inc.
9940 Allisonville Rd.
Fishers, IN 46038

Kevin,

Thank you for your submitted drawings for Andover Townhomes dated July 11, 2006. We have reviewed the drawings and please note that your drawings have been approved.

1. Please note that the following changes were made: added Water Node ID to the following: 16, 23, 22, 20, 7, 6, 1, 17, 18 and 19. Added the Sanitary casting type: Neenah R-1772-C.

Please contact me if you have any questions.

Thanks,
Leane

Leane O'Daniel B.S., M.S.
GIS/GPS Technician
Westfield Public Works
2706 E 171st St.
Westfield, IN 46074
P: 317-896-5253 x 140
F: 317-867-0202

Ready for Town Council?

- If they have passed inspection by development construction.
- If their As-Built submittal has been accepted.

▶ Ready to add to the Town Council Agenda:

Using As-builts to locate

FW: IUPPS ID0202 2007/10/17 #00001 0710170005-00A DAMG DAMG

Locates

This message was sent with High importance.
This message was AutoForwarded.
Extra line breaks in this message were removed.

To: EmergencyLocates@westfield.in.gov

```
-----------------------------------------
From: irth@iupps.org[SMTP:IRTH@IUPPS.ORG]
Sent: Wednesday, October 17, 2007 5:13:59 AM
To: Locates
Subject: IUPPS ID0202 2007/10/17 #00001 0710170005-00A DAMG DAMG
Importance: High
Auto forwarded by a Rule

ID0202 00001 IUPPSa 10/17/2007 04:13:59 0710170005-00A EMER DAMG STRT

DAMAGE DAMAGE SEE REMARKS

Ticket : 0710170005 Date: 10/17/2007 Time: 04:06 Oper: NPICKEREL Chan:000

State: IN Cnty: HAMILTON Twp: WASHINGTON
Cityname: WESTFIELD  Inside: Y Near: N
Subdivision: WESTFIELD PUBLIC WORKS

Address : 2706
Street  : E 171ST ST
Cross 1 : OAK RD   Within 1/4 mile: Y
Location: PLEASE LOCATE FROM SOUTH WALL OF NEW BUILDING SOUTH 50 FEET ------THIS IS FOR THE SALT BUILDING ***Boring Where =
UNDER PAVEMENT
:
Grids   : 4002D8606B   4002D8606A   4002D8607D

Work type : INSTALLING A NEW GAS SERVICE Done for  : CITIZENS GAS Start date: 10/17/2007  Time: 04:13  Hours notice: 0/0
Priority: EMER
Ug/Oh/Both: U  Blasting: N  Boring: Y  Railroad: N  Emergency: Y
Duration  : THREE DAYS    Depth: THREE FEET

Company : CITIZENS GAS & COKE UTILITY/WESTFIELD GA  Type: MEMB Co addr : 2150 DR MARTIN LUTHER KING JR STREET
City    : INDIANAPOLIS State: IN Zip: 46202
Caller  : MICK POTOCHNIK Phone: (317)927-4636 Contact : RUBIN RAMERIZ--CELL Phone:
BestTime:
Mobile  : (317)557-3362
Fax     : (317)927-4636

Remarks : PER MICK - HAS CUT INSIGHT LINE BY E 171ST STREET - CALLER WILL CONTACT INSIGHT - SITE CONTACT IS RUBIN RAMERIZ AT
317-557-3362 - CREW WILL BE ON SITE AT 8AM - PREVIOUS TICKET 0710100106 -THANK-YOU
:

Submitted date: 10/17/2007 Time: 04:06
Members: CINERG ID0103 ID0202 ID0660 ID2581 ID8000 ID8025 SM     SM     SM
SM
```

811 Know what's below. Call before you dig.

Using As-builts to locate

CAD Based Conversion to GIS – Digital As-Built Submittal Requirements

Eric Becker & Leane O'Daniel
Westfield Public Works Department (WPWD)

October 19, 2007

http://www.westfield.in.gov/gis

GIS

Questions?

Westfield Public Works Department CAD Based Conversion to GIS – Digital As-Built Submittal Requirements

- **Presentation Outline**

1. What is GIS
2. What / Who / Why / When – Digital Specs Origin
3. Digital Project Life Cycle
4. Overview of the Submittal Requirements Items
5. Overview of the Submittal Spreadsheets
6. Overview of the CAD to GIS Conversion Process
7. Questions & Answers

Digital As-Built Submittal Requirements

Eric Becker & Leane O'Daniel
Westfield Public Works Department (WPWD)

IGIC GIS in Engineering - October 19, 2007

- Westfield GIS: http://www.westfield.in.gov/gis
- Utility Infrastructure: http://gis.westfield.in.gov/WPWD_Infrastructure
- Project Tracking: http://gis.westfield.in.gov/projecttracking
- Locates: http://www.iupps.org