KYTC Photo Log Asset Collection

Chad Shive
Keith Dotson
April, 2010

Explanation of Need

- Complete Inventory of Signs
  - MUTCD Requirement for Sign Assessment to Maintain Minimum Retroreflectivity
- FHWA Mandated Guardrail Inventory
  - Improve the Guardrail Replacement Program
  - Maintain large State Asset
- Collect New Assets
  - Cable Barrier
  - New Construction

Mandli Data Collection Vehicle

- Right of Way Cameras
  - 3 cameras; One facing forward, right and left
- Global Positioning System
  - Includes Differential and Inertial Measurement Systems
- Distance Measure Instrument
- Roughness Measurement
  - Dynatest Mark IV RSP
- Rutting Measurement
  - INO Laser Rut Measurement System
  - 1280 Transverse points


060-0017


Dynatest


MANDLI
Communications, Inc.
LASER RUT MEASUREMENT SYSTEM

Panoramic View

Infrastructure in Place

- One Vehicle Purchased
- Roadview Software for Data Extraction
- Web Distribution of Images Through Roadview Explorer
- Oracle Database
  - Modifications can still be made
- Fiber connection for Data Upload
- 5 – 6 Year Collection Cycle with only One Vehicle

Planned Asset Collection

- Statewide Sign Inventory
- Statewide Guardrail Inventory
  - End Treatments included
- Cable Barrier / Barrier Wall
- Raised Pavement Markers / Striping
- Attenuators
- Validation of Current Assets like:
  - Shoulder / Median / Auxiliary Lane Information

Database

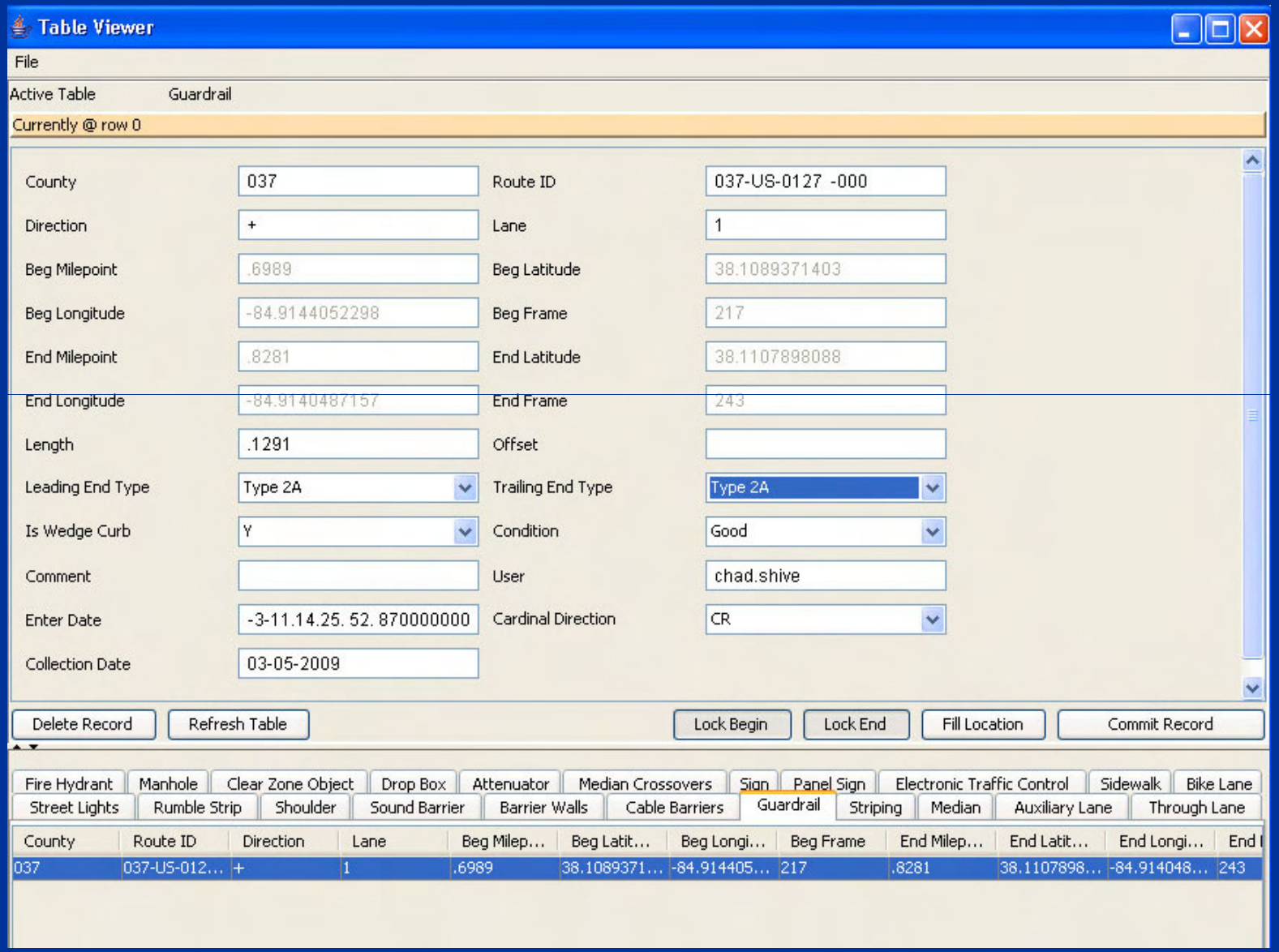
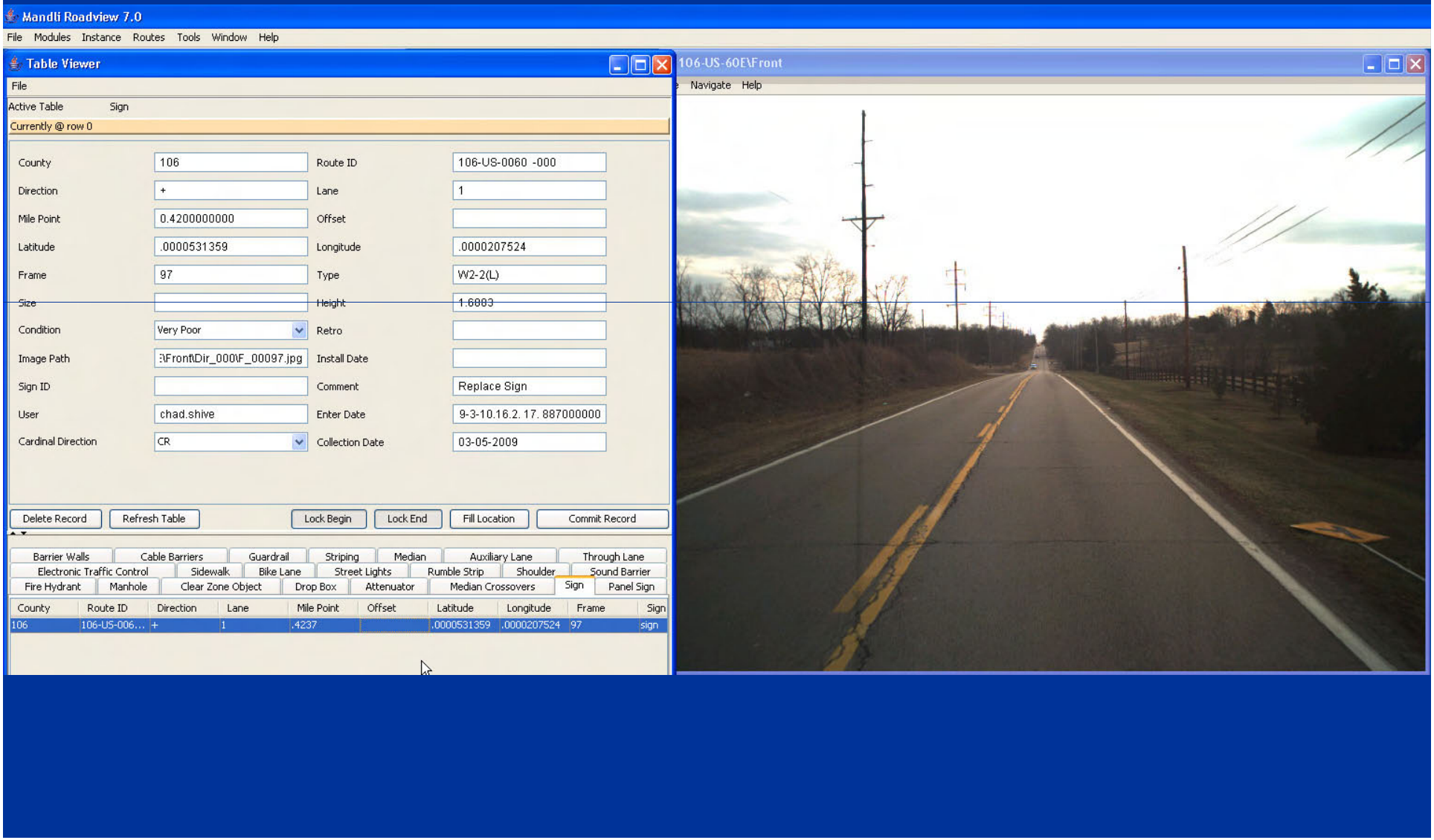


Table Viewer
File
Active Table Guardrail
Currently @ row 0
County 037
Route ID 037-US-0127 -000
Direction +
Lane 1
Beg Milepoint .6989
Beg Latitude 38.1089371403
Beg Longitude -84.9144052298
Beg Frame 217
End Milepoint .8281
End Latitude 38.1107898088
End Longitude -84.9140487157
End Frame 243
Length .1291
Offset
Leading End Type Type 2A
Trailing End Type Type 2A
Is Wedge Curb Y
Condition Good
Comment
User chad.shive
Enter Date -3-11.14.25. 52. 870000000
Cardinal Direction CR
Collection Date 03-05-2009
Delete Record
Refresh Table
Lock Begin
Lock End
Fill Location
Commit Record
Fire Hydrant
Manhole
Clear Zone Object
Drop Box
Attenuator
Median Crossovers
Sign
Panel Sign
Electronic Traffic Control
Sidewalk
Bike Lane
Street Lights
Rumble Strip
Shoulder
Sound Barrier
Barrier Walls
Cable Barriers
Guardrail
Striping
Median
Auxiliary Lane
Through Lane
County
Route ID
Direction
Lane
Beg Milep...
Beg Latit...
Beg Longi...
Beg Frame
End Milep...
End Latit...
End Longi...
End
037
037-US-012...
+
1
.6989
38.1089371...
-84.914405...
217
.8281
38.1107898...
-84.914048...
243

Capture Asset to Database



Goals

- Obtain Two Additional Vehicles
- Collect All Kentucky State Maintained Routes in Two - Three Year Cycle
- Equip One Vehicle with Downward Pavement Imaging Unit (LRIS – Laser Road Imaging System)
  - Gives 1mm accurate pavement image for crack detection
- Equip One Vehicle with LIDAR (Light Detection and Ranging)
  - Overhead Clearance Measurement
  - Asset Encroachment
  - Urban Modeling
  - Complete 3d Modeling of Right of Way

Making it work for KYTC

- KY has an ever changing route network

- 2 areas of concern going in:
  1. Make the van data collection match the current route network
  2. Keep it up to date until the next data collection

Oracle Spatially Enabled Databse (Bentley/EXOR)

- KYTC Uses an Oracle Spatially enabled databse to store it's road centerlines and road inventory (Assets).
- Currently
  - Almost 87,000 miles of public road centerlines
  - 46 different Asset items stored
- Road centerline arcs serve as a place holder for data

Roadway Centerlines in Kentucky

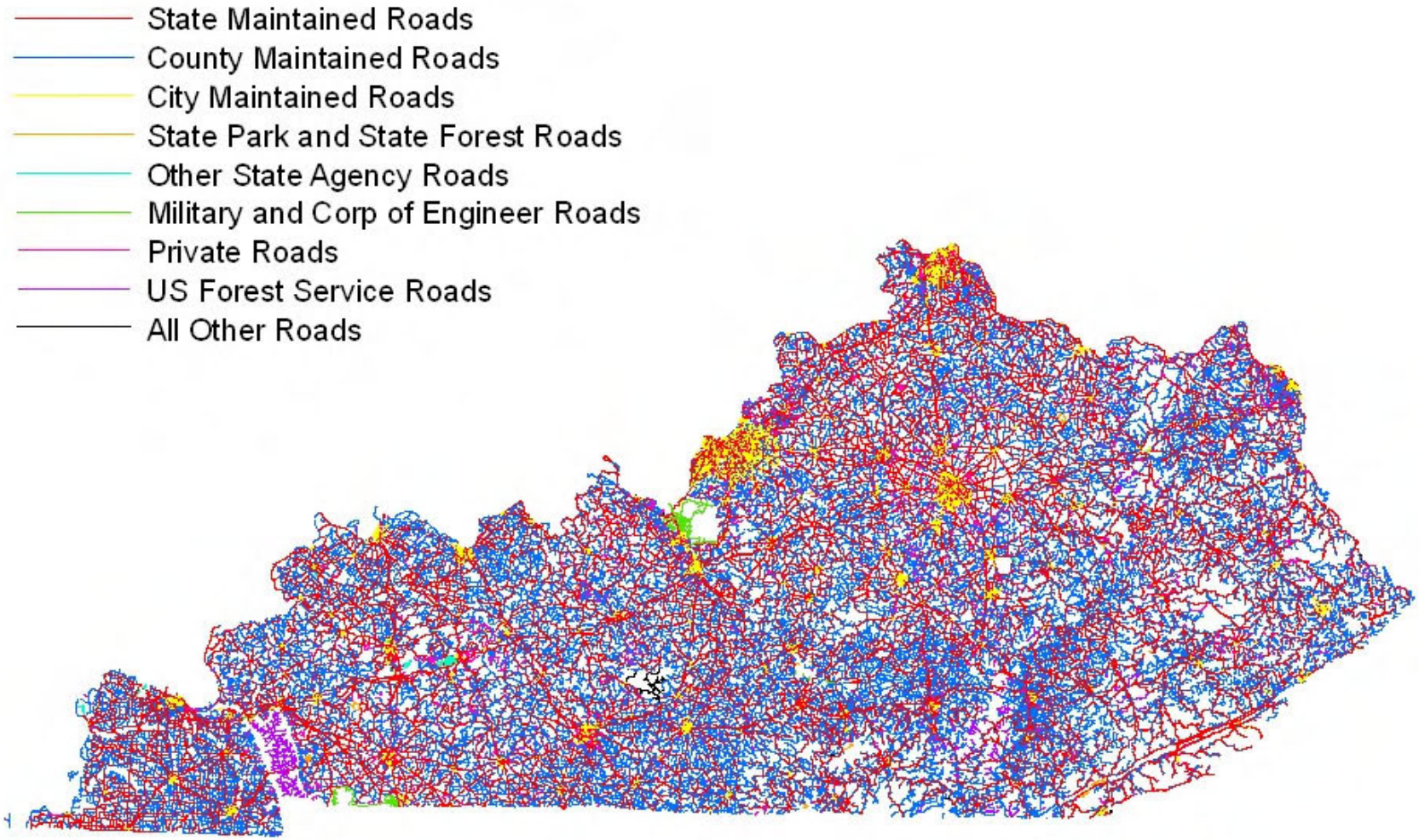
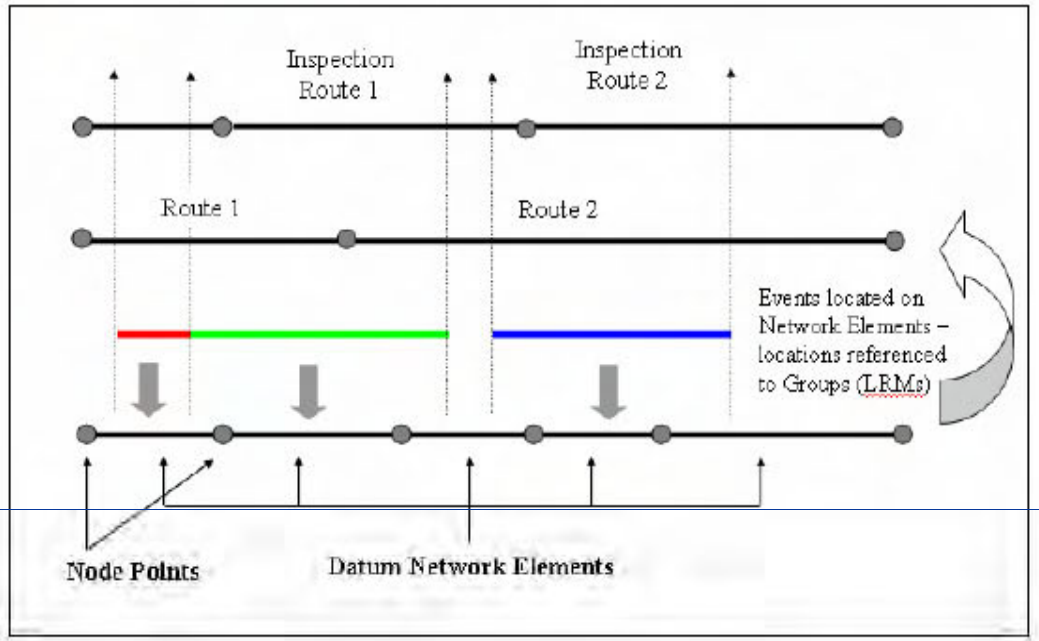


Figure 2



The underpinning concept of ***Network Manager by Exor's*** Multiple Linear Referencing capability is the Linear Datum Network Element. This provides the required Direction and Connectivity information that ***Network Manager by Exor*** needs to derive each of the required Linear Referencing Methods which can be assigned as views or layers on this Datum. Datum Network Elements are located between Node Points which are known locations on a Network. These are typically (but not necessarily) at Intersections or Junctions. Node Points may also be required at 'notional' boundaries, eg. maintenance or regional boundaries, depending on how security and Network maintenance activities are to be administered.

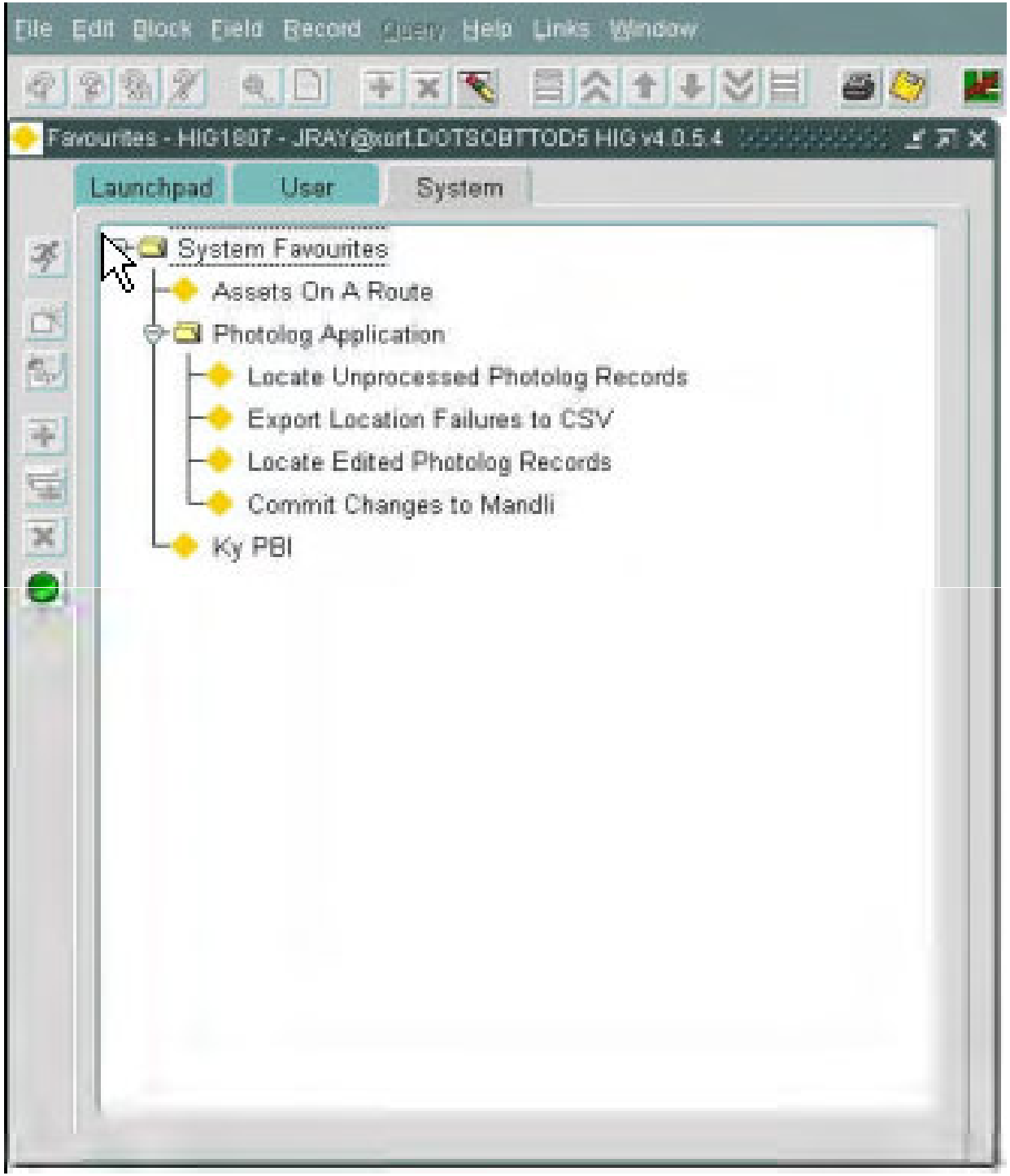
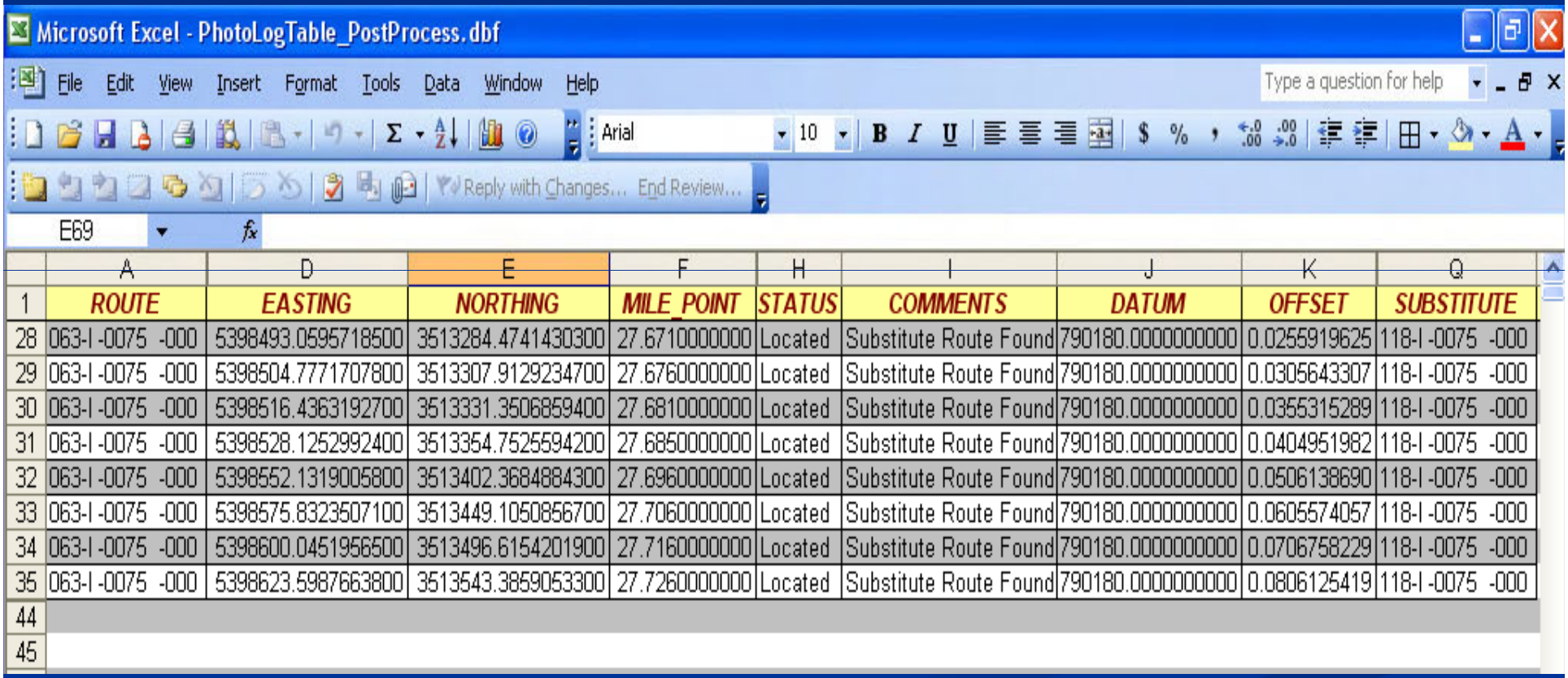
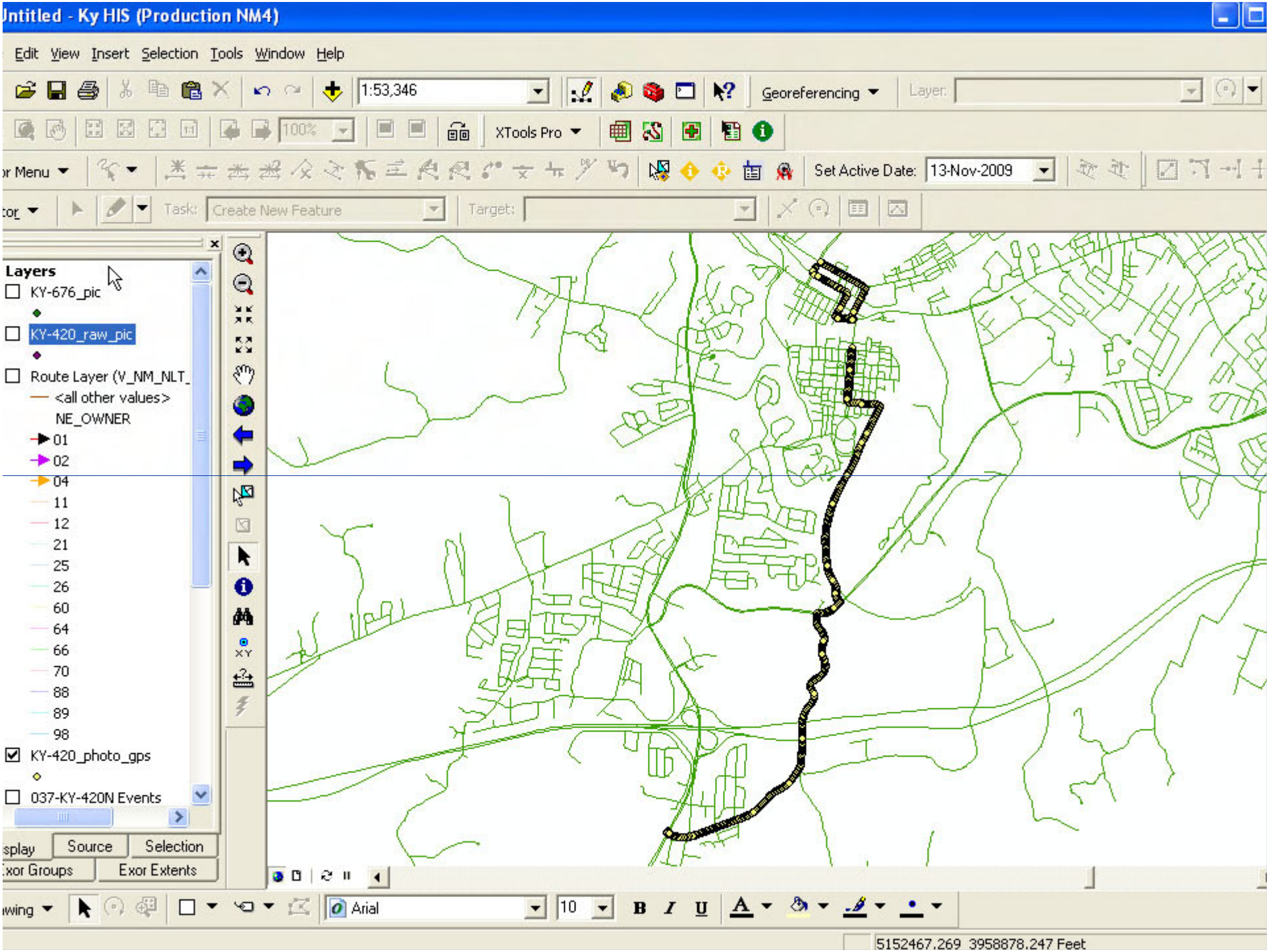
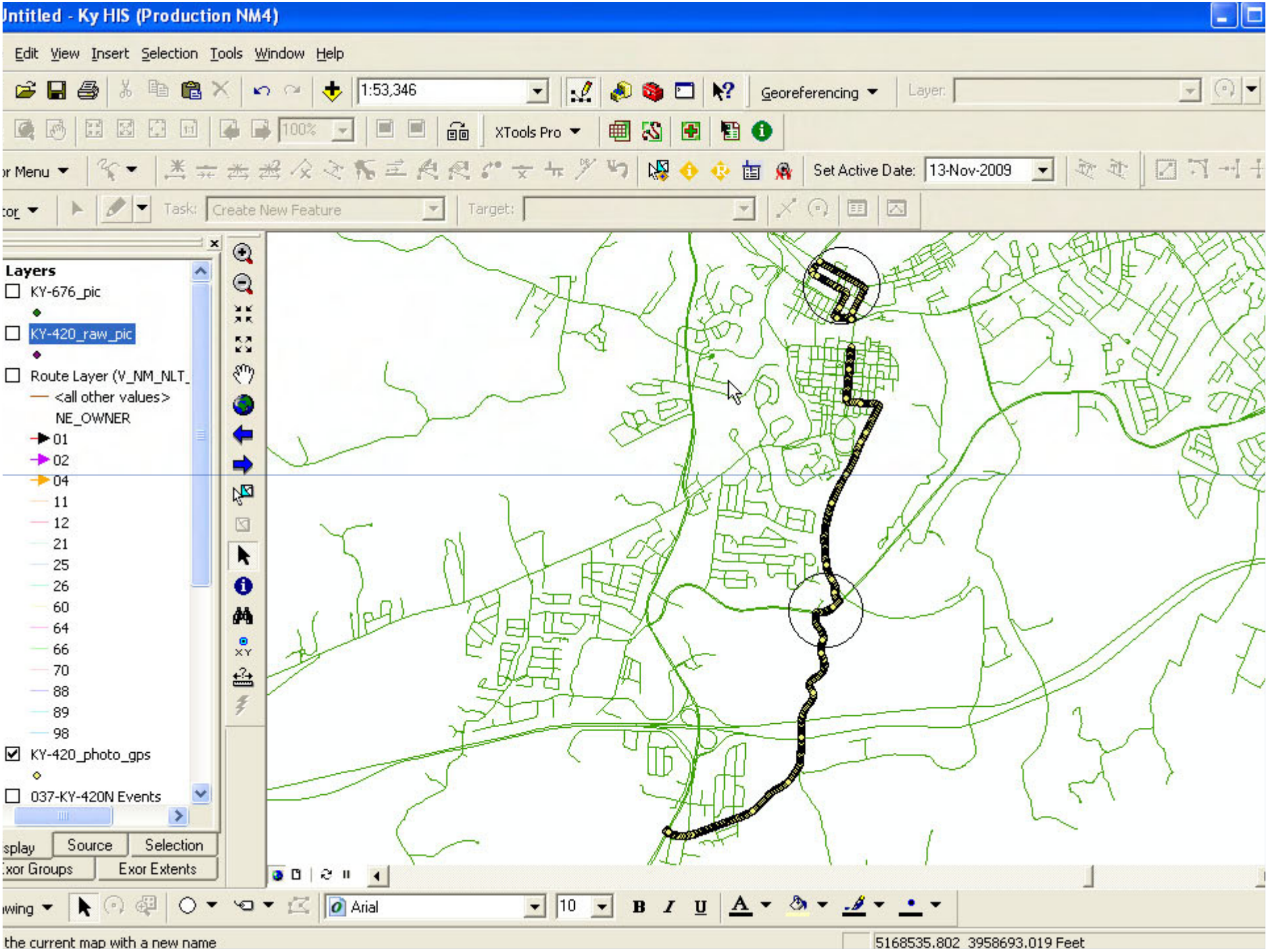

File Edit Block Field Record Query Help Links Window
Favourites - HIG1807 - JRAY@xort.DOTSOBTTOD5 HIG v4.0.5.4
Launchpad
User
System
System Favourites
Assets On A Route
Photolog Application
Locate Unprocessed Photolog Records
Export Location Failures to CSV
Locate Edited Photolog Records
Commit Changes to Mandli
Ky PBI

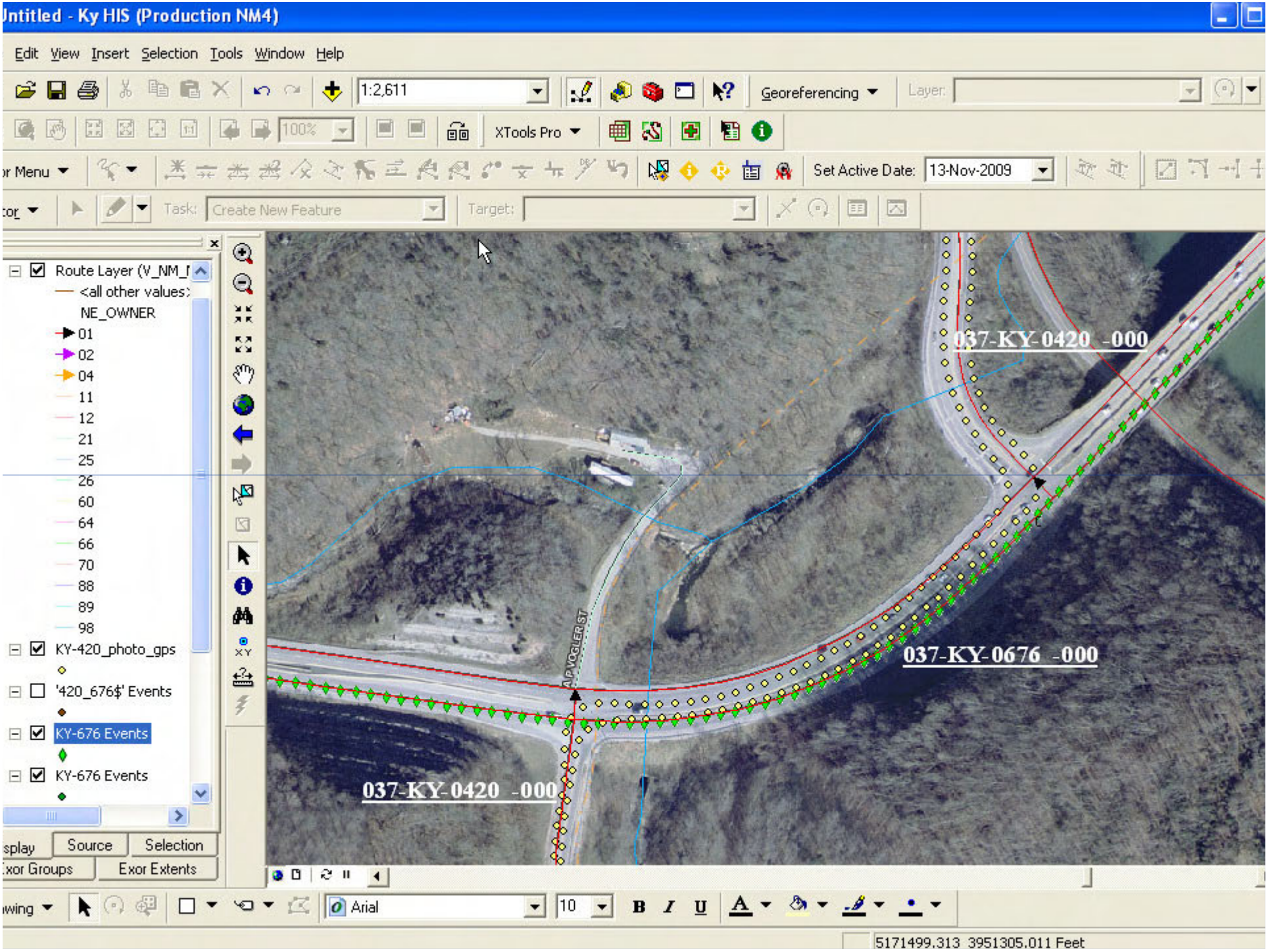
Photo Log Table Post Processing

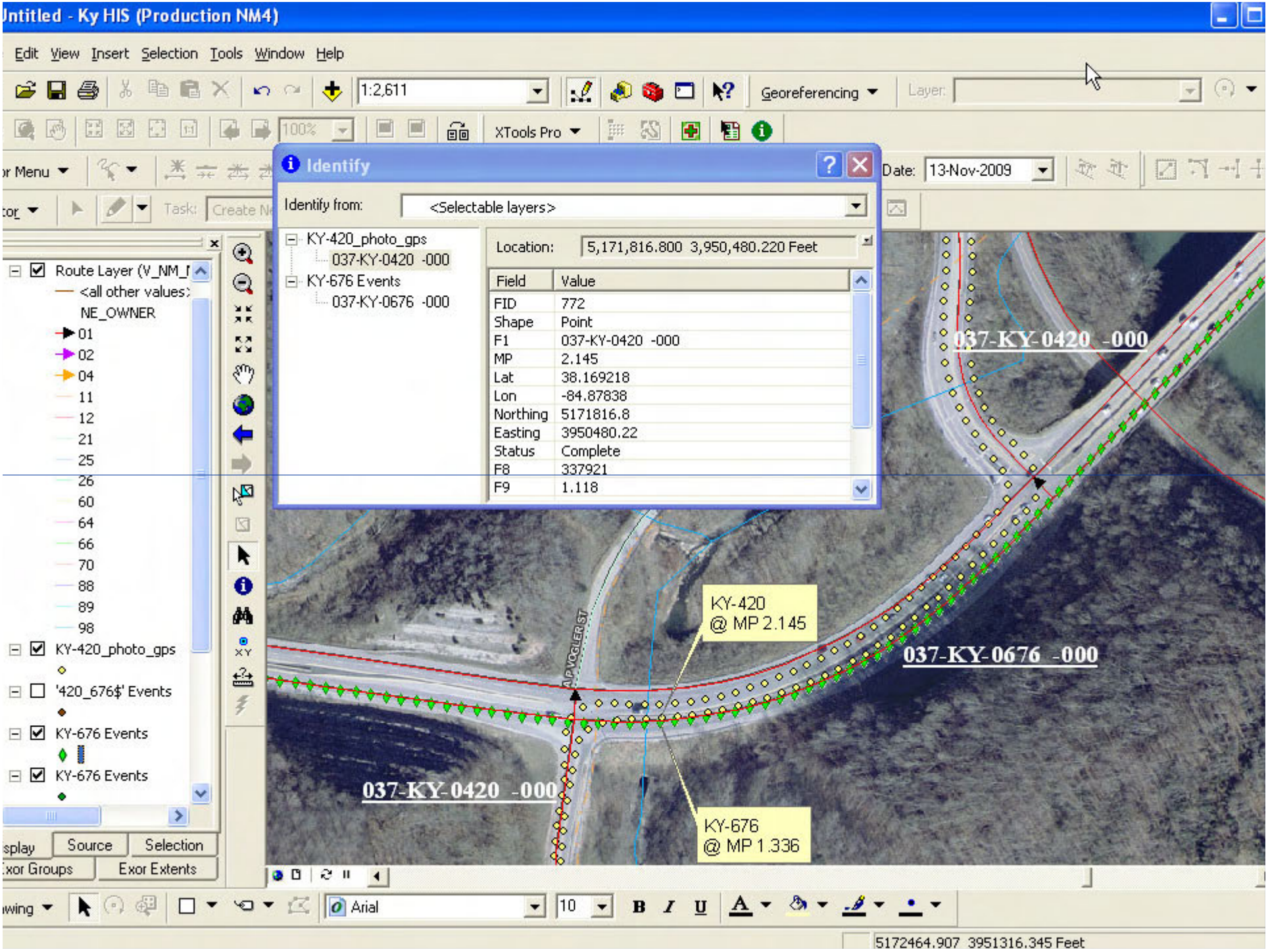


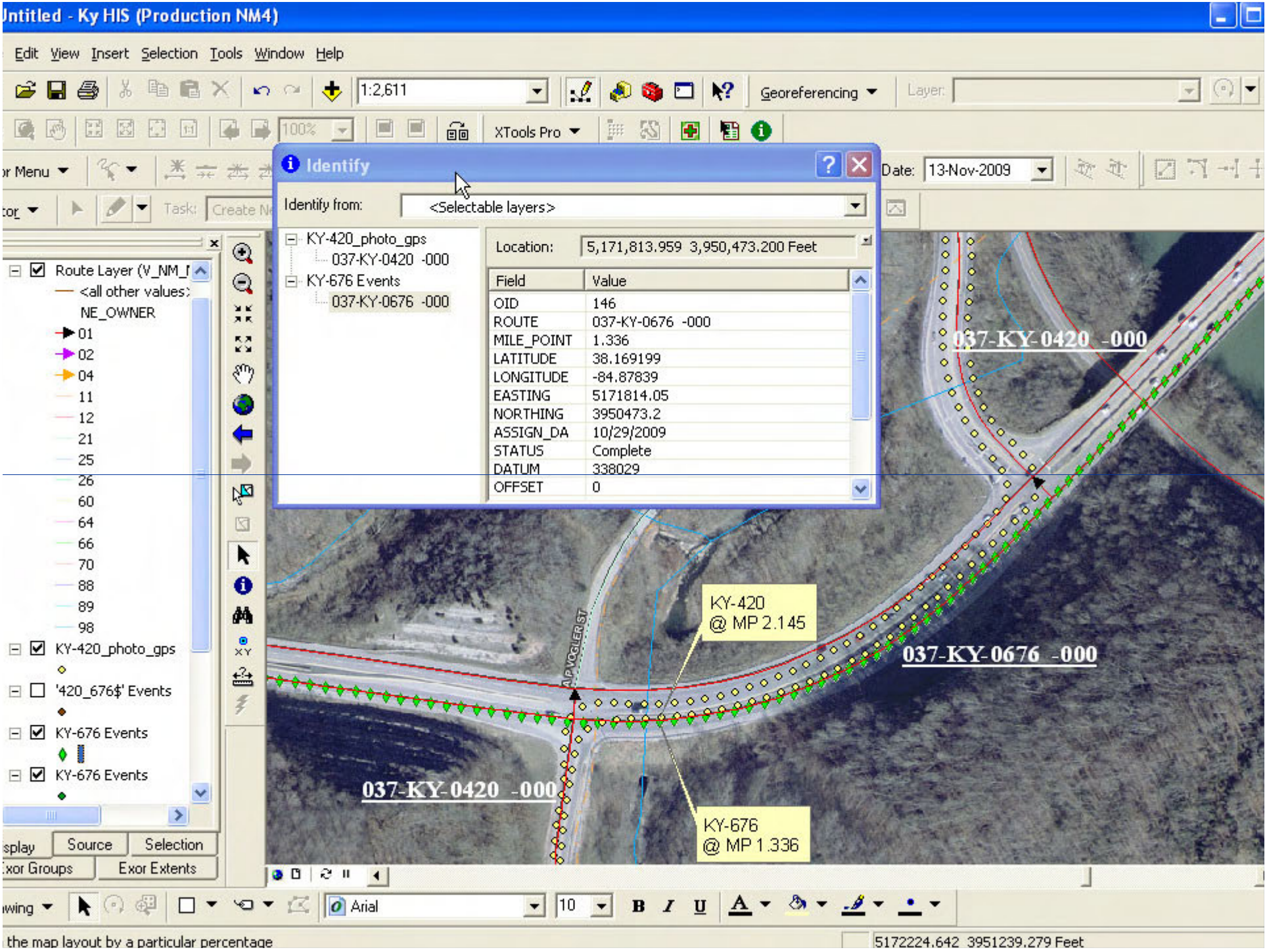
	A	D	E	F	H	I	J	K	Q
1	ROUTE	EASTING	NORTHING	MILE_POINT	STATUS	COMMENTS	DATUM	OFFSET	SUBSTITUTE
28	063-I -0075 -000	5398493.0595718500	3513284.4741430300	27.6710000000	Located	Substitute Route Found	790180.0000000000	0.0255919625	118-I -0075 -000
29	063-I -0075 -000	5398504.7771707800	3513307.9129234700	27.6760000000	Located	Substitute Route Found	790180.0000000000	0.0305643307	118-I -0075 -000
30	063-I -0075 -000	5398516.4363192700	3513331.3506859400	27.6810000000	Located	Substitute Route Found	790180.0000000000	0.0355315289	118-I -0075 -000
31	063-I -0075 -000	5398528.1252992400	3513354.7525594200	27.6850000000	Located	Substitute Route Found	790180.0000000000	0.0404951982	118-I -0075 -000
32	063-I -0075 -000	5398552.1319005800	3513402.3684884300	27.6960000000	Located	Substitute Route Found	790180.0000000000	0.0506138690	118-I -0075 -000
33	063-I -0075 -000	5398575.8323507100	3513449.1050856700	27.7060000000	Located	Substitute Route Found	790180.0000000000	0.0605574057	118-I -0075 -000
34	063-I -0075 -000	5398600.0451956500	3513496.6154201900	27.7160000000	Located	Substitute Route Found	790180.0000000000	0.0706758229	118-I -0075 -000
35	063-I -0075 -000	5398623.5987663800	3513543.3859053300	27.7260000000	Located	Substitute Route Found	790180.0000000000	0.0806125419	118-I -0075 -000
44									
45									

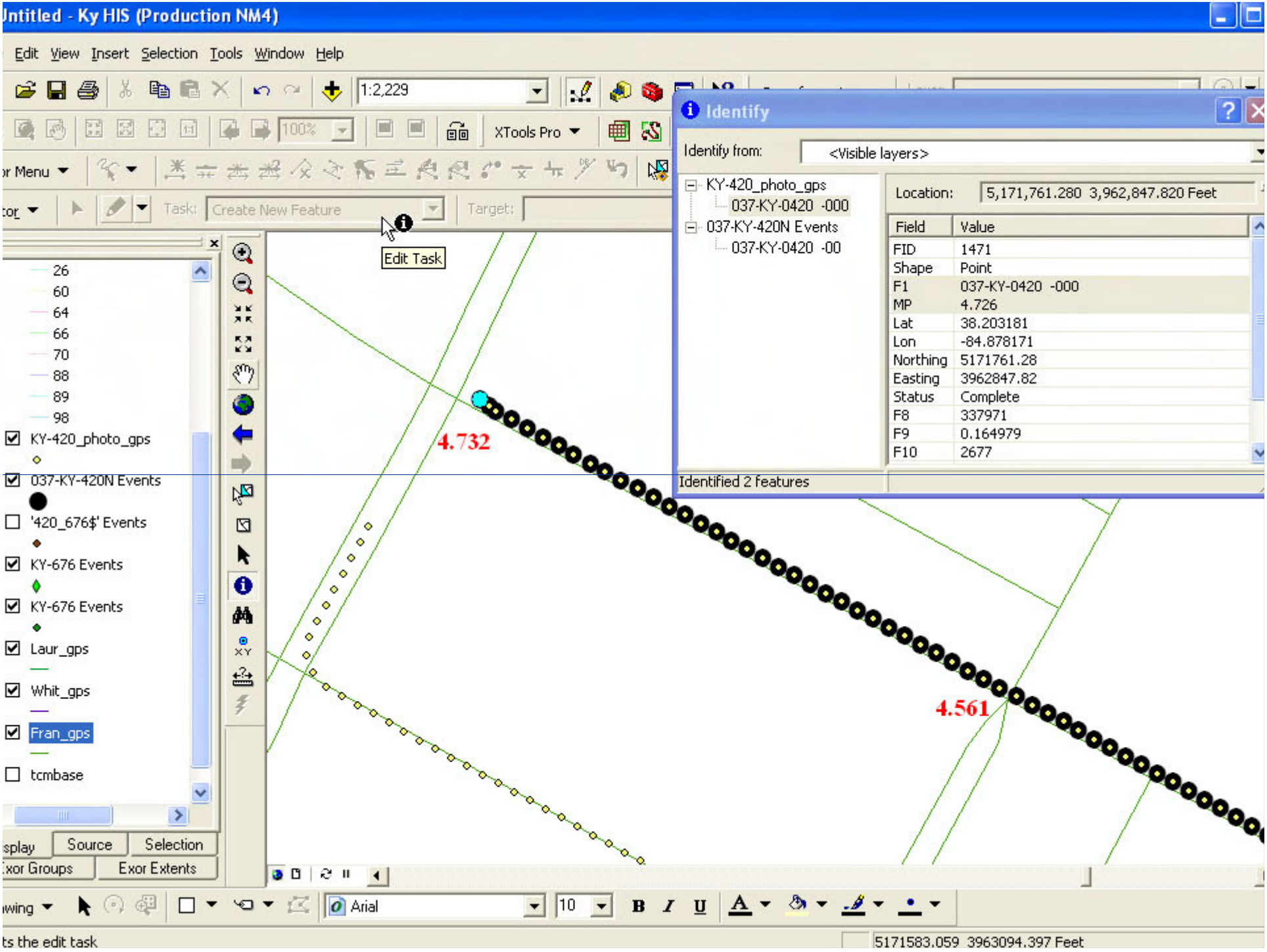

Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:53,346
Georeferencing
Layer:
XTools Pro
Set Active Date: 13-Nov-2009
Task: Create New Feature
Target:
Layers
KY-676_pic
KY-420_raw_pic
Route Layer (V_NM_NLT_
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
Source
Selection
Exor Groups
Exor Extents
Arial
10
5152467.269 3958878.247 Feet

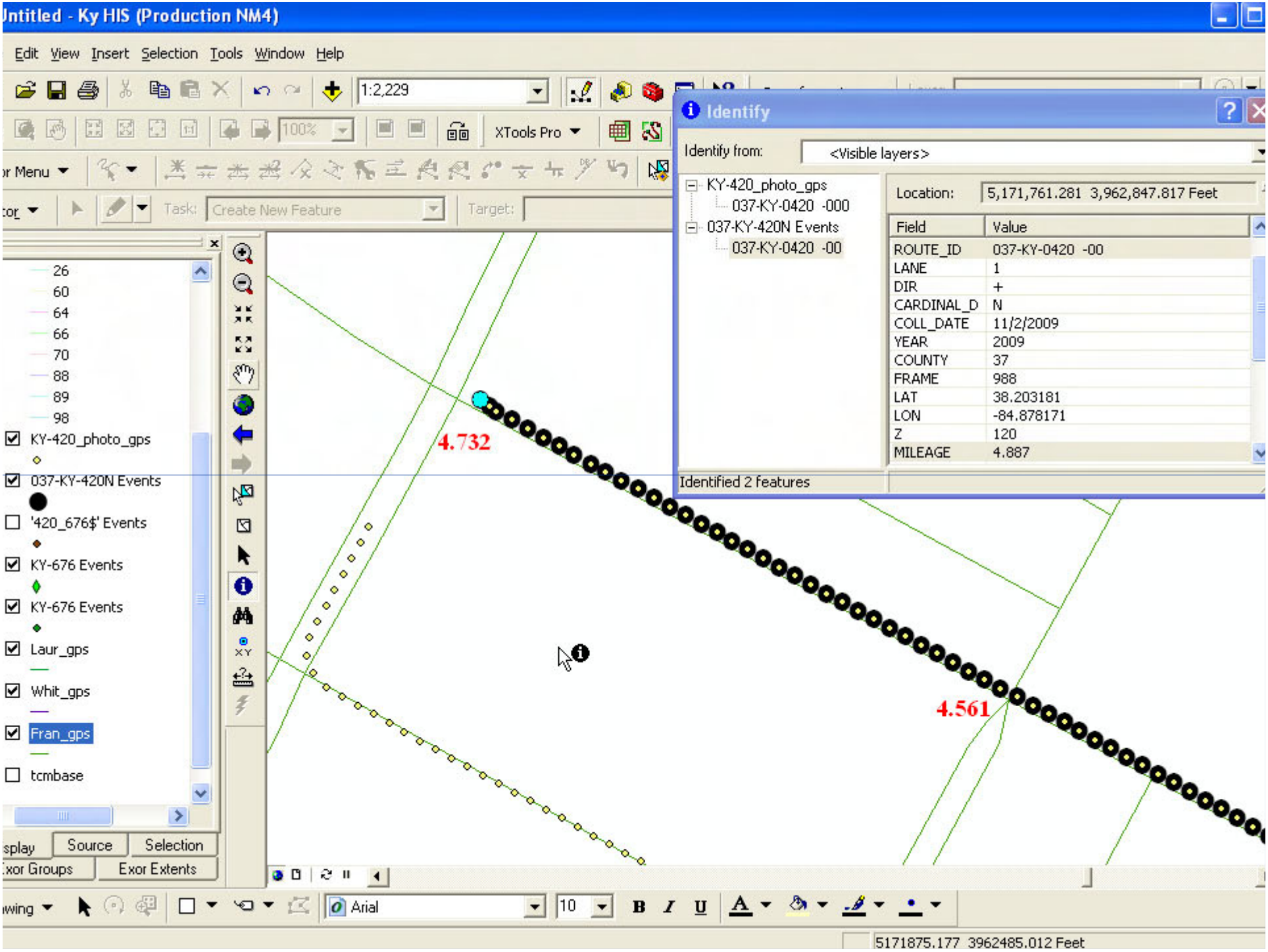

Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:53,346
Georeferencing
Layer:
XTools Pro
Set Active Date: 13-Nov-2009
Task: Create New Feature
Target:
Layers
KY-676_pic
KY-420_raw_pic
Route Layer (V_NM_NLT_
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
Source
Selection
Exor Groups
Exor Extents
Arial
10
the current map with a new name
5168535.802 3958693.019 Feet

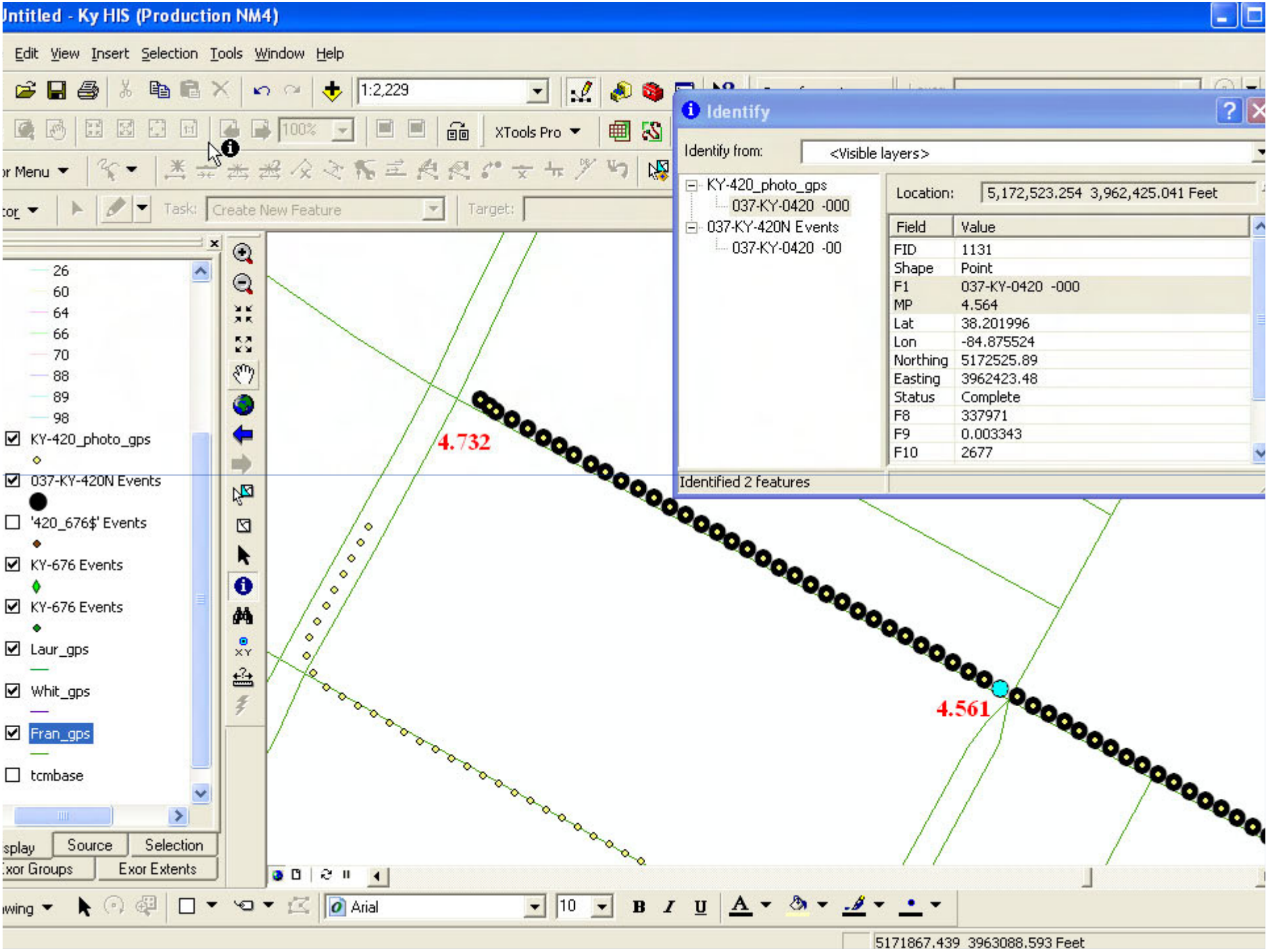

Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,611
Georeferencing
Layer:
XTools Pro
Set Active Date:
13-Nov-2009
Task:
Create New Feature
Target:
Route Layer (V_NM_I
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
'420_676$' Events
KY-676 Events
KY-676 Events
Source
Selection
Exor Groups
Exor Extents
Arial
10
037-KY-0420 -000
037-KY-0676 -000
037-KY-0420 -000
A P VOGLER ST
5171499.313 3951305.011 Feet

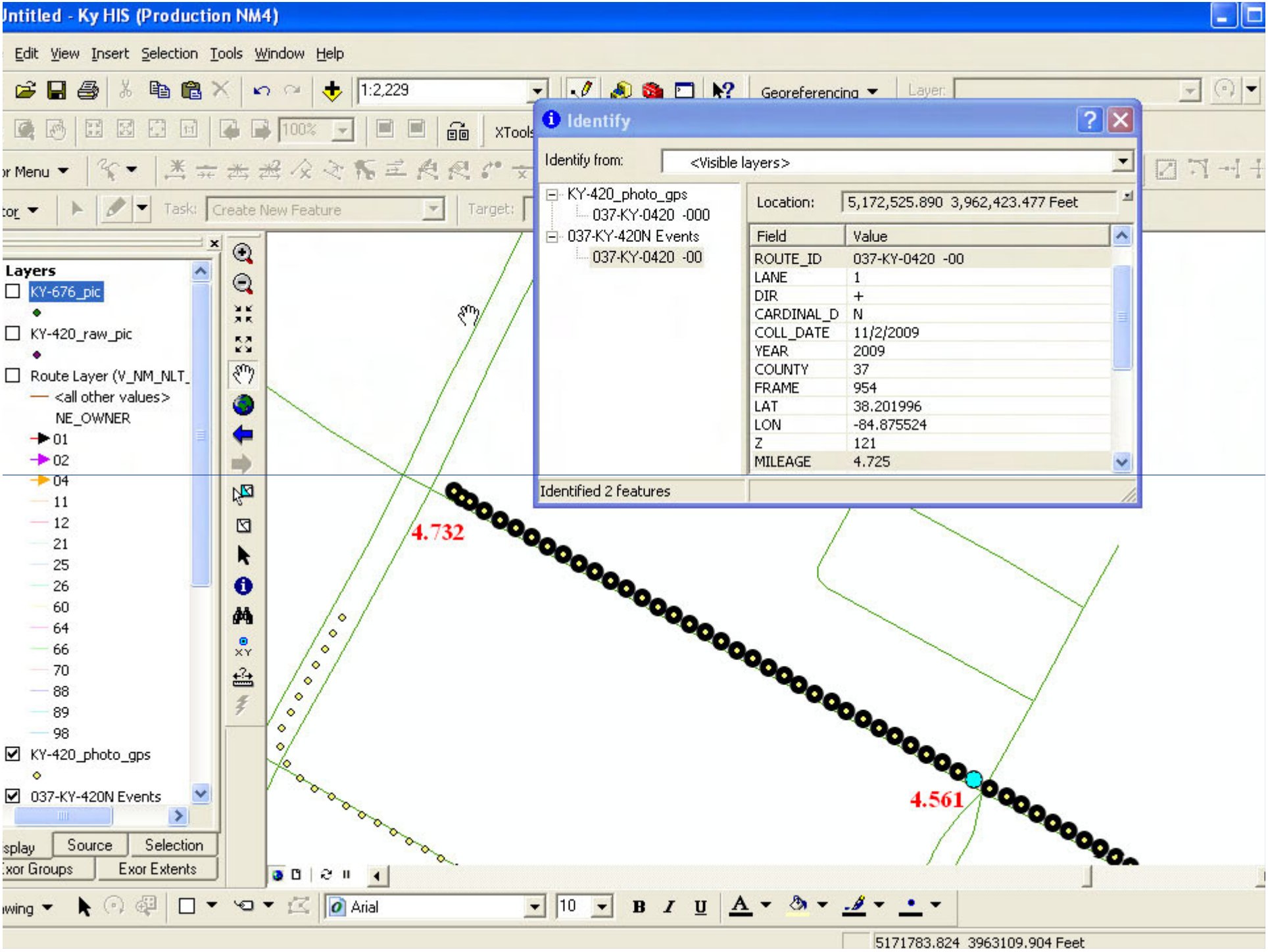

Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,611
Georeferencing
Layer:
XTools Pro
Identify
Identify from:
<Selectable layers>
KY-420_photo_gps
037-KY-0420 -000
KY-676 Events
037-KY-0676 -000
Location:
5,171,816.800 3,950,480.220 Feet
Field
Value
FID
772
Shape
Point
F1
037-KY-0420 -000
MP
2.145
Lat
38.169218
Lon
-84.87838
Northing
5171816.8
Easting
3950480.22
Status
Complete
F8
337921
F9
1.118
Date:
13-Nov-2009
Route Layer (V_NM_I
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
'420_676$' Events
KY-676 Events
KY-676 Events
Source
Selection
Exor Groups
Exor Extents
037-KY-0420 -000
KY-420
@ MP 2.145
037-KY-0676 -000
KY-676
@ MP 1.336
A P VOGLER ST
Arial
10
5172464.907 3951316.345 Feet

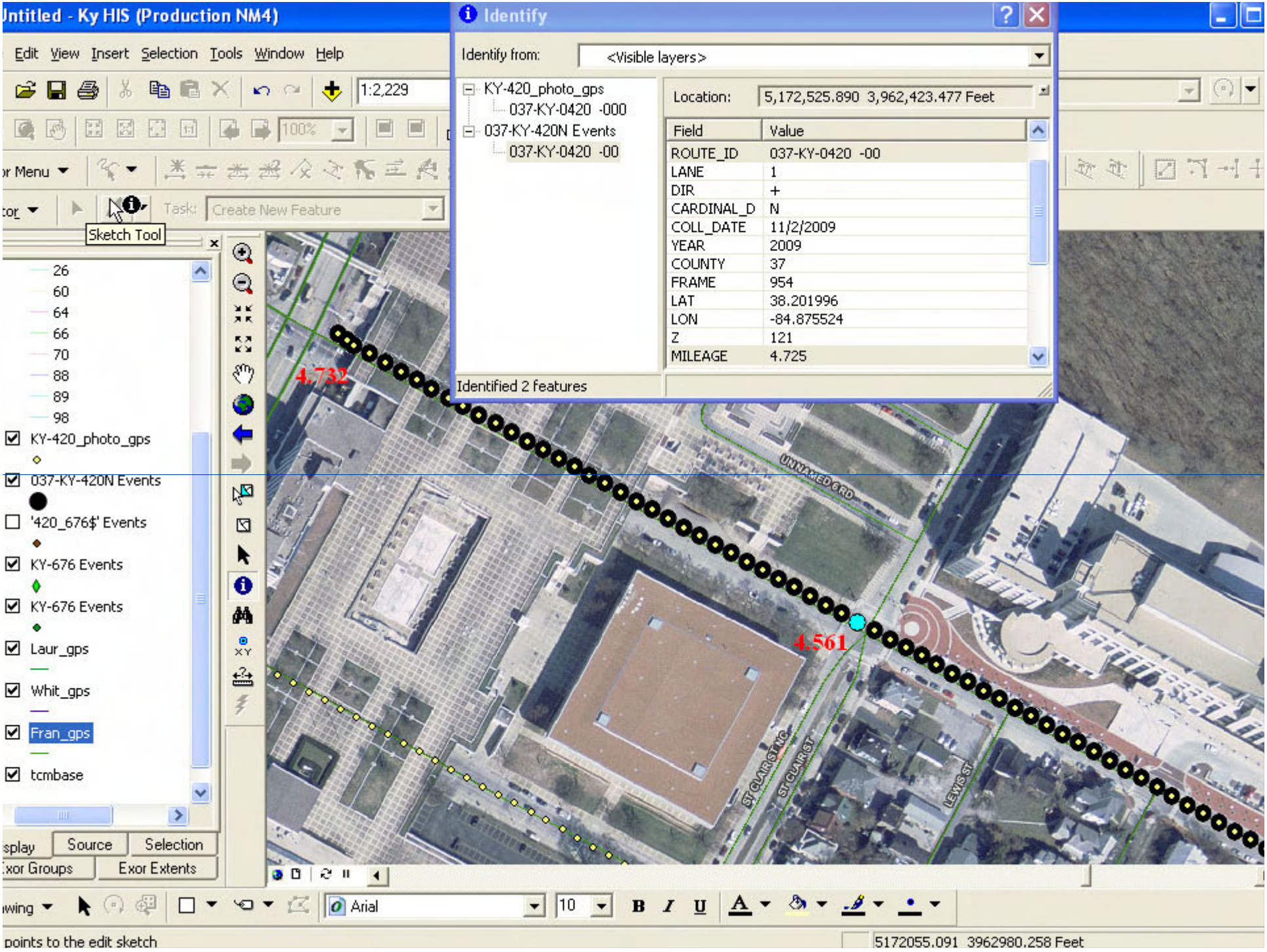

Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,611
Georeferencing
Layer:
XTools Pro
Date: 13-Nov-2009
Identify
Identify from:
<Selectable layers>
KY-420_photo_gps
037-KY-0420 -000
KY-676 Events
037-KY-0676 -000
Location:
5,171,813.959 3,950,473.200 Feet
Field
Value
OID
146
ROUTE
037-KY-0676 -000
MILE_POINT
1.336
LATITUDE
38.169199
LONGITUDE
-84.87839
EASTING
5171814.05
NORTHING
3950473.2
ASSIGN_DA
10/29/2009
STATUS
Complete
DATUM
338029
OFFSET
0
Route Layer (V_NM_I
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
'420_676$' Events
KY-676 Events
KY-676 Events
Source
Selection
Exor Groups
Exor Extents
037-KY-0420 -000
037-KY-0676 -000
KY-420
@ MP 2.145
KY-676
@ MP 1.336
A P VOGLER ST
Arial
10
the map layout by a particular percentage
5172224.642 3951239.279 Feet


Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,229
XTools Pro
Task: Create New Feature
Target:
Edit Task
Identify
Identify from:
<Visible layers>
KY-420_photo_gps
037-KY-0420 -000
037-KY-420N Events
037-KY-0420 -00
Location: 5,171,761.280 3,962,847.820 Feet
Field
Value
FID 1471
Shape Point
F1 037-KY-0420 -000
MP 4.726
Lat 38.203181
Lon -84.878171
Northing 5171761.28
Easting 3962847.82
Status Complete
F8 337971
F9 0.164979
F10 2677
Identified 2 features
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
'420_676$' Events
KY-676 Events
KY-676 Events
Laur_gps
Whit_gps
Fran_gps
tcmbase
Source
Selection
Exor Groups
Exor Extents
4.732
4.561
Arial
10
5171583.059 3963094.397 Feet


Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,229
XTools Pro
Task: Create New Feature
Target:
Identify
Identify from:
<Visible layers>
KY-420_photo_gps
037-KY-0420 -000
037-KY-420N Events
037-KY-0420 -00
Location: 5,171,761.281 3,962,847.817 Feet
Field
Value
ROUTE_ID 037-KY-0420 -00
LANE 1
DIR +
CARDINAL_D N
COLL_DATE 11/2/2009
YEAR 2009
COUNTY 37
FRAME 988
LAT 38.203181
LON -84.878171
Z 120
MILEAGE 4.887
Identified 2 features
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
'420_676$' Events
KY-676 Events
KY-676 Events
Laur_gps
Whit_gps
Fran_gps
tcmbase
Source
Selection
Exor Groups
Exor Extents
4.732
4.561
Arial
10
5171875.177 3962485.012 Feet


Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,229
XTools Pro
Task: Create New Feature
Target:
Identify
Identify from:
<Visible layers>
KY-420_photo_gps
037-KY-0420 -000
037-KY-420N Events
037-KY-0420 -00
Location: 5,172,523.254 3,962,425.041 Feet
Field
Value
FID 1131
Shape Point
F1 037-KY-0420 -000
MP 4.564
Lat 38.201996
Lon -84.875524
Northing 5172525.89
Easting 3962423.48
Status Complete
F8 337971
F9 0.003343
F10 2677
Identified 2 features
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
'420_676$' Events
KY-676 Events
KY-676 Events
Laur_gps
Whit_gps
Fran_gps
tcmbase
Source
Selection
Exor Groups
Exor Extents
4.732
4.561
Arial
10
5171867.439 3963088.593 Feet


Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,229
Georeferencing
Layer:
Identify
Identify from:
<Visible layers>
KY-420_photo_gps
037-KY-0420 -000
037-KY-420N Events
037-KY-0420 -00
Location:
5,172,525.890 3,962,423.477 Feet
Field
Value
ROUTE_ID
037-KY-0420 -00
LANE
1
DIR
+
CARDINAL_D
N
COLL_DATE
11/2/2009
YEAR
2009
COUNTY
37
FRAME
954
LAT
38.201996
LON
-84.875524
Z
121
MILEAGE
4.725
Identified 2 features
Layers
KY-676_pic
KY-420_raw_pic
Route Layer (V_NM_NLT_
<all other values>
NE_OWNER
01
02
04
11
12
21
25
26
60
64
66
70
88
89
98
KY-420_photo_gps
037-KY-420N Events
Source
Selection
Exor Groups
Exor Extents
4.732
4.561
Arial
10
5171783.824 3963109.904 Feet


Untitled - Ky HIS (Production NM4)
Edit View Insert Selection Tools Window Help
1:2,229
Task: Create New Feature
Sketch Tool
Identify
Identify from: <Visible layers>
KY-420_photo_gps
037-KY-0420 -000
037-KY-420N Events
037-KY-0420 -00
Location: 5,172,525.890 3,962,423.477 Feet
Field Value
ROUTE_ID 037-KY-0420 -00
LANE 1
DIR +
CARDINAL_D N
COLL_DATE 11/2/2009
YEAR 2009
COUNTY 37
FRAME 954
LAT 38.201996
LON -84.875524
Z 121
MILEAGE 4.725
Identified 2 features
4.732
4.561
KY-420_photo_gps
037-KY-420N Events
'420_676$' Events
KY-676 Events
KY-676 Events
Laur_gps
Whit_gps
Fran_gps
tcmbase
Source
Selection
Exor Groups
Exor Extents
Arial
10
points to the edit sketch
5172055.091 3962980.258 Feet

Keeping the Locations Current

- Now we must keep the image route locations correct
  - Re-designation of routes (Re-route around town)
  - Curve replacement projects
  - Reconstruction
- All these cause mile point and route adjustments
- Simply Link the HIS route location to the Mandli database Route and Mile Point fields.