Automated Permitting and Routing for Oversized and Overweight Vehicles

WASHTO 2011

Jay Adams, Oklahoma Department of Transportation

Evaluation for Legislature

Business Problem	• *Rapid Growth of OS/OW Permits and unacceptable times to provided safe routes and permits*
Solution	• *Develop an Internet based Routing and Permitting Solution, generate permits in a timely manner, provide a 24 hour web service and maintain public safety*
Benefits	• *Trucking Industry can maintain their critical schedules and the State doesn't sacrifice public safety*
Anticipated Long-Term Benefits	• *Increased economic development for a friendlier business environment and overall cost savings to the State in better management operations*
Future Plans and Strategy	• *Work with surrounding states to look at possible OS/OW Permitting and Routing in the Cloud for a single permitting source for multiple states*

Business Problem

- Increased safety and protection of the infrastructure
- Experienced exponential growth in OS/OW truck traffic
  - Agriculture, Oil, and Gas Industries power the Oklahoma Economy
  - Issues more than 200,000 permits per year (~800 per day)
  - Limited resources to fill the requests
- Increased pressure by the trucking industry
  - Carriers were waiting three days to a week for a permit
- Economic issues were prevalent
  - Delay in permits encouraged carriers to operate without a permit

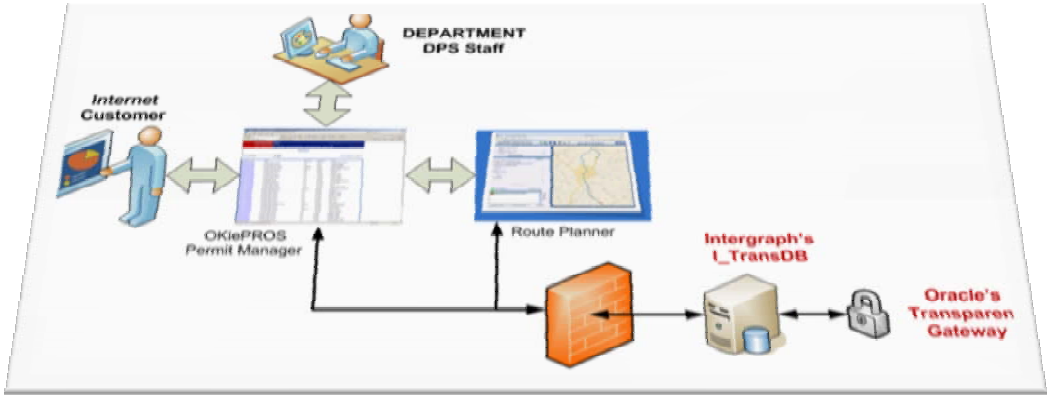
Project Goals and Functionality

The Project Provides

- ***DPS/DOT customers the ability to:***
  - **Submit a permit request electronically**
  - **Generate safe routes automatically**
  - **Pay for and receive permits electronically**
- ***DPS/DOT with ability to:***
  - **Keep pace with OS/OW permits demand**
  - **Preserve roadway infrastructure**
  - **Ensure public safety**
  - **Improve customer service**
  - **Enable monitoring and analysis**

Through Key Components

- ***Permitting***
- ***Routing***
- ***Restriction Management***
- ***Administration***
- ***Data Integration***



Project Approach / Timeline

Nov 2009
Project
Kickoff

Dec 2009-
July 2011
Iteration
Design

Aug 2011
Code
complete

FAT/SAT

Sept 2011
Beta
Testing

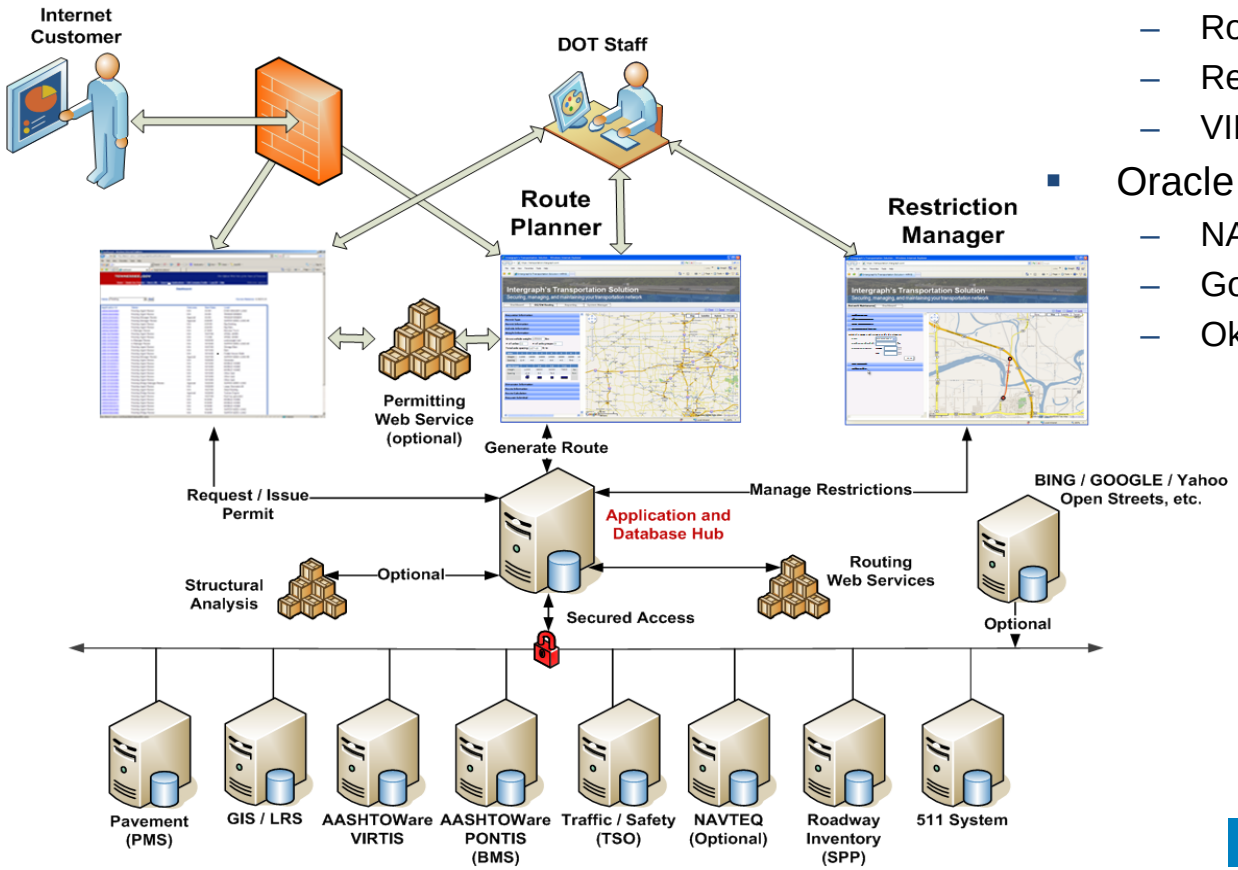
Oct 2011
Industry
Training

Nov 2011
Production
Go Live!!!

Technical Approach

Permitting

- Cambridge provided web application
  - Java based
  - Oracle Database



Automated Routing & Restriction Management

- Intergraph Provided COTS
  - GeoMedia Desktop Products (Data processing / Management)
  - GeoMedia WebMap Professional
- Industryware – Configurable Software
  - Route Planner
  - Restriction Manager
  - VIRTIS Interface
- Oracle Spatial Database
  - NAVTEQ Streets
  - Google Premium
  - Oklahoma Roadway and PONTIS Data

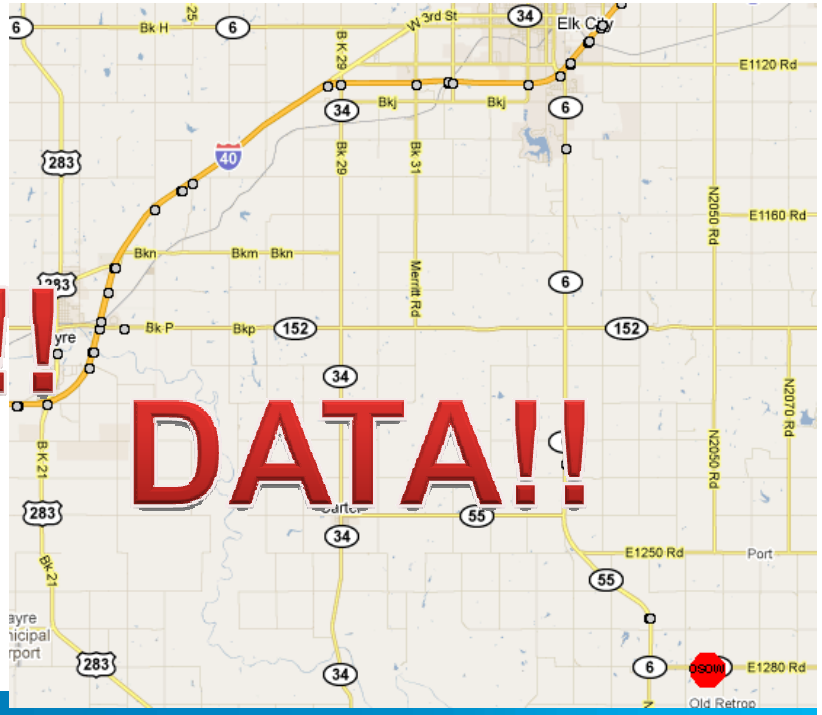
Technical Challenges

- Cutting edge technology
- IT Infrastructure to support the application
- Conflation of Roadway and PONTIS Data to NAVTEQ
  - Positional Accuracy
    - Assignment to Road vs Ramps or both
    - On-structure vs over / under
    - Bridge Ratings and Vehicle Classification
  - Alignment of route identification with NAVTEQ Road Names

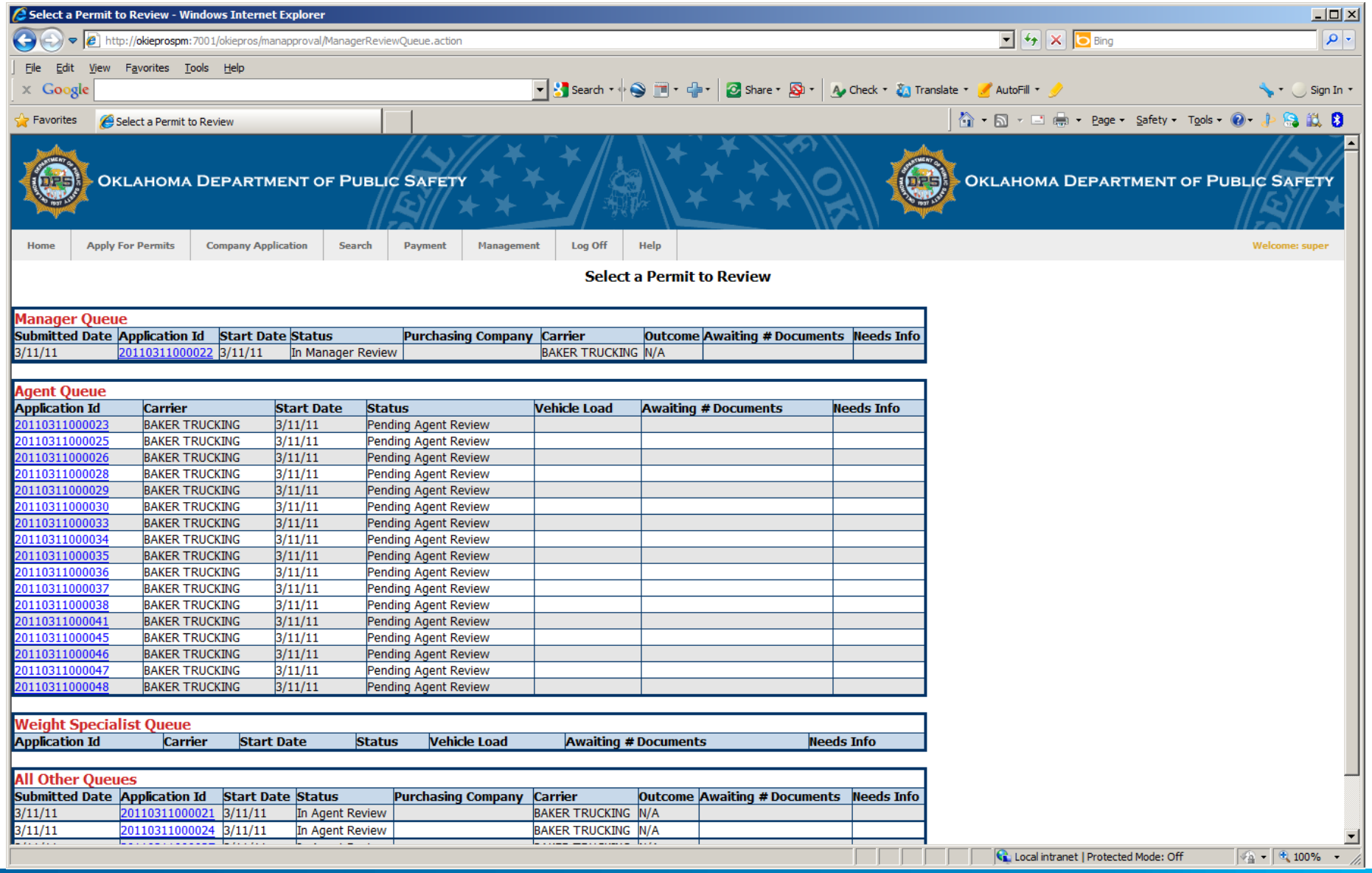
DATA!!

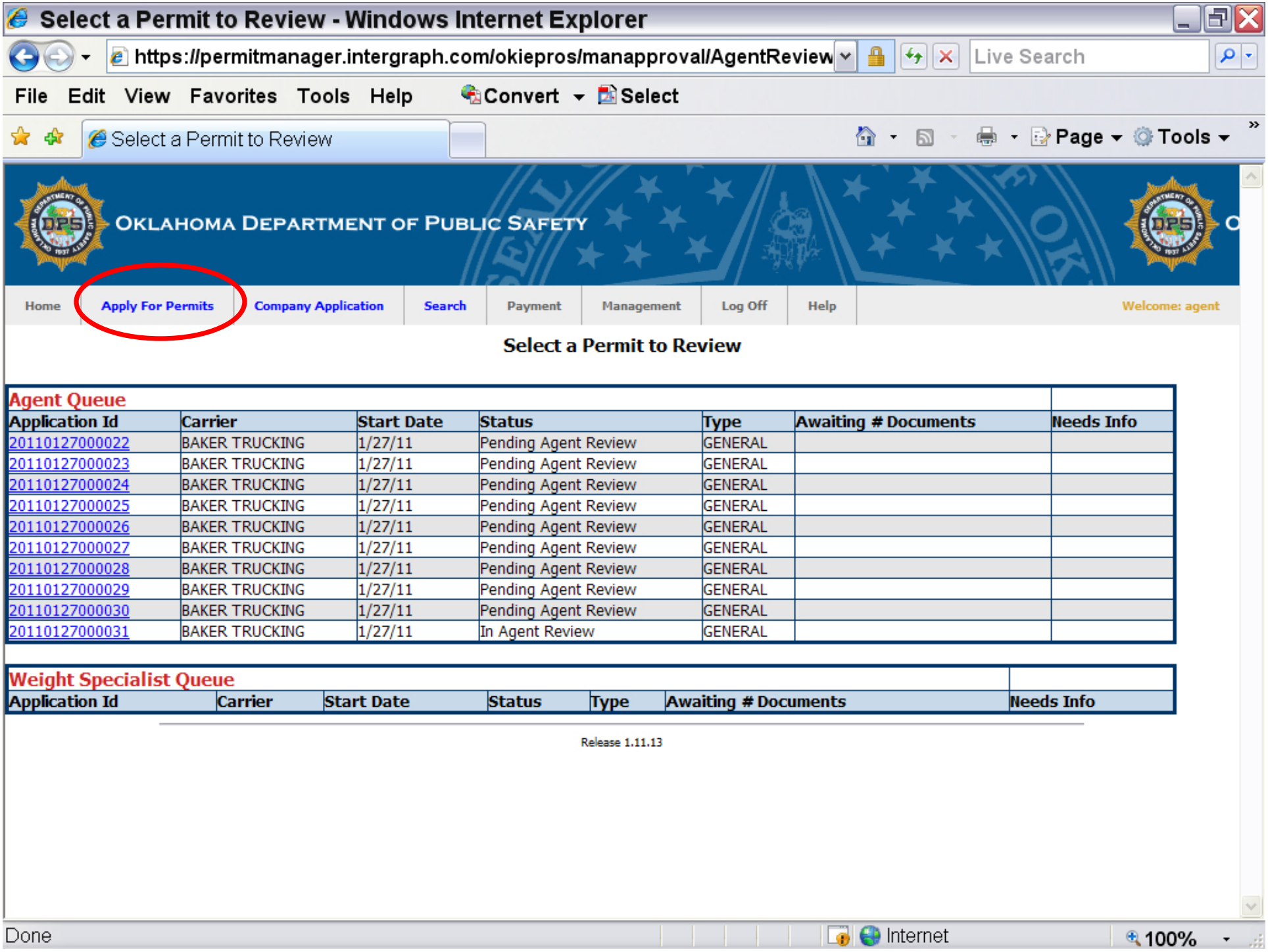
DATA!!

DATA!!



Applying for a permit

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Welcome: agent
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Agent Queue
Application Id | Carrier | Start Date | Status | Type | Awaiting # Documents | Needs Info
20110127000022 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000023 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000024 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000025 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000026 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000027 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000028 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000029 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000030 | BAKER TRUCKING | 1/27/11 | Pending Agent Review | GENERAL
20110127000031 | BAKER TRUCKING | 1/27/11 | In Agent Review | GENERAL
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Application Id | Carrier | Start Date | Status | Type | Awaiting # Documents | Needs Info
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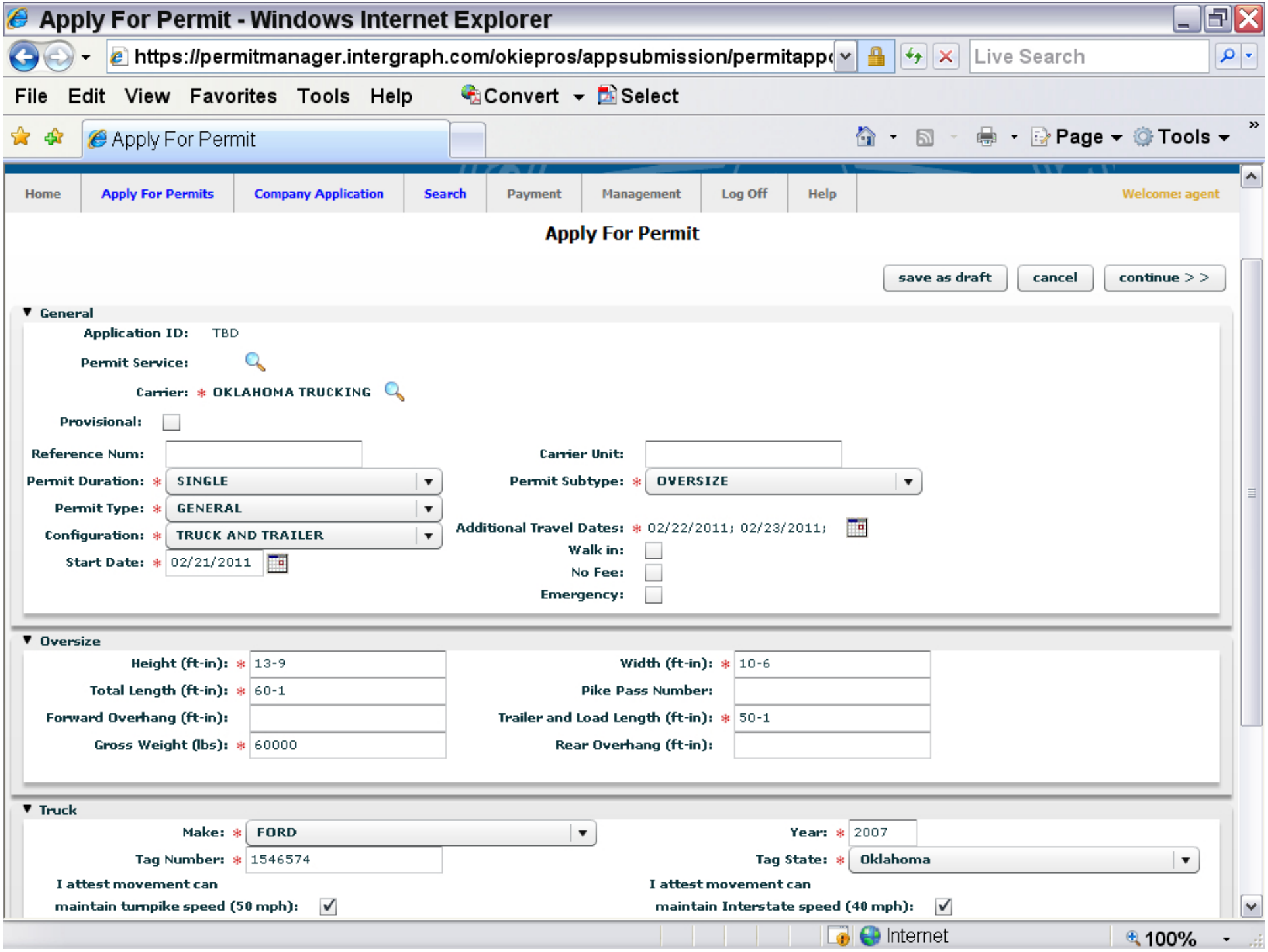
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Company Application
Search
Payment
Management
Log Off
Help
Welcome: agent
Apply For Permit
save as draft
cancel
continue > >
General
Application ID: TBD
Permit Service:
Carrier: * OKLAHOMA TRUCKING
Provisional:
Reference Num:
Carrier Unit:
Permit Duration: * SINGLE
Permit Subtype: * OVERSIZE
Permit Type: * GENERAL
Configuration: * TRUCK AND TRAILER
Additional Travel Dates: * 02/22/2011; 02/23/2011;
Start Date: * 02/21/2011
Walk in:
No Fee:
Emergency:
Oversize
Height (ft-in): * 13-9
Width (ft-in): * 10-6
Total Length (ft-in): * 60-1
Pike Pass Number:
Forward Overhang (ft-in):
Trailer and Load Length (ft-in): * 50-1
Gross Weight (lbs): * 60000
Rear Overhang (ft-in):
Truck
Make: * FORD
Year: * 2007
Tag Number: * 1546574
Tag State: * Oklahoma
I attest movement can maintain turnpike speed (50 mph):
I attest movement can maintain Interstate speed (40 mph):
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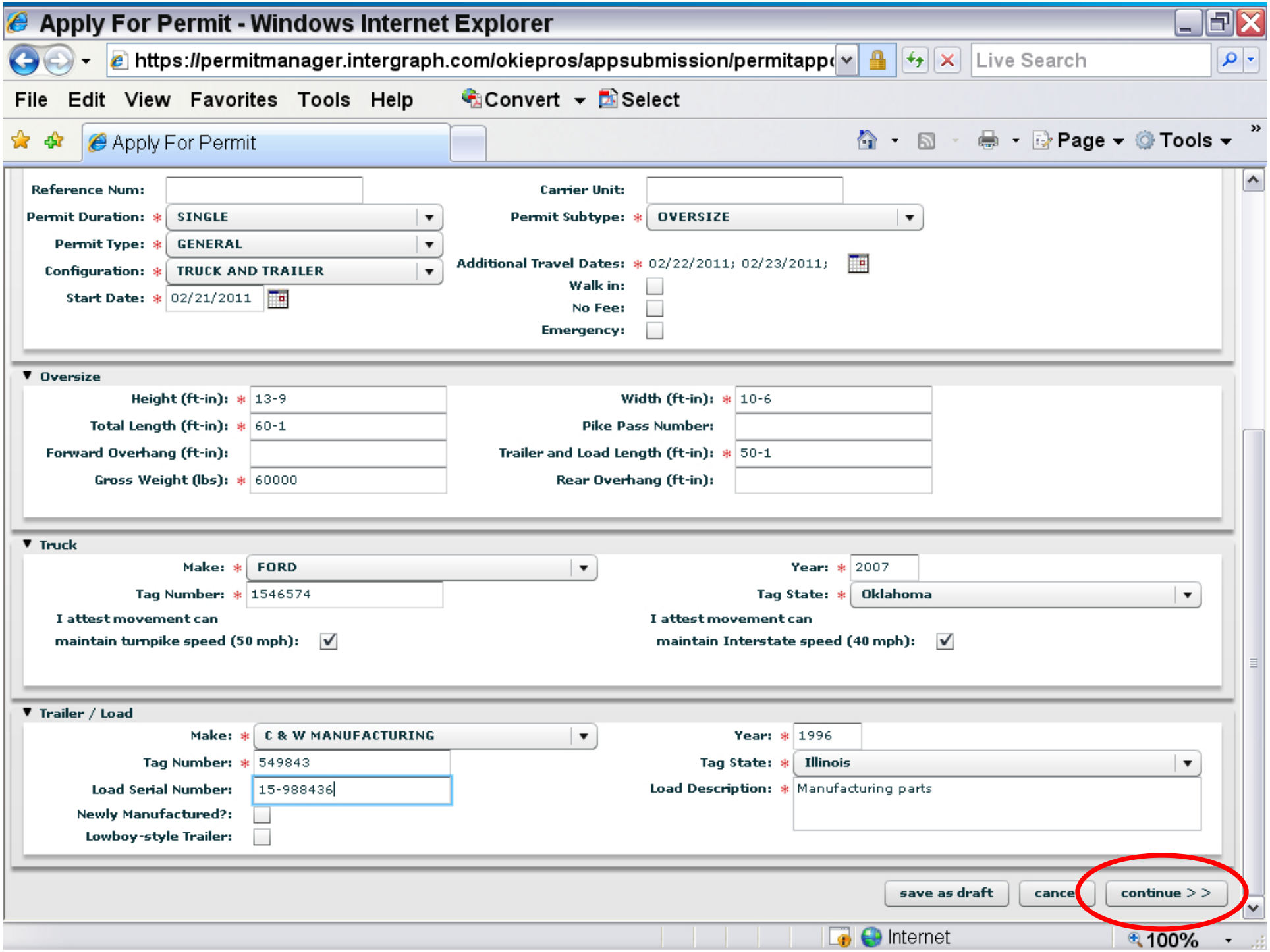
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Reference Num:
Carrier Unit:
Permit Duration: * SINGLE
Permit Subtype: * OVERSIZE
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Additional Travel Dates: * 02/22/2011; 02/23/2011;
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I attest movement can maintain turnpike speed (50 mph):
I attest movement can maintain Interstate speed (40 mph):
Trailer / Load
Make: * C & W MANUFACTURING
Year: * 1996
Tag Number: * 549843
Tag State: * Illinois
Load Serial Number: 15-988436
Load Description: * Manufacturing parts
Newly Manufactured?:
Lowboy-style Trailer:
save as draft
cancel
continue > >
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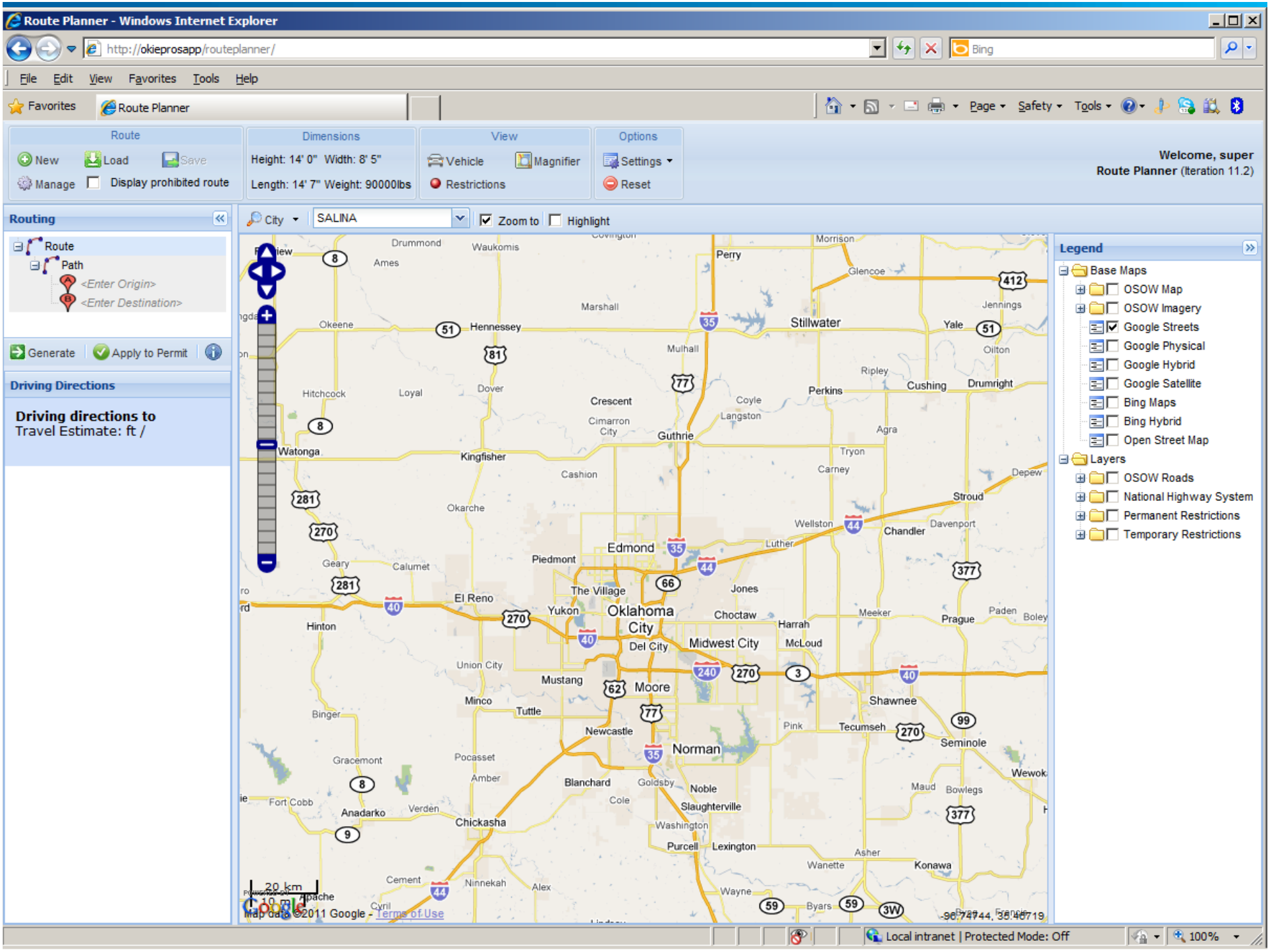
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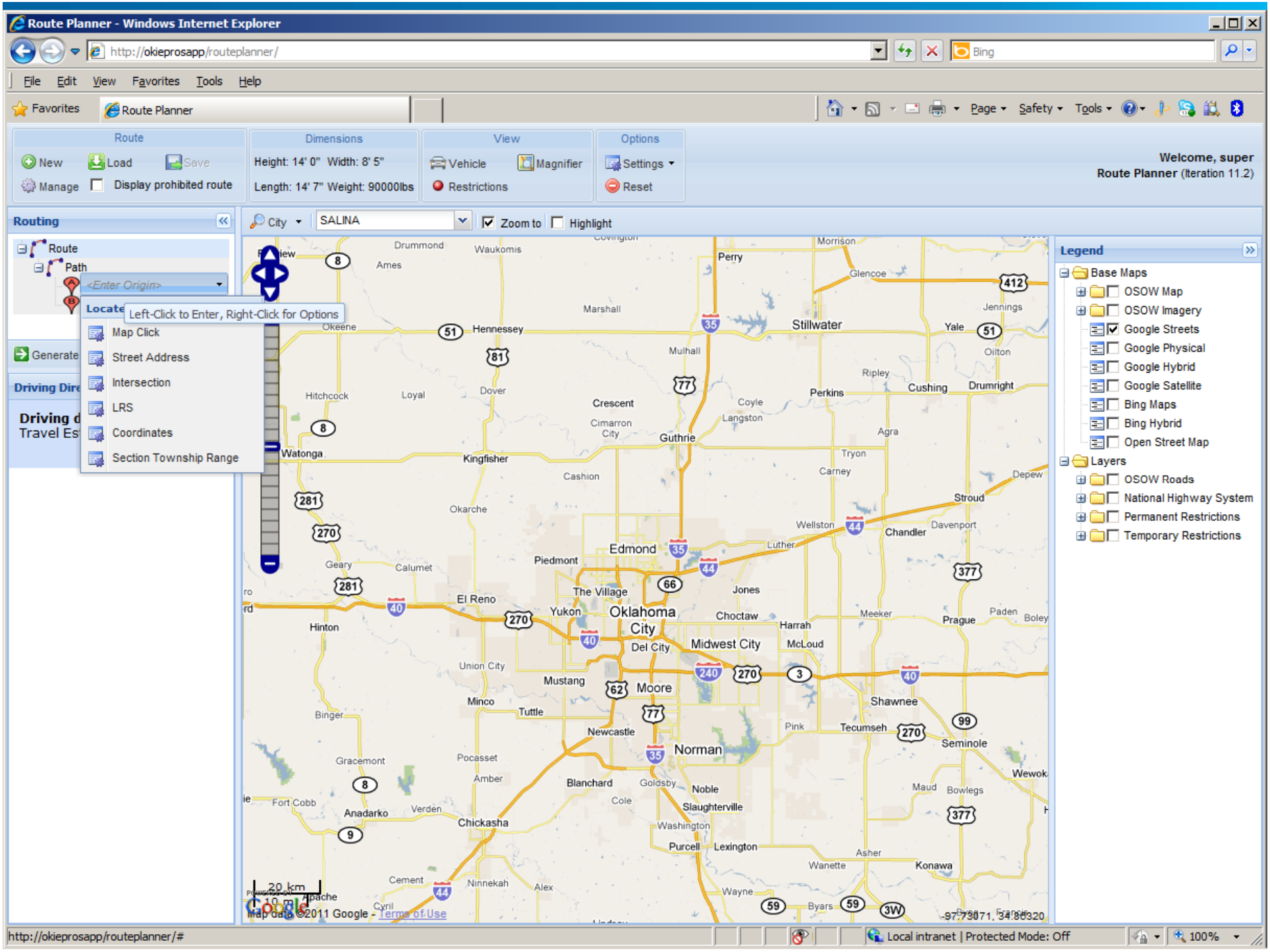
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Midwest City
McLoud
Union City
Mustang
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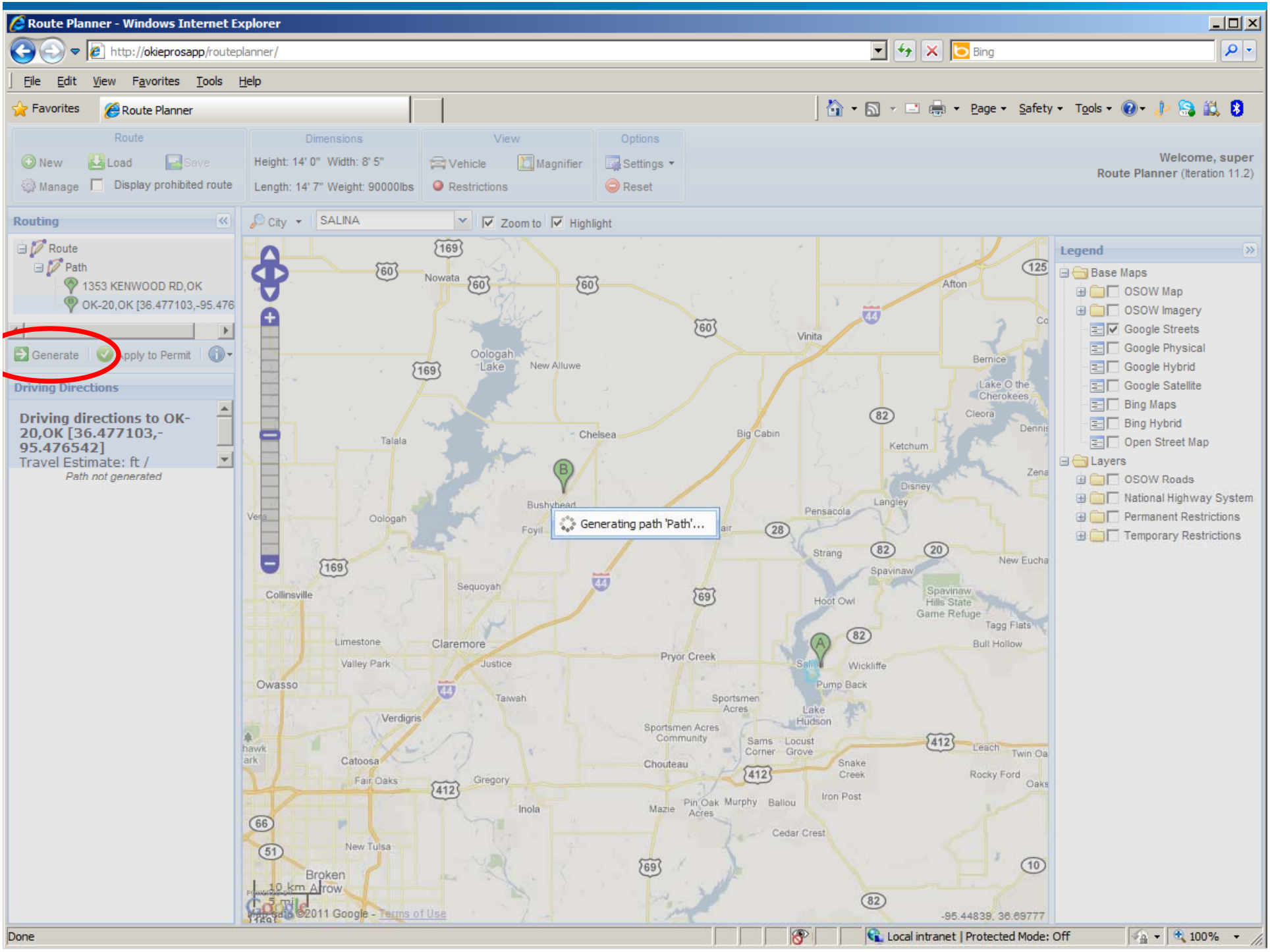
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Route Planner (Iteration 11.2)
Routing
Route
Path
1353 KENWOOD RD,OK
OK-20,OK [36.477103,-95.476
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Apply to Permit
Driving Directions
Driving directions to OK-20,OK [36.477103,-95.476542]
Travel Estimate: ft /
Path not generated
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Zoom to
Highlight
Generating path 'Path'...
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OSOW Imagery
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Ketchum
Bushyhead
Foyil
Oologah
Pensacola
Langley
Strang
Spavinaw
Hoot Owl
Spavinaw Hills State Game Refuge
Collinsville
Sequoyah
Limestone
Claremore
Valley Park
Justice
Owasso
Pryor Creek
Wickliffe
Pump Back
Tagg Flats
Bull Hollow
Sportsmen Acres
Lake Hudson
Verdigris
Sportsmen Acres Community
Sams Corner
Locust Grove
Catoosa
Fair Oaks
Gregory
Chouteau
Snake Creek
Rocky Ford
Iron Post
Inola
Mazie
Pin Oak Acres
Murphy
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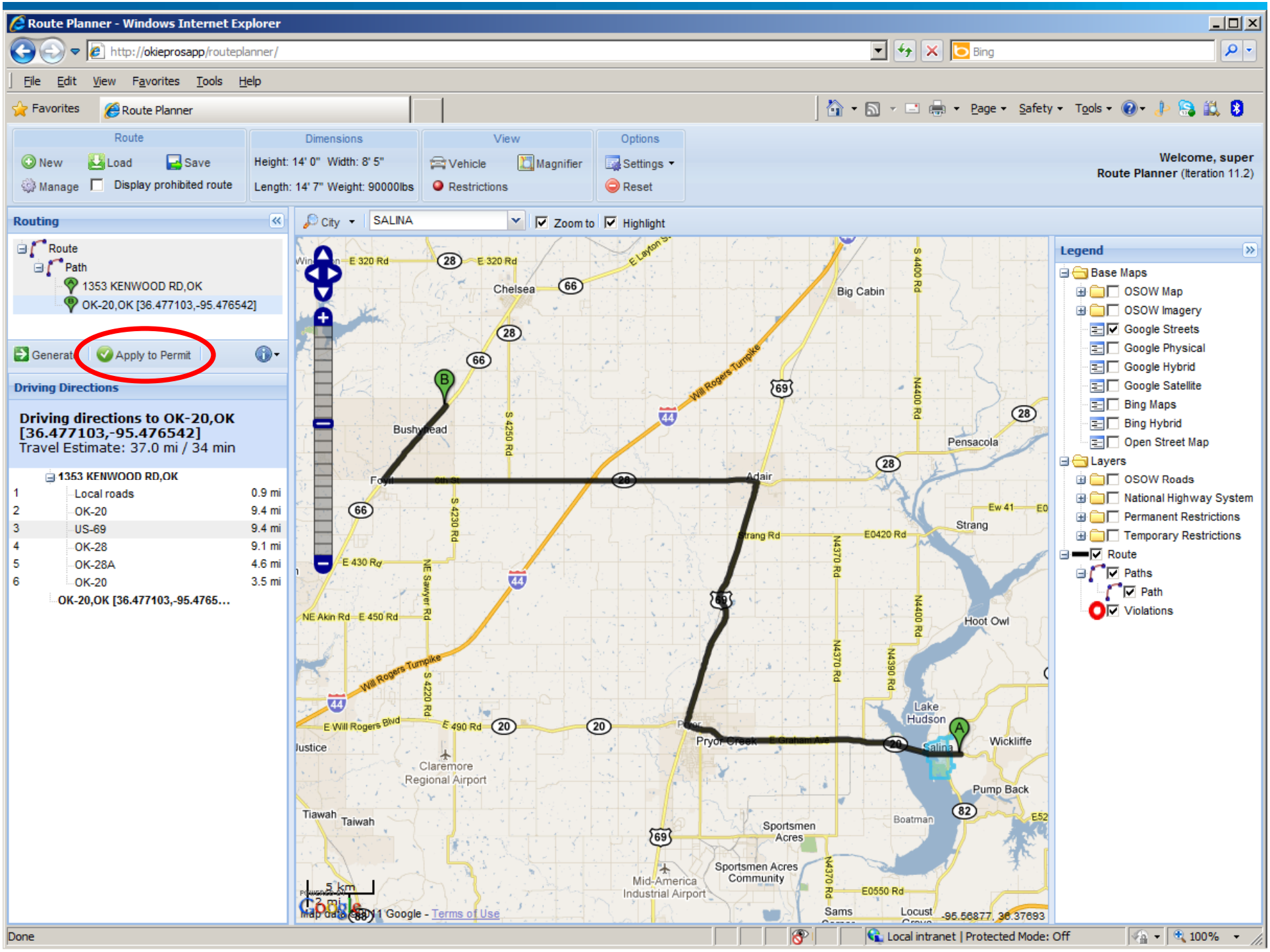
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Routing
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Path
1353 KENWOOD RD,OK
OK-20,OK [36.477103,-95.476542]
Generat
Apply to Permit
Driving Directions
Driving directions to OK-20,OK [36.477103,-95.476542]
Travel Estimate: 37.0 mi / 34 min
1353 KENWOOD RD,OK
1 Local roads 0.9 mi
2 OK-20 9.4 mi
3 US-69 9.4 mi
4 OK-28 9.1 mi
5 OK-28A 4.6 mi
6 OK-20 3.5 mi
OK-20,OK [36.477103,-95.4765...
City
SALINA
Zoom to
Highlight
Chelsea
Big Cabin
Bushyhead
Foyil
Adair
Pensacola
Strang
Hoot Owl
Lake Hudson
Salina
Wickliffe
Pump Back
Boatman
Pryor Creek
Claremore Regional Airport
Tiawah
Sportsmen Acres
Sportsmen Acres Community
Mid-America Industrial Airport
Sams
Locust
Will Rogers Turnpike
E 320 Rd
E 430 Rd
NE Akin Rd
E 450 Rd
E Will Rogers Blvd
E 490 Rd
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Base Maps
OSOW Map
OSOW Imagery
Google Streets
Google Physical
Google Hybrid
Google Satellite
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Bing Hybrid
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National Highway System
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Temporary Restrictions
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Violations
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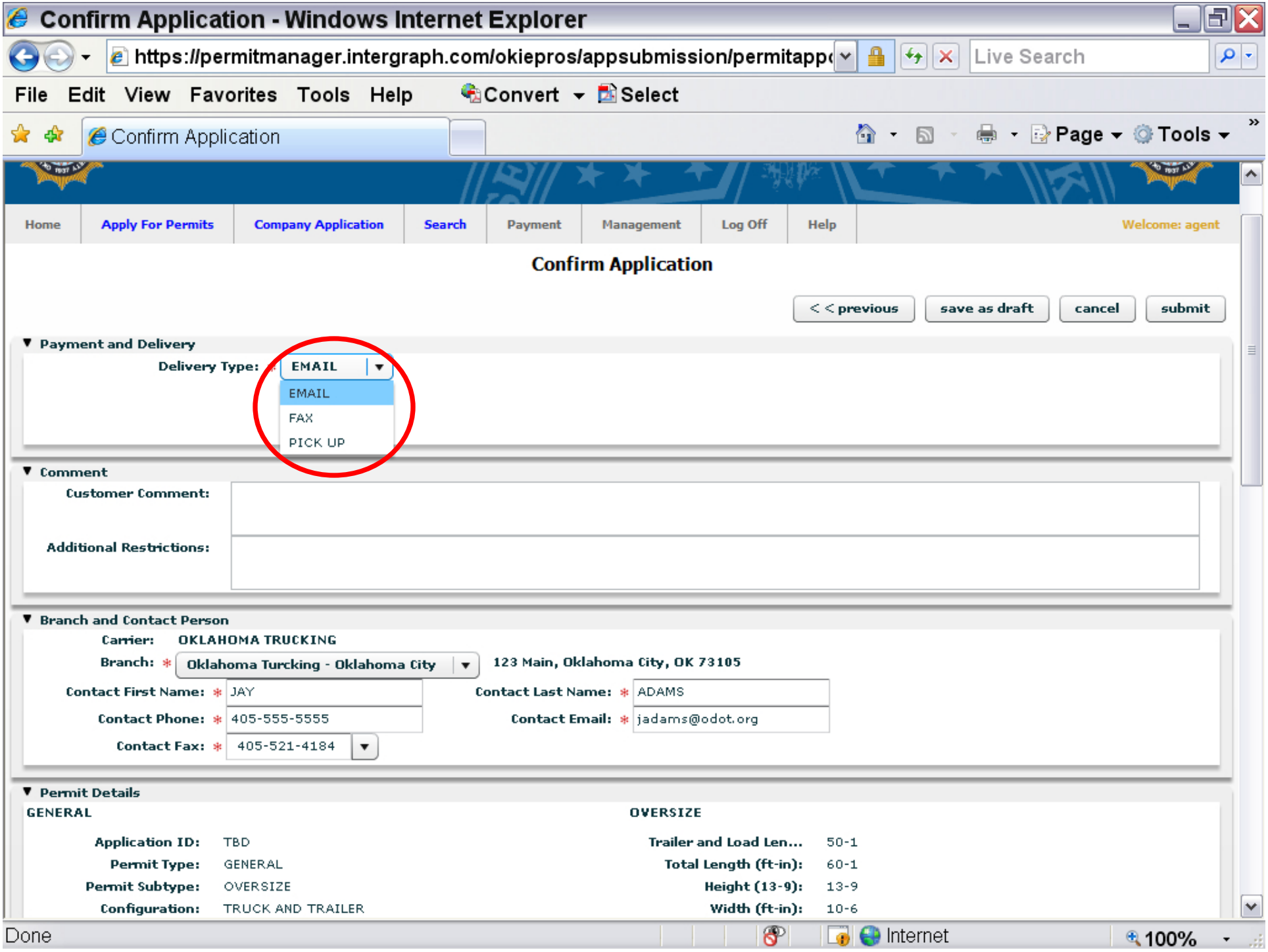
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FAX
PICK UP
Comment
Customer Comment:
Additional Restrictions:
Branch and Contact Person
Carrier: OKLAHOMA TRUCKING
Branch: *
Oklahoma Turcking - Oklahoma City
123 Main, Oklahoma City, OK 73105
Contact First Name: *
JAY
Contact Last Name: *
ADAMS
Contact Phone: *
405-555-5555
Contact Email: *
jadams@odot.org
Contact Fax: *
405-521-4184
Permit Details
GENERAL
Application ID: TBD
Permit Type: GENERAL
Permit Subtype: OVERSIZE
Configuration: TRUCK AND TRAILER
OVERSIZE
Trailer and Load Len... 50-1
Total Length (ft-in): 60-1
Height (13-9): 13-9
Width (ft-in): 10-6
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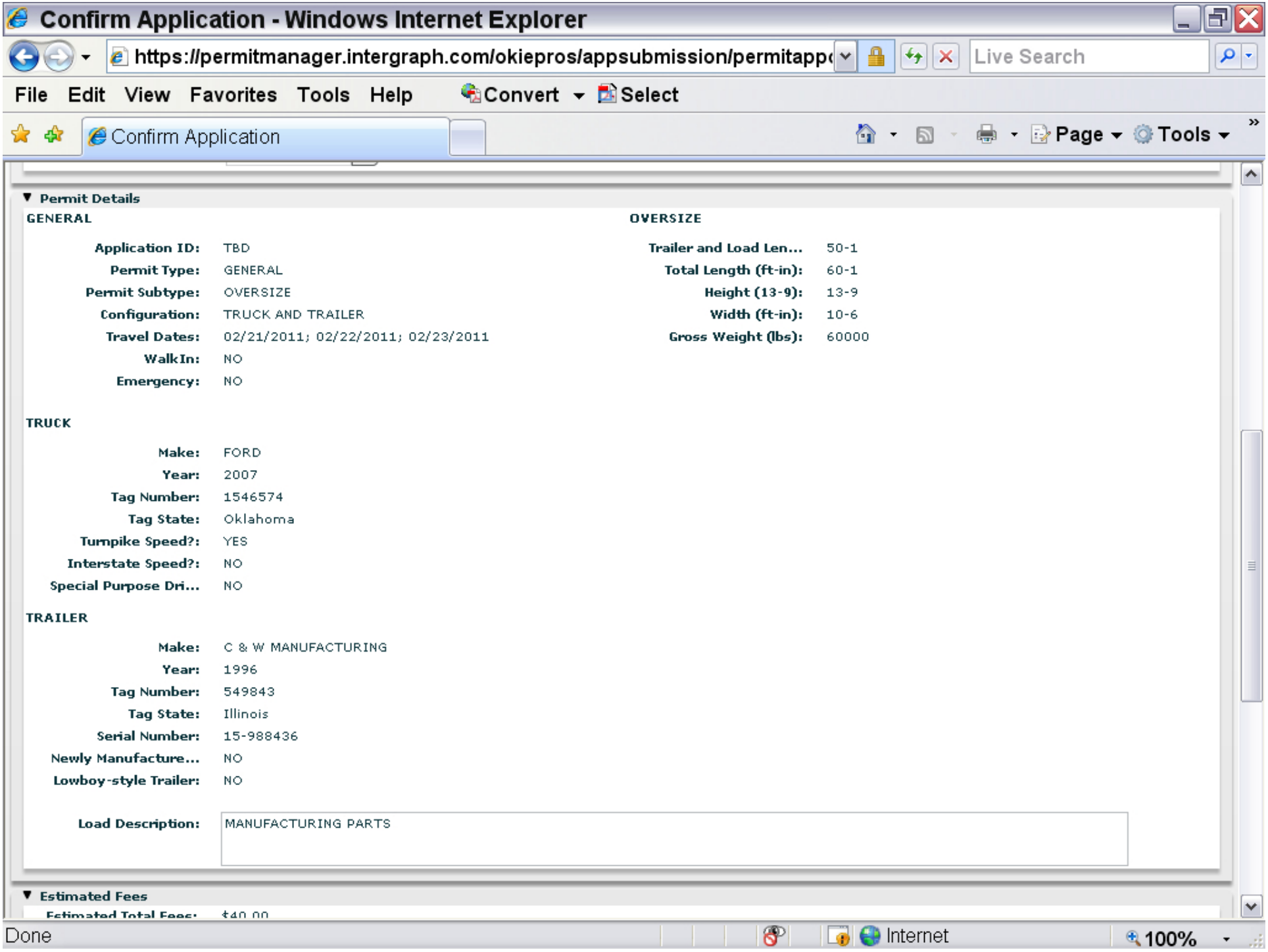
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Permit Details
GENERAL
Application ID: TBD
Permit Type: GENERAL
Permit Subtype: OVERSIZE
Configuration: TRUCK AND TRAILER
Travel Dates: 02/21/2011; 02/22/2011; 02/23/2011
WalkIn: NO
Emergency: NO
OVERSIZE
Trailer and Load Len... 50-1
Total Length (ft-in): 60-1
Height (13-9): 13-9
Width (ft-in): 10-6
Gross Weight (lbs): 60000
TRUCK
Make: FORD
Year: 2007
Tag Number: 1546574
Tag State: Oklahoma
Turnpike Speed?: YES
Interstate Speed?: NO
Special Purpose Dri... NO
TRAILER
Make: C & W MANUFACTURING
Year: 1996
Tag Number: 549843
Tag State: Illinois
Serial Number: 15-988436
Newly Manufacture... NO
Lowboy-style Trailer: NO
Load Description: MANUFACTURING PARTS
Estimated Fees
Estimated Total Fees: $40.00
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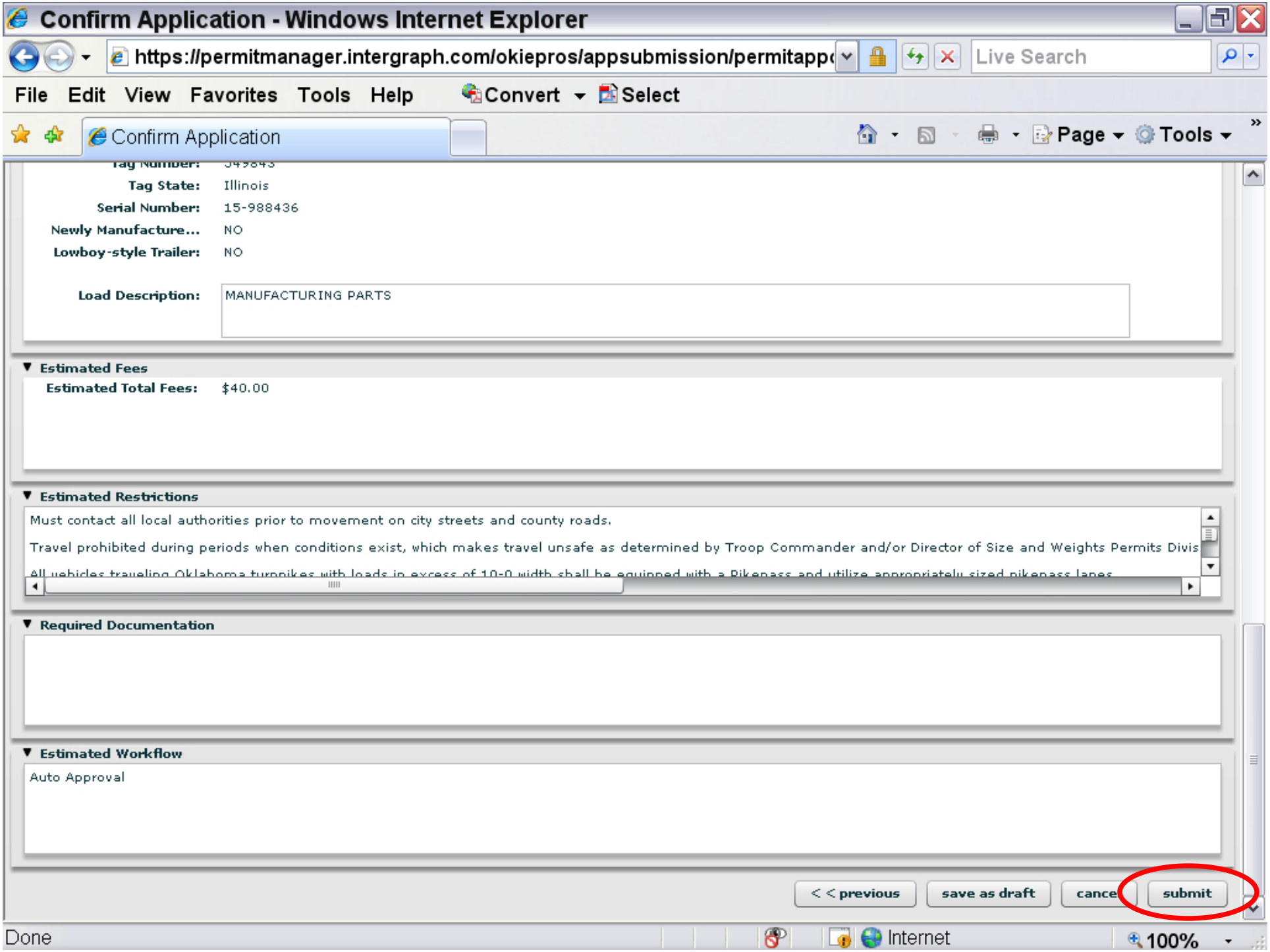
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Live Search
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Tools
Tag Number: 349843
Tag State: Illinois
Serial Number: 15-988436
Newly Manufacture... NO
Lowboy-style Trailer: NO
Load Description: MANUFACTURING PARTS
Estimated Fees
Estimated Total Fees: $40.00
Estimated Restrictions
Must contact all local authorities prior to movement on city streets and county roads.
Travel prohibited during periods when conditions exist, which makes travel unsafe as determined by Troop Commander and/or Director of Size and Weights Permits Divis
All vehicles traveling Oklahoma turnpikes with loads in excess of 10-0 width shall be equipped with a Pikepass and utilize appropriately sized pikepass lanes
Required Documentation
Estimated Workflow
Auto Approval
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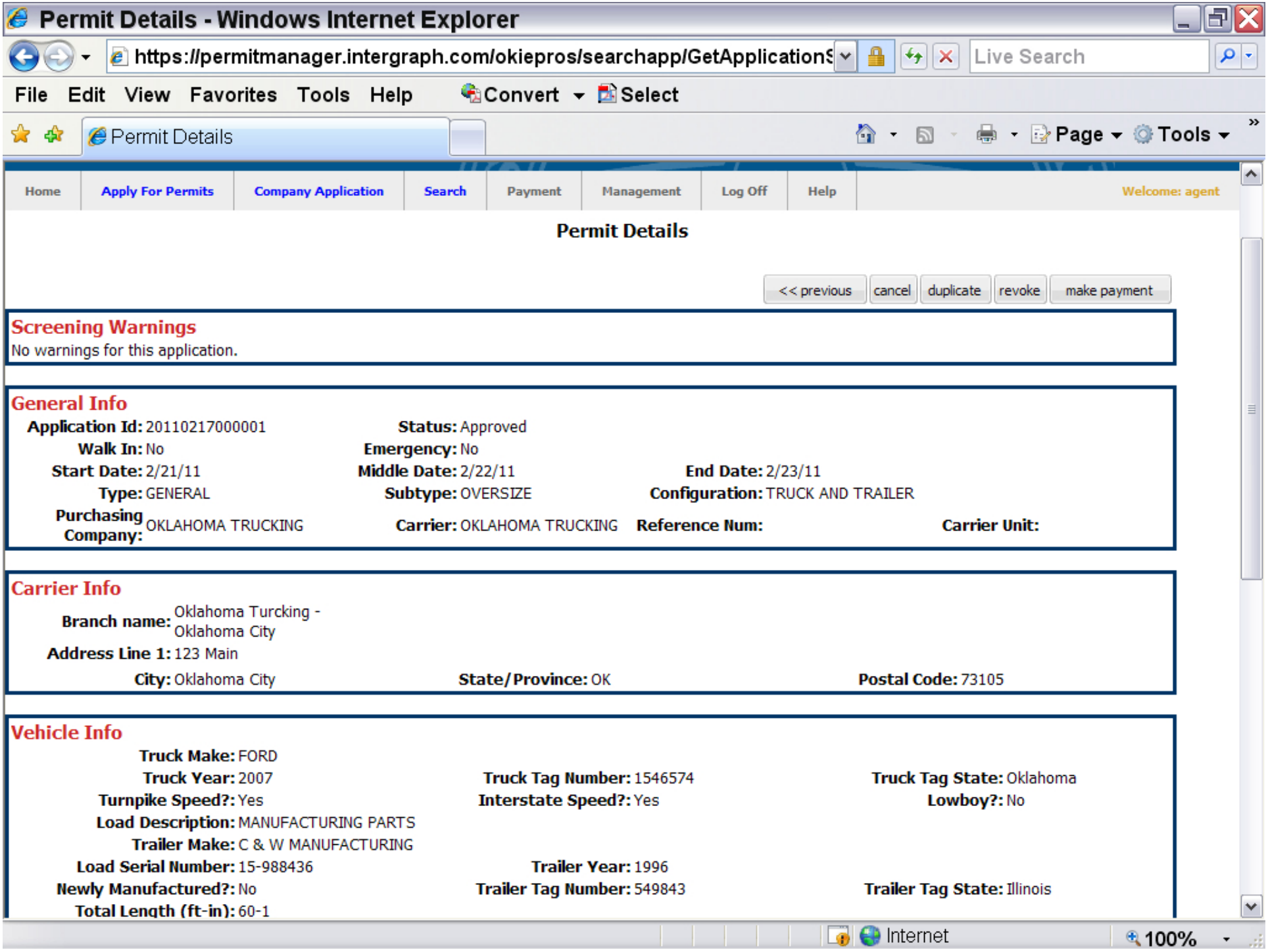
Permit Details - Windows Internet Explorer
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Live Search
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Home
Apply For Permits
Company Application
Search
Payment
Management
Log Off
Help
Welcome: agent
Permit Details
<< previous
cancel
duplicate
revoke
make payment
Screening Warnings
No warnings for this application.
General Info
Application Id: 20110217000001
Status: Approved
Walk In: No
Emergency: No
Start Date: 2/21/11
Middle Date: 2/22/11
End Date: 2/23/11
Type: GENERAL
Subtype: OVERSIZE
Configuration: TRUCK AND TRAILER
Purchasing Company: OKLAHOMA TRUCKING
Carrier: OKLAHOMA TRUCKING
Reference Num:
Carrier Unit:
Carrier Info
Branch name: Oklahoma Turcking - Oklahoma City
Address Line 1: 123 Main
City: Oklahoma City
State/Province: OK
Postal Code: 73105
Vehicle Info
Truck Make: FORD
Truck Year: 2007
Truck Tag Number: 1546574
Truck Tag State: Oklahoma
Turnpike Speed?: Yes
Interstate Speed?: Yes
Lowboy?: No
Load Description: MANUFACTURING PARTS
Trailer Make: C & W MANUFACTURING
Load Serial Number: 15-988436
Trailer Year: 1996
Newly Manufactured?: No
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Trailer Tag State: Illinois
Total Length (ft-in): 60-1
Internet
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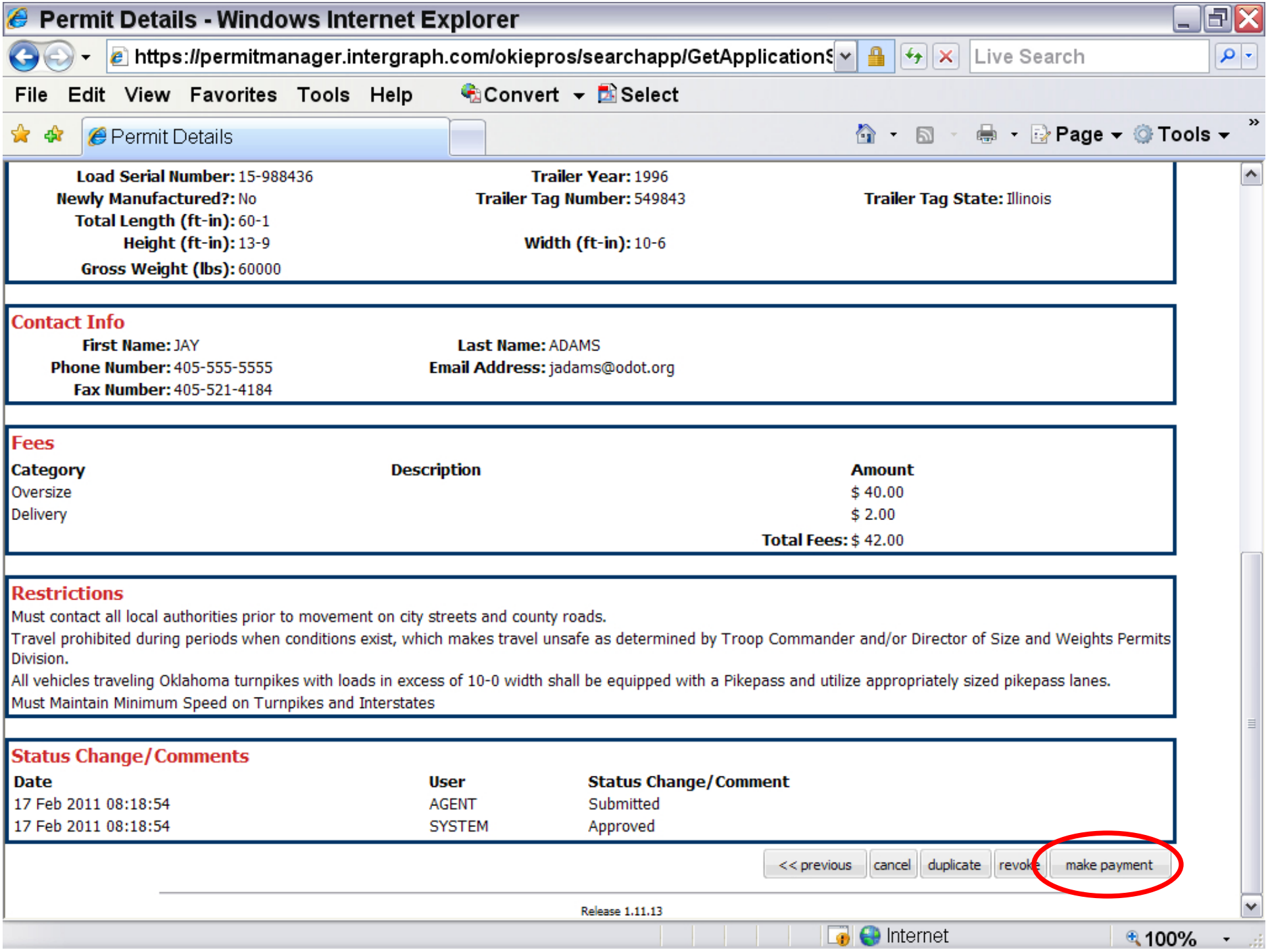
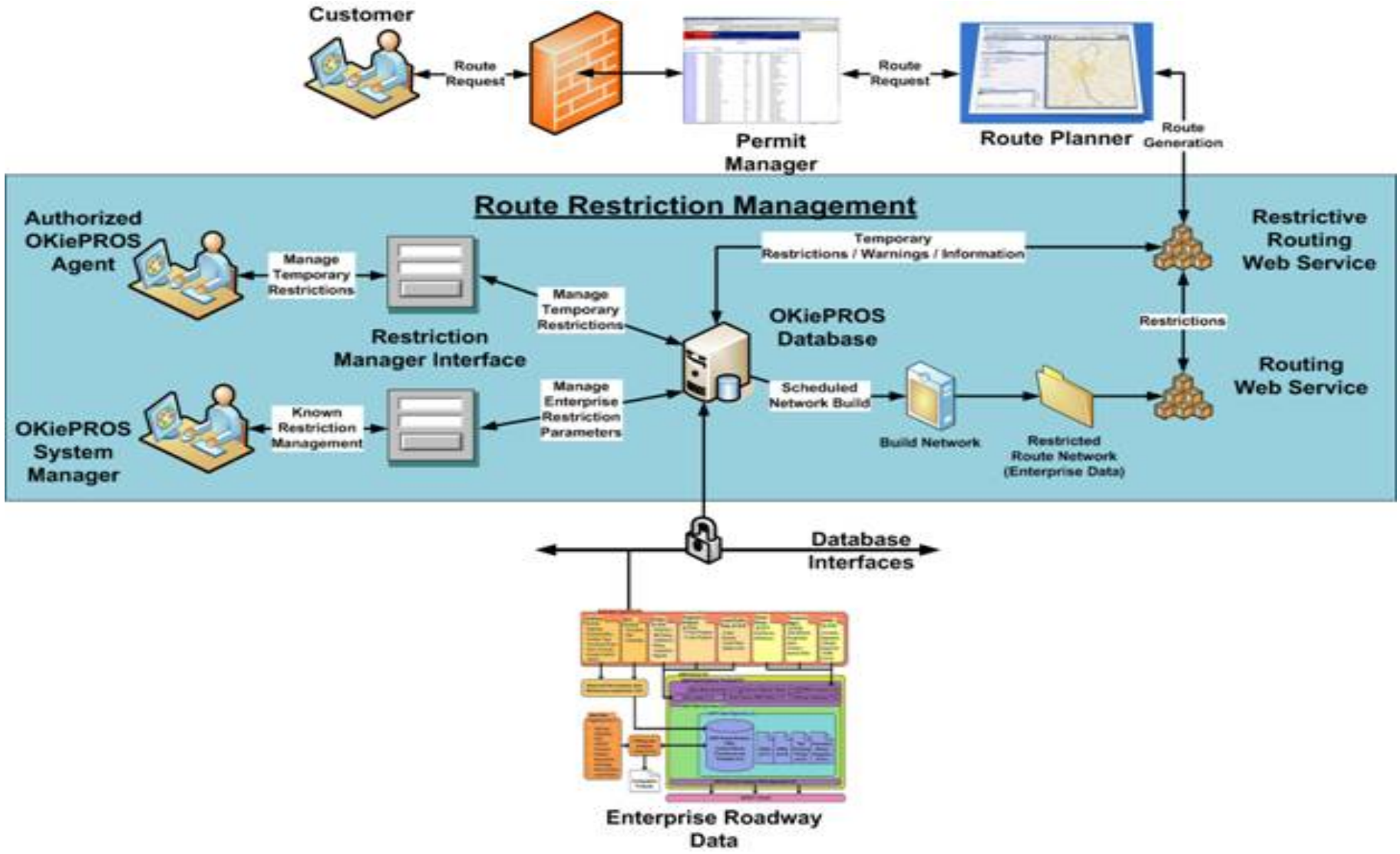
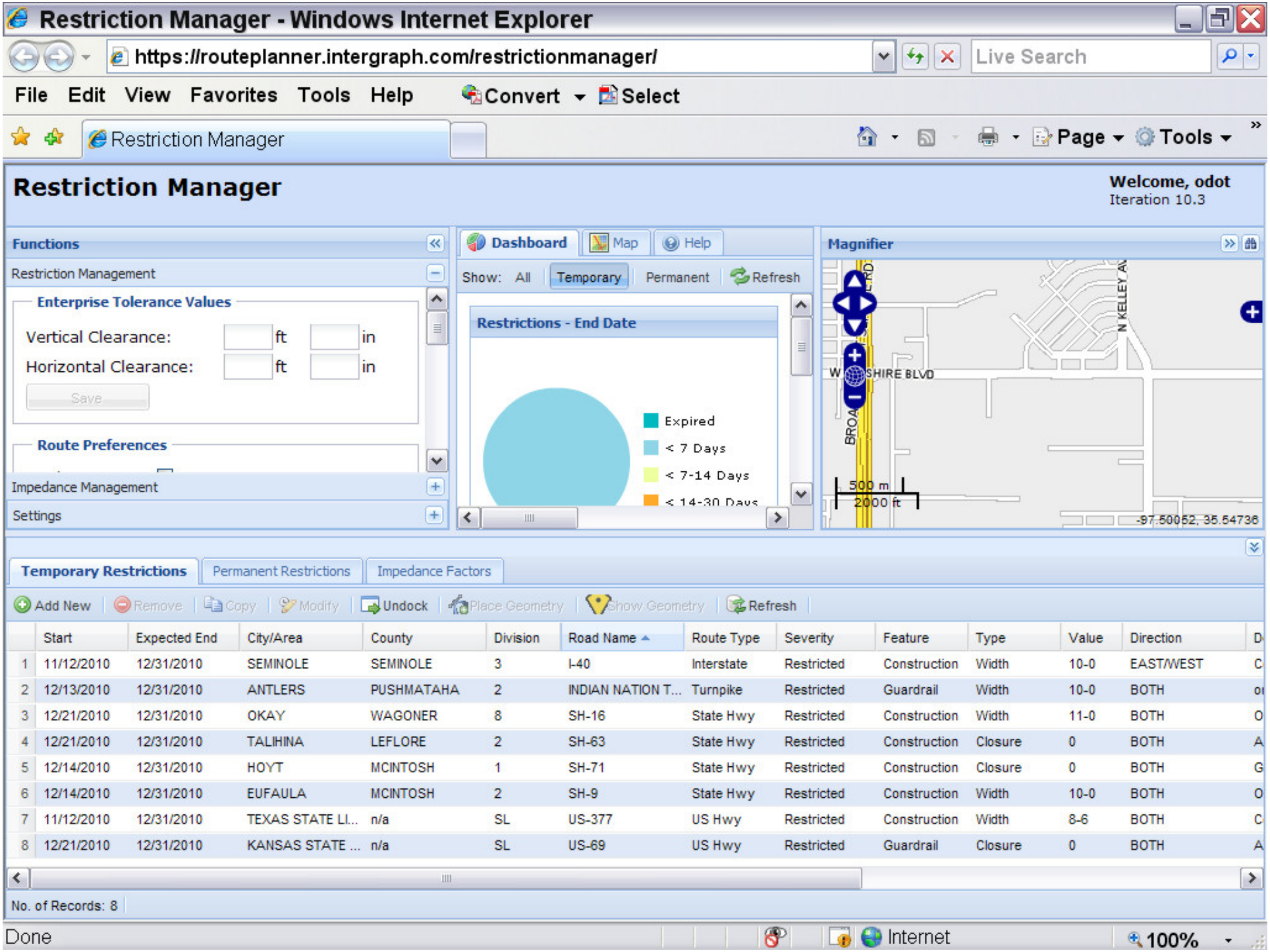
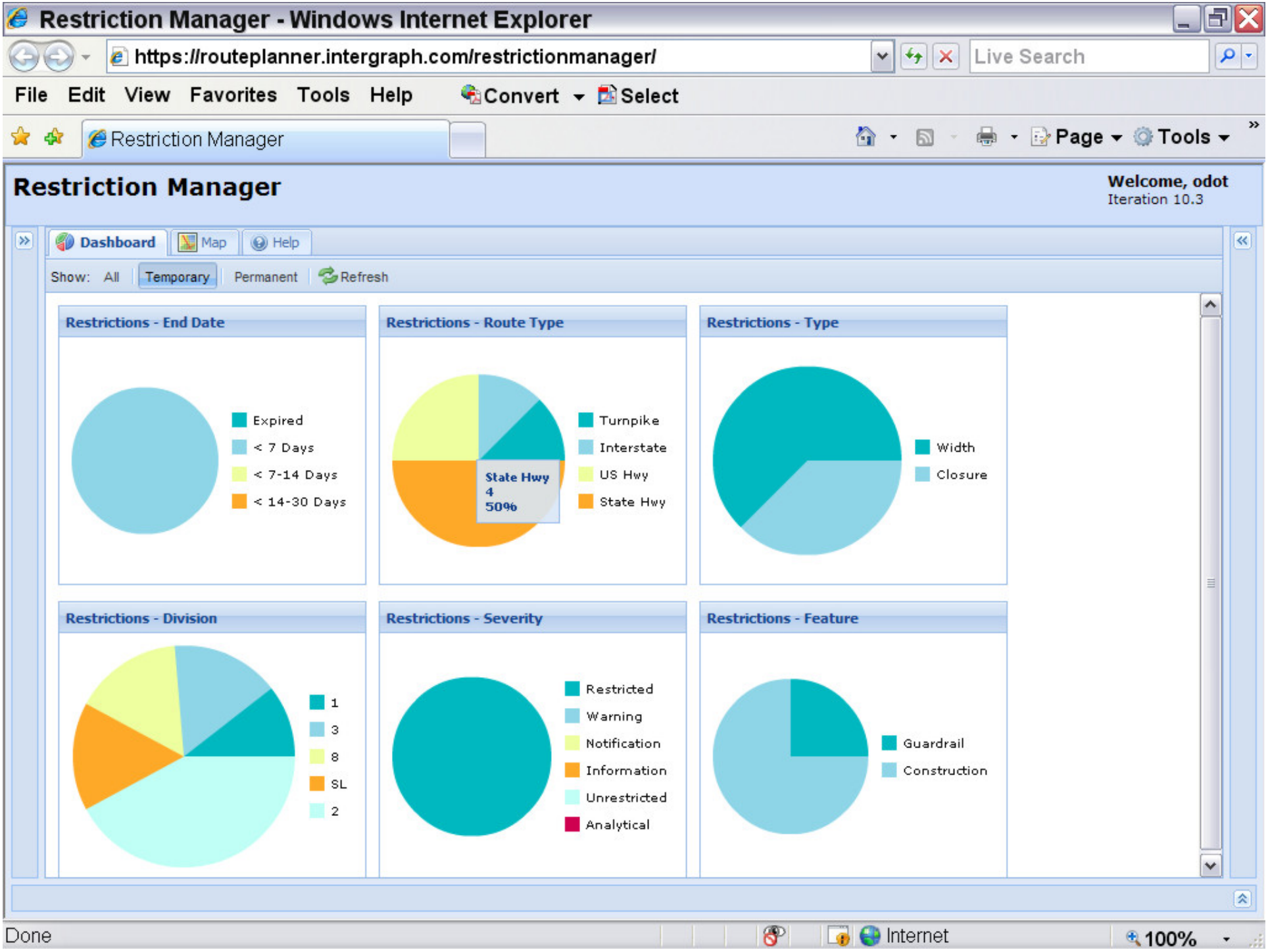

Permit Details - Windows Internet Explorer
https://permitmanager.intergraph.com/okiepros/searchapp/GetApplicationS
Live Search
File Edit View Favorites Tools Help
Convert
Select
Permit Details
Page
Tools
Load Serial Number: 15-988436
Trailer Year: 1996
Newly Manufactured?: No
Trailer Tag Number: 549843
Trailer Tag State: Illinois
Total Length (ft-in): 60-1
Height (ft-in): 13-9
Width (ft-in): 10-6
Gross Weight (lbs): 60000
Contact Info
First Name: JAY
Last Name: ADAMS
Phone Number: 405-555-5555
Email Address: jadams@odot.org
Fax Number: 405-521-4184
Fees
Category
Description
Amount
Oversize
$ 40.00
Delivery
$ 2.00
Total Fees: $ 42.00
Restrictions
Must contact all local authorities prior to movement on city streets and county roads.
Travel prohibited during periods when conditions exist, which makes travel unsafe as determined by Troop Commander and/or Director of Size and Weights Permits Division.
All vehicles traveling Oklahoma turnpikes with loads in excess of 10-0 width shall be equipped with a Pikepass and utilize appropriately sized pikepass lanes.
Must Maintain Minimum Speed on Turnpikes and Interstates
Status Change/Comments
Date
User
Status Change/Comment
17 Feb 2011 08:18:54
AGENT
Submitted
17 Feb 2011 08:18:54
SYSTEM
Approved
<< previous
cancel
duplicate
revoke
make payment
Release 1.11.13
Internet
100%

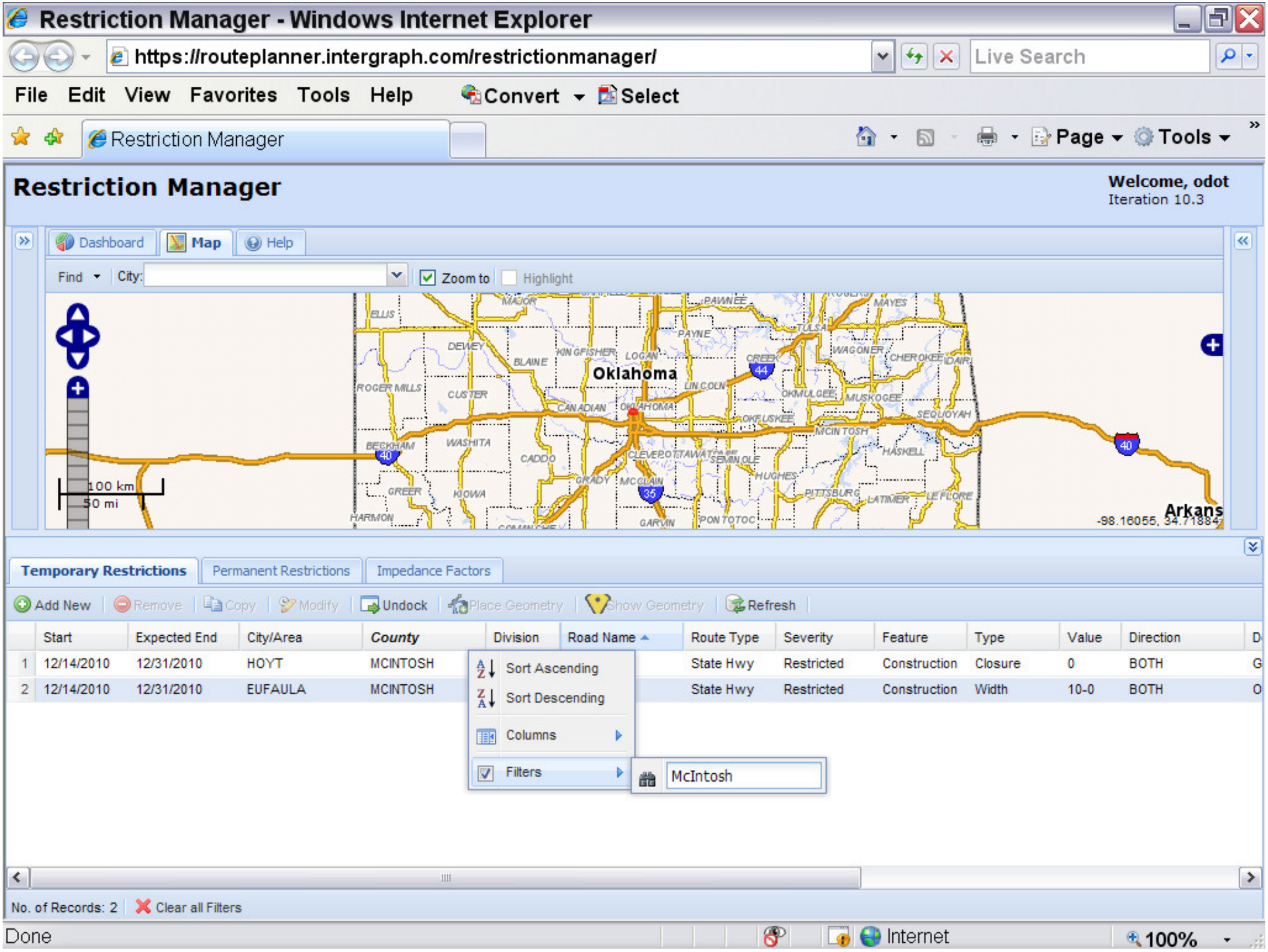
Restriction Manager Workflow





	Start	Expected End	City/Area	County	Division	Road Name	Route Type	Severity	Feature	Type	Value	Direction	D
1	11/12/2010	12/31/2010	SEMINOLE	SEMINOLE	3	I-40	Interstate	Restricted	Construction	Width	10-0	EAST/WEST	C
2	12/13/2010	12/31/2010	ANTLERS	PUSHMATAHA	2	INDIAN NATION T...	Turnpike	Restricted	Guardrail	Width	10-0	BOTH	o
3	12/21/2010	12/31/2010	OKAY	WAGONER	8	SH-16	State Hwy	Restricted	Construction	Width	11-0	BOTH	O
4	12/21/2010	12/31/2010	TALIHINA	LEFLORE	2	SH-63	State Hwy	Restricted	Construction	Closure	0	BOTH	A
5	12/14/2010	12/31/2010	HOYT	MCINTOSH	1	SH-71	State Hwy	Restricted	Construction	Closure	0	BOTH	G
6	12/14/2010	12/31/2010	EUFAULA	MCINTOSH	2	SH-9	State Hwy	Restricted	Construction	Width	10-0	BOTH	O
7	11/12/2010	12/31/2010	TEXAS STATE LI...	n/a	SL	US-377	US Hwy	Restricted	Construction	Width	8-6	BOTH	C
8	12/21/2010	12/31/2010	KANSAS STATE ...	n/a	SL	US-69	US Hwy	Restricted	Guardrail	Closure	0	BOTH	A


Restriction Manager - Windows Internet Explorer
https://routeplanner.intergraph.com/restrictionmanager/
Live Search
File Edit View Favorites Tools Help
Convert
Select
Restriction Manager
Page
Tools
Restriction Manager
Welcome, odot
Iteration 10.3
Dashboard
Map
Help
Show: All
Temporary
Permanent
Refresh
Restrictions - End Date
Expired
< 7 Days
< 7-14 Days
< 14-30 Days
Restrictions - Route Type
State Hwy
4
50%
Turnpike
Interstate
US Hwy
State Hwy
Restrictions - Type
Width
Closure
Restrictions - Division
1
3
8
SL
2
Restrictions - Severity
Restricted
Warning
Notification
Information
Unrestricted
Analytical
Restrictions - Feature
Guardrail
Construction
Done
Internet
100%


Restriction Manager - Windows Internet Explorer
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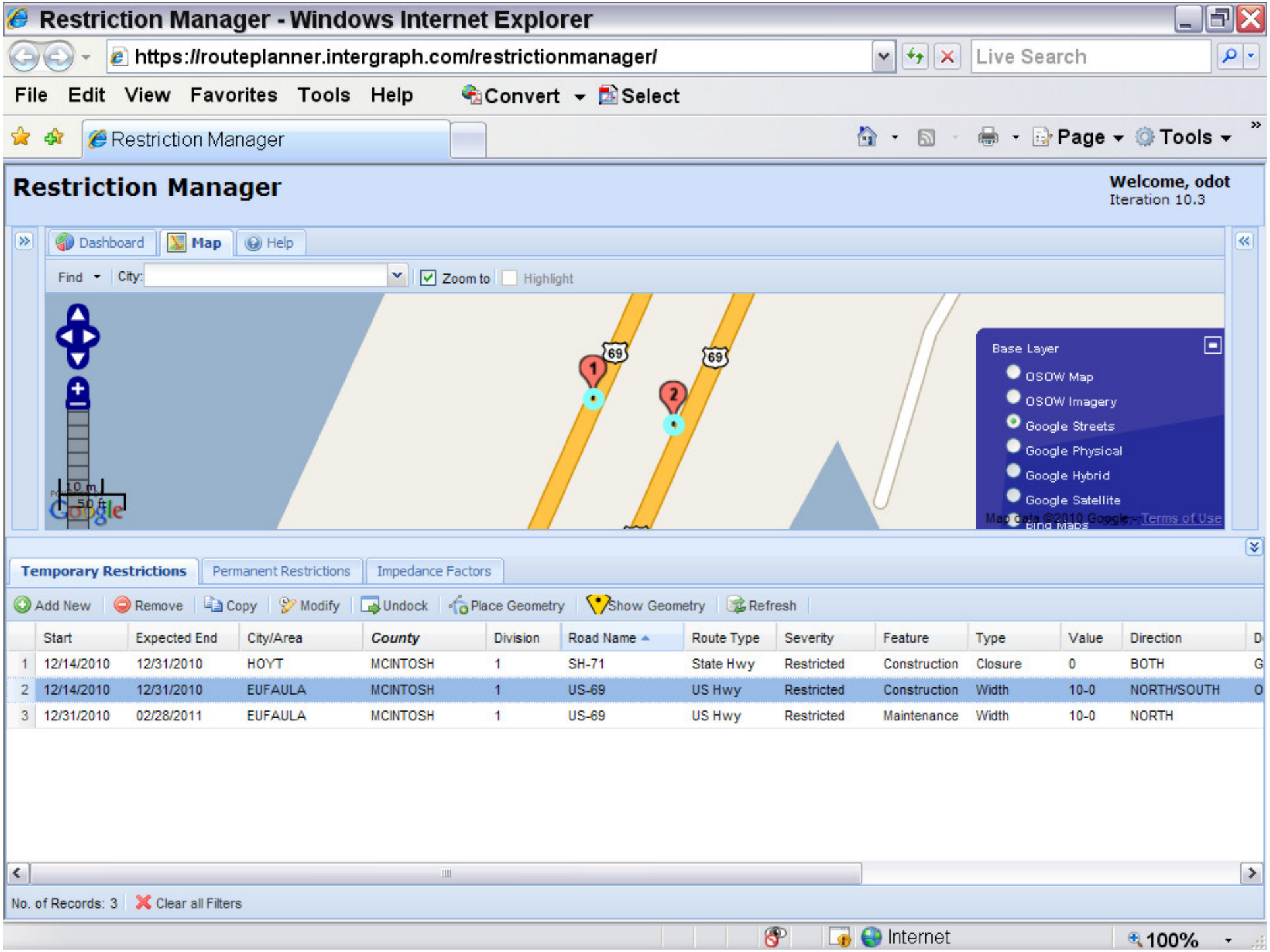
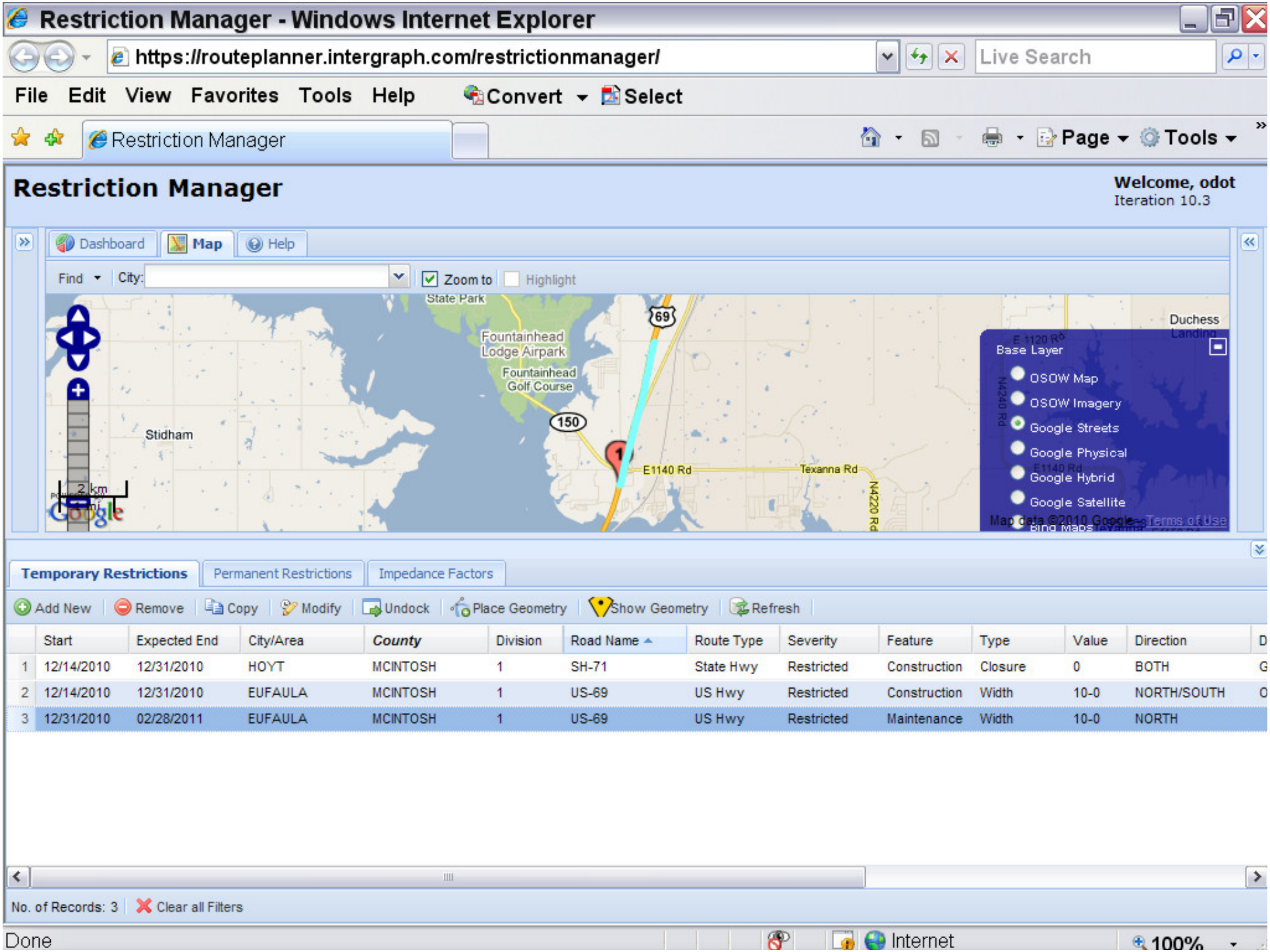
Select
Restriction Manager
Page
Tools
Restriction Manager
Welcome, odot
Iteration 10.3
Dashboard
Map
Help
Find
City:
Zoom to
Highlight
Oklahoma
100 km
50 mi
-98.16055, 34.71884
Temporary Restrictions
Permanent Restrictions
Impedance Factors
Add New
Remove
Copy
Modify
Undock
Place Geometry
Show Geometry
Refresh
Start
Expected End
City/Area
County
Division
Road Name
Route Type
Severity
Feature
Type
Value
Direction
1 12/14/2010 12/31/2010 HOYT MCINTOSH State Hwy Restricted Construction Closure 0 BOTH
2 12/14/2010 12/31/2010 EUFAULA MCINTOSH State Hwy Restricted Construction Width 10-0 BOTH
Sort Ascending
Sort Descending
Columns
Filters
McIntosh
No. of Records: 2
Clear all Filters
Done
Internet
100%

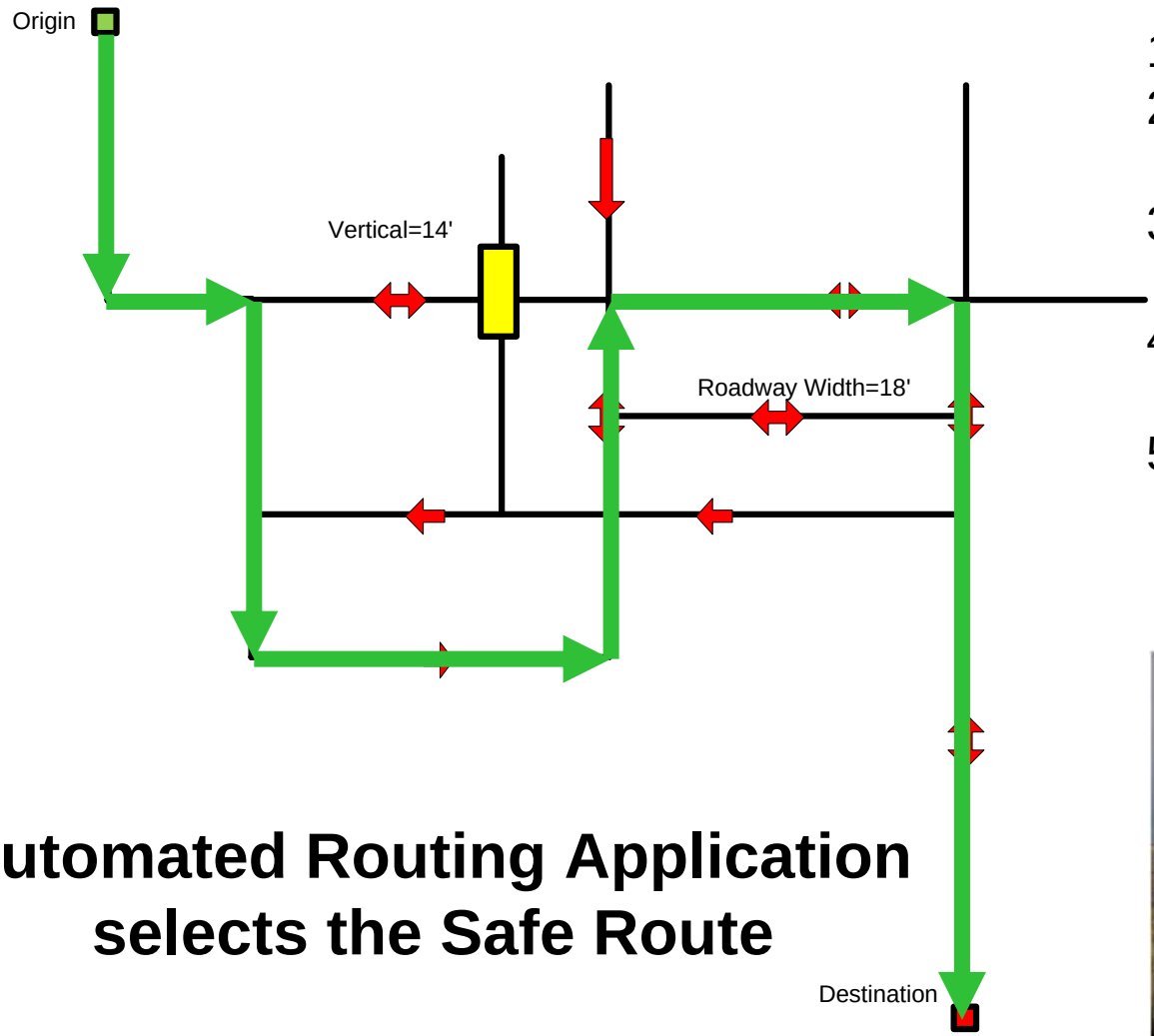


	Start	Expected End	City/Area	County	Division	Road Name	Route Type	Severity	Feature	Type	Value	Direction	D
1	12/14/2010	12/31/2010	HOYT	MCINTOSH	1	SH-71	State Hwy	Restricted	Construction	Closure	0	BOTH	G
2	12/14/2010	12/31/2010	EUFAULA	MCINTOSH	1	US-69	US Hwy	Restricted	Construction	Width	10-0	NORTH/SOUTH	O
3	12/31/2010	02/28/2011	EUFAULA	MCINTOSH	1	US-69	US Hwy	Restricted	Maintenance	Width	10-0	NORTH	



	Start	Expected End	City/Area	County	Division	Road Name	Route Type	Severity	Feature	Type	Value	Direction
1	12/14/2010	12/31/2010	HOYT	MCINTOSH	1	SH-71	State Hwy	Restricted	Construction	Closure	0	BOTH
2	12/14/2010	12/31/2010	EUFAULA	MCINTOSH	1	US-69	US Hwy	Restricted	Construction	Width	10-0	NORTH/SOUTH
3	12/31/2010	02/28/2011	EUFAULA	MCINTOSH	1	US-69	US Hwy	Restricted	Maintenance	Width	10-0	NORTH

Automated Routing



1. Road Network
2. Apply Roadway Restriction
3. Enter Vehicle and Load Information
4. Enter Origin and Destination
5. Submit Route Request

Automated Routing Application selects the Safe Route

Wrap-Up & Questions

- Positional Data Accuracy (Bridge or other features affecting the capacity of the roadway)
  - Ensuring the data is accurately located on the network
- Correct Topology
  - Ensuring the network it navigable
- Road Classifications
  - Ensuring the roads are accurately classified
- Road Names – What is the source?
  - The road name on the network is what will be displayed in the driving directions
  - Conflation routines will use the spatial location and attributes
- Communication among stakeholders is critical