

INDOT Traffic Forecasting Tool

Online R-Based Version

presented to

Southeast Florida Model Users Group

Presented by

Akbar Bakhshi, The Corradino Group

March 15, 2019



TFT Introduction

- **A customized R application to facilitate INDOT's long range traffic forecasting activities at project level**
- **Earlier TFT– developed in 2006.**
- **Existing TFT v3.0 – developed in 2017**
 - GISDK based post-processor
 - TransCAD license required to use the post-processor
 - Input data in native TransCAD format (DBD, BIN)
 - Up to 15 links for analysis at a time
 - Reports & graphs in BIN format

TFT Introduction (Cont.)

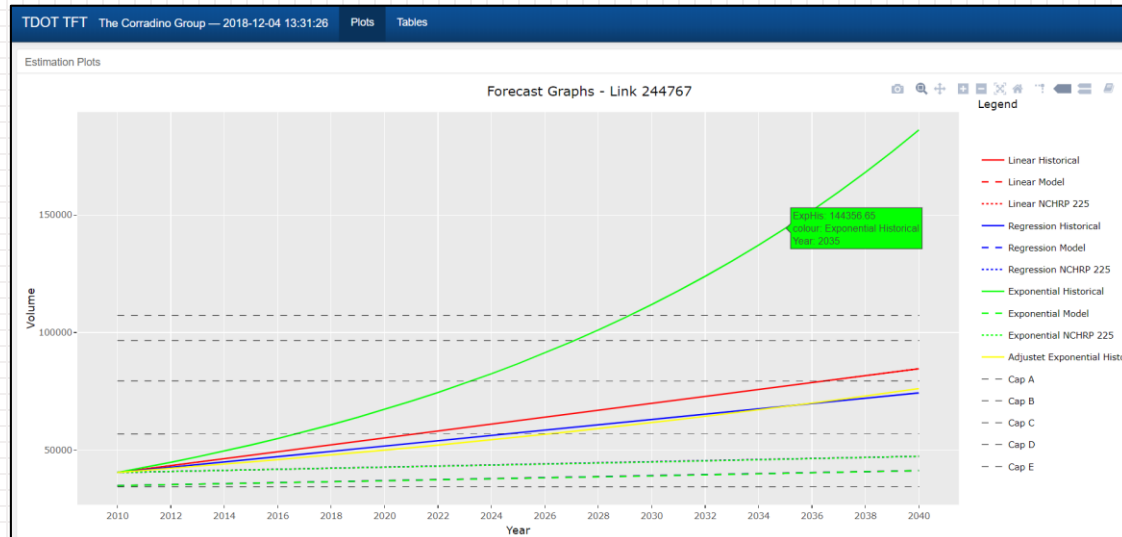
- **TFT v4.0 (for this presentation)** – This is currently a working version and INDOT hasn't made decision regarding the official final version
 - Interactive online tool
 - Easy to access and use by every individual with access to internet
 - Customized base year & future year for analysis
 - Latest traffic counts throughout Indiana
 - Utilization of the latest ISTDM
 - Various traffic forecasting methods
 - Analysis of multiple links at a time (No limit)
 - Enhanced output visualization (powered by R)
- **Minimizes staff requirements, reduces potential method & calculation errors**
- **Evolved version based on tools for Kentucky and Tennessee**

TFT Introduction (Cont.)

Why  ?

- An open-source & emerging programming language for travel demand modeling
- Efficient data management of multiple links at a time
- Powerful graphing capability for better output visualization
- “Live” graphs
- .HTML output files – extremely convenient for info dissemination

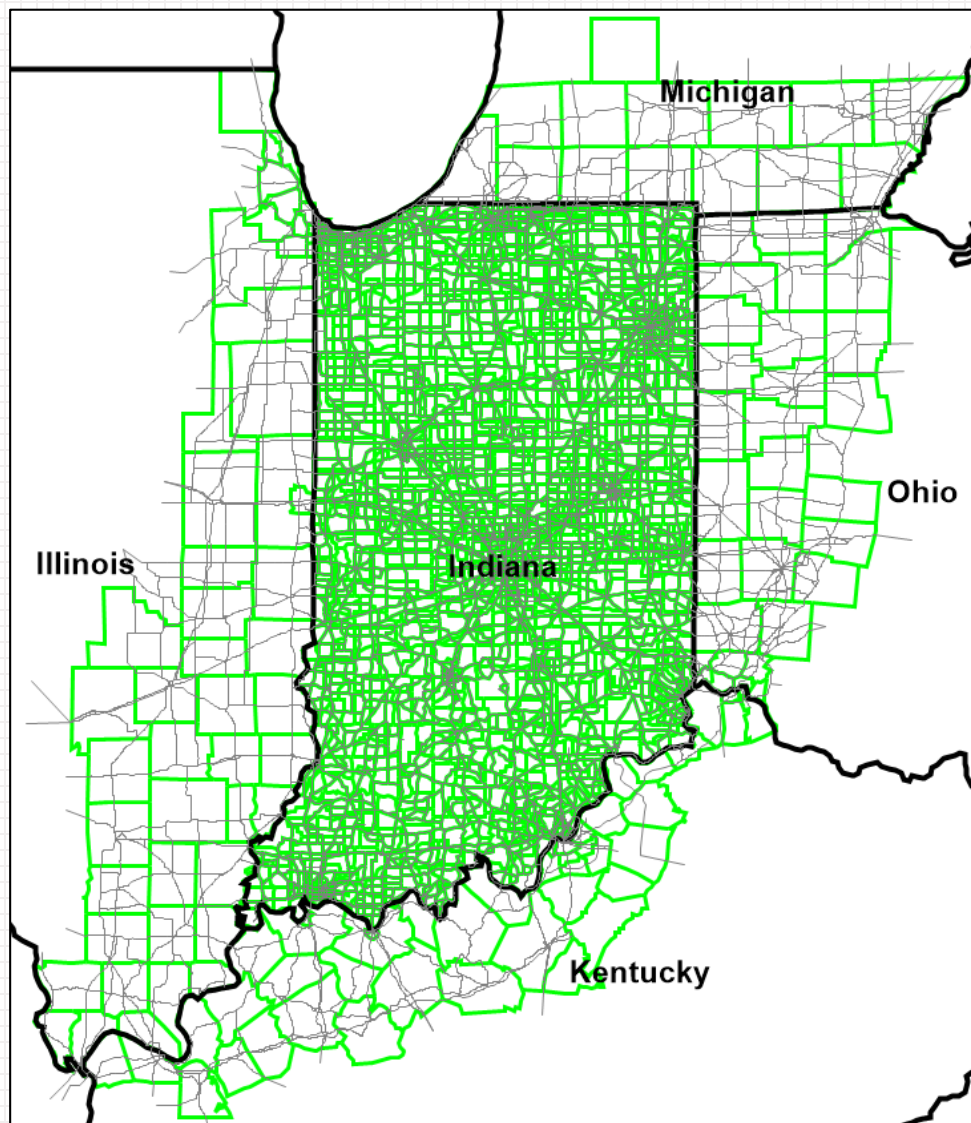
Link Info			Forecast Data							
Show 50 entries			Show 50 entries							
Forecast for Link 244767			Forecast for Link 244767							
	Name	LinkInfo	Year	Lin_History	Lin_TSTM	Lin_NCHRP_255	Break1	Reg_History	Reg_TSTM	Reg_NCHRP_255
1	Link ID	244767	2010	40435	34059	40435		40435	34059	40435
2	Count Station	037000198	2011	41907	35072	40665		41533	35072	40665
3	County	Davidson	2012	43379	35285	40895		42663	35285	40895
4	Route Name	I-40	2013	44851	35497	41125		43793	35497	41125
5	Functional Class	11 - Urban Interstate	2014	46323	35710	41355		44823	35710	41355
6	# of Lanes	4	2015	47795	35923	41584		46053	35923	41584
7	Area Type	Urban	2016	49267	36136	41814		47183	36136	41814
8	AM TOD Factor	0.250074	2017	50739	36349	42044		48313	36349	42044
9	PM TOD Factor	0.297376	2018	52211	36562	42274		49443	36562	42274
10	% Truck	17.077%	2019	53683	36775	42504		50573	36775	42504
11	TSTM Base Year Vol	34059	2020	55155	36988	42734		51703	36988	42734
12	TSTM Future Year Vol	41245	2021	56627	37200	42964		52833	37200	42964
			2022	58099	37413	43194		53963	37413	43194
			2023	59571	37626	43424		55093	37626	43424
			2024	61043	37839	43654		56223	37839	43654
			2025	62515	38052	43883		57353	38052	43883
			2026	63987	38265	44113		58483	38265	44113
			2027	65459	38478	44343		59613	38478	44343



ISTDM 8*

- 4-step model (TransCAD 7)
- Coverage – entire **IN** + partial **IL, KY, MI, OH**
- 4,915 zones & 61,410 links
- Modes
 - auto, freight, LD transit
 - tolling
- Model years 2015 – 2045 with 10-year increment

* This version is currently under development and the specific info provided here might change



Traffic Data

- **INDOT's Traffic Count Database System (TCDS)**
- **Use recent data (2001 – 2015)**
- **Tag INDOT's Traffic Section & count stations GIS layers to ISTDM 8 network**
- **Cover all segments of state owned roads**

Forecasting Fundamentals

■ Traffic Estimation/Forecast Methods

- Linear
- Regression
- Exponential (Annual Growth Factor)
- Adjusted Exponential (Indiana Traffic Growth Profile)
- NCHRP 255 Calibration Procedure: average of difference and growth factor methods.

Used Data

- 2001 – 2015 traffic counts (as many as 15 data points per location)
- ISTDM8 model volume (2 data points per location – base year & future year)

■ Capacity Estimation (by Level of Service)

Linear Model

$$P_t = P_b + s(t - b)$$

Where,

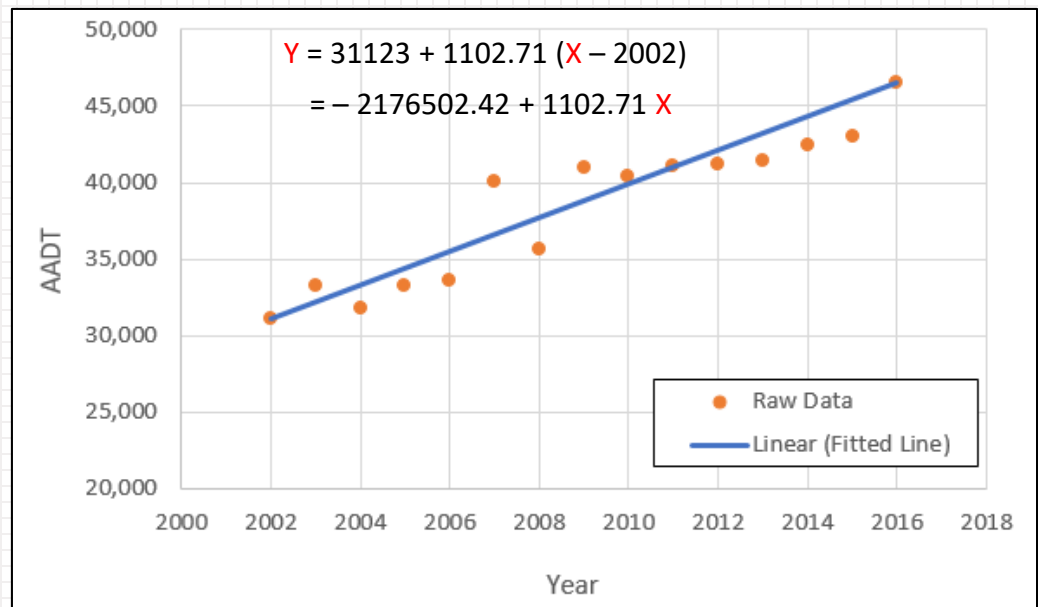
P_b = traffic volume in year b

P_t = traffic volume in year t

s = annual growth increment, which is defined as $s = \frac{P_t - P_b}{t - b}$

Year	AADT
2002	31,123
2003	33,288
2004	31,753
2005	33,231
2006	33,611
2007	40,087
2008	35,688
2009	41,020
2010	40,435
2011	41,041
2012	41,246
2013	41,455
2014	42,447
2015	42,998
2016	46,561

$$s = \frac{46561 - 31123}{2016 - 2002} = 1102.71$$



Regression Model

$$\hat{P}_t = a + b \times t$$

Where,

\hat{P}_t = traffic volume in year t

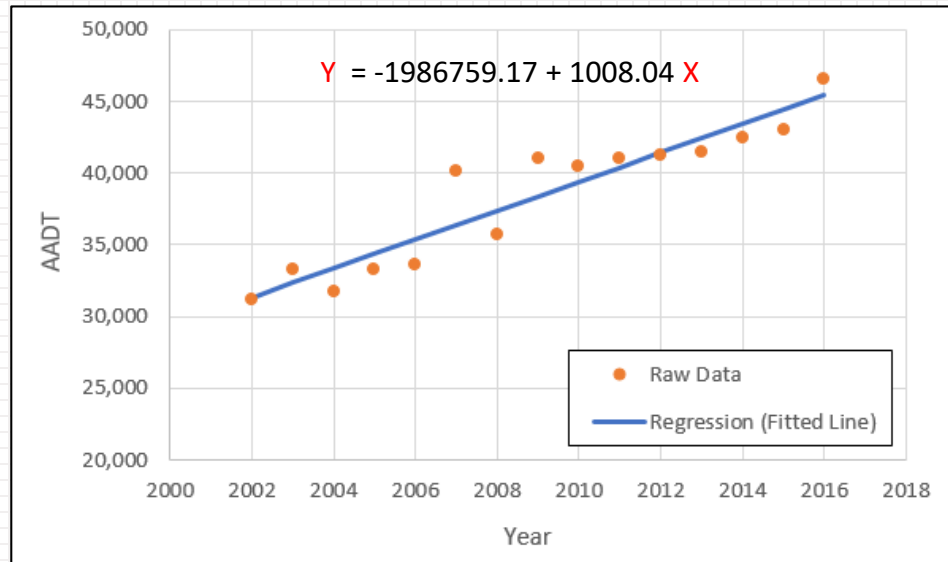
a = intercept

b = slope

Year	AADT
2002	31,123
2003	33,288
2004	31,753
2005	33,231
2006	33,611
2007	40,087
2008	35,688
2009	41,020
2010	40,435
2011	41,041
2012	41,246
2013	41,455
2014	42,447
2015	42,998
2016	46,561

$$a = -1986759.17$$

$$b = 1008.04$$



Exponential Model

$$P_t = P_b \times (1 + r)^{t-b}$$

Where,

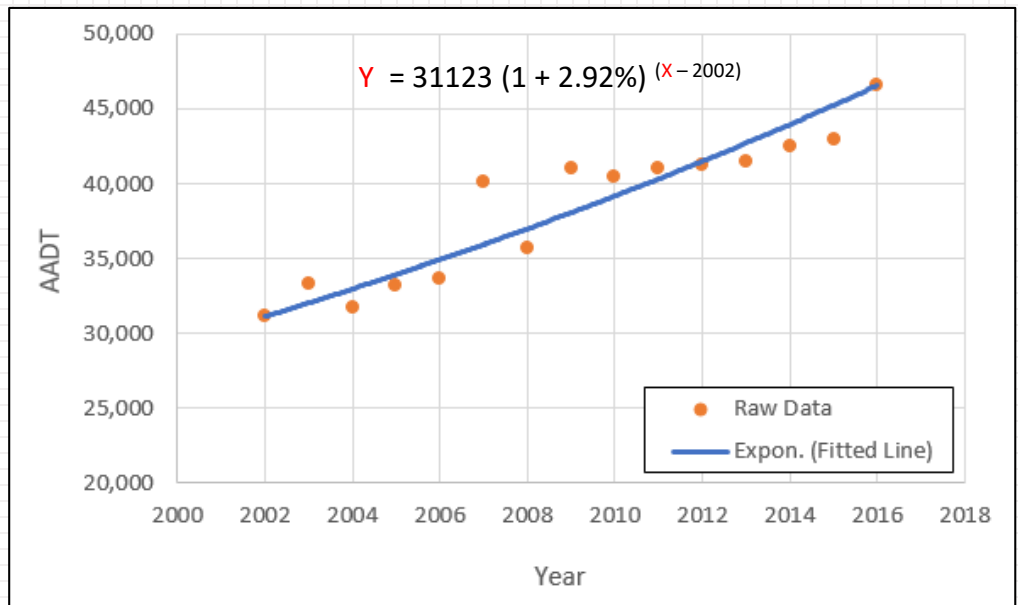
P_b = traffic volume in year b

P_t = traffic volume in year t

r = annual growth rate, which is defined as $r = \left(\frac{P_t}{P_b}\right)^{\frac{1}{t-b}} - 1$

$$r = \left(\frac{46561}{31123}\right)^{\frac{1}{2016-2002}} - 1 = 2.92\%$$

Year	AADT
2002	31,123
2003	33,288
2004	31,753
2005	33,231
2006	33,611
2007	40,087
2008	35,688
2009	41,020
2010	40,435
2011	41,041
2012	41,246
2013	41,455
2014	42,447
2015	42,998
2016	46,561



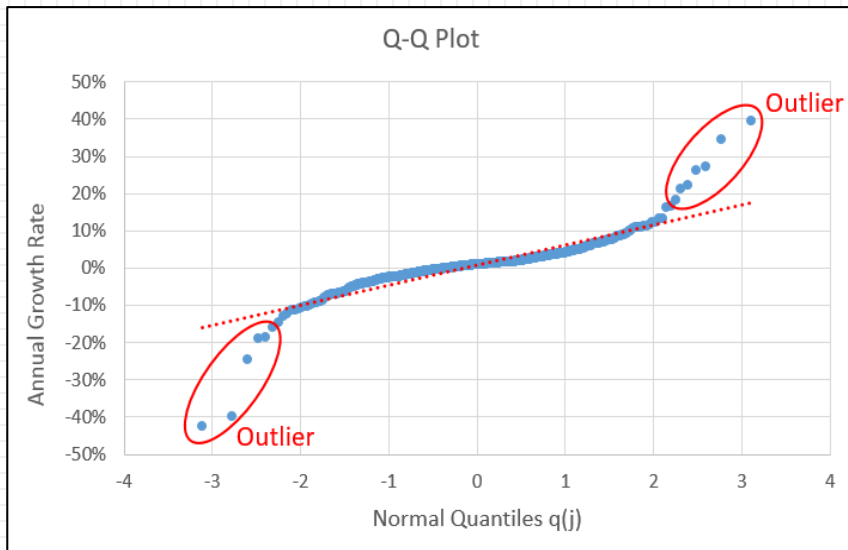
Indiana Traffic Growth Profile

- **Sometimes, it's necessary to adjust abnormal annual growth rate for long range traffic forecasting, due to raw data deficiency**
 - **Insufficient historical counts**
 - **Significant short-term variations caused by transient local event (e.g., land use development, new roadway projects)**

Indiana Traffic Growth Profile

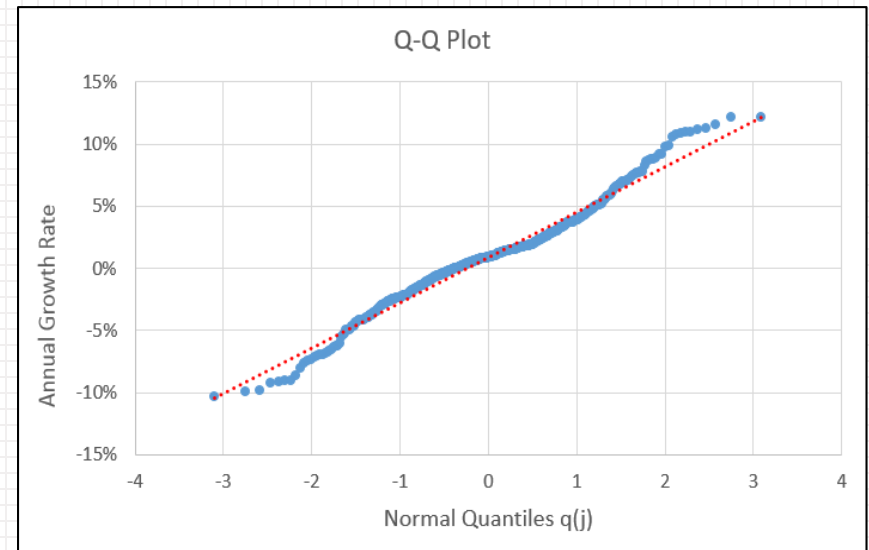
- Use Q-Q plot to filter outliers (normally distributed data should follow a straight line with correlation coef. = 1.0).
- Find & delete the outliers from the analysis (Excel-based).

Example: Rural Interstate (raw data)



correlation coef. = 0.89

Example: Rural Interstate (cleaned data)



correlation coef. = 0.99

Indiana Traffic Growth Profile (cont.)

**Cleaned
Data**

Functional Classification	Rural			Urban		
	99% CI - Lower	Mean	99% CI - Upper	99% CI - Lower	Mean	99% CI - Upper
1 - Interstate	0.46%	0.88%	1.31%	1.04%	1.28%	1.52%
2 - Other Freeway or Expressway	0.88%	1.89%	2.90%	0.59%	1.13%	1.67%
3 - Other Principal Arterial	0.07%	0.26%	0.46%	-0.02%	0.13%	0.29%
4 - Minor Arterial	-0.08%	0.08%	0.25%	0.45%	0.57%	0.70%
5 - Major Collector	-0.06%	0.02%	0.10%	0.07%	0.33%	0.60%
6 - Minor Collector	-1.61%	-0.61%	0.39%	0.57%	0.84%	1.11%
7 - Local	-1.39%	-0.56%	0.26%	1.01%	1.44%	1.87%

Indiana Traffic Growth Profile (cont.)

Cleaned Data

Functional Classification	Rural			Urban		
	99% CI - Lower	Mean	99% CI - Upper	99% CI - Lower	Mean	99% CI - Upper
1 - Interstate	0.46%	0.88%	1.31%	1.04%	1.28%	1.52%
2 - Other Freeway or Expressway	0.88%	1.89%	2.90%	0.59%	1.13%	1.67%
3 - Other Principal Arterial	0.07%	0.26%	0.46%	-0.02%	0.13%	0.29%
4 - Minor Arterial	-0.08%	0.08%	0.25%	0.45%	0.57%	0.70%
5 - Major Collector	-0.06%	0.02%	0.10%	0.07%	0.33%	0.60%
6 - Minor Collector	-1.61%	-0.61%	0.39%	0.57%	0.84%	1.11%
7 - Local	-1.39%	-0.56%	0.26%	1.01%	1.44%	1.87%

VS.

Raw Data

Functional Classification	Rural			Urban		
	Min	Mean	Max	Min	Mean	Max
1 - Interstate	-42.53%	0.83%	39.31%	-34.31%	1.21%	33.52%
2 - Other Freeway or Expressway	-10.65%	1.89%	14.98%	-46.94%	0.54%	41.54%
3 - Other Principal Arterial	-26.08%	-0.22%	23.11%	-65.92%	-0.06%	57.37%
4 - Minor Arterial	-64.81%	0.00%	33.51%	-65.32%	0.33%	46.55%
5 - Major Collector	-58.93%	-0.50%	62.66%	-79.46%	0.35%	112.86%
6 - Minor Collector	-32.24%	-0.46%	68.87%	-46.31%	-1.29%	17.75%
7 - Local	-56.53%	-1.26%	45.97%	-52.38%	-0.07%	10.66%

Indiana Traffic Growth Profile (cont.)

Cleaned
Data

Functional Classification	Rural			Urban		
	99% CI - Lower	Mean	99% CI - Upper	99% CI - Lower	Mean	99% CI - Upper
1 - Interstate	0.46%	0.88%	1.31%	1.04%	1.28%	1.52%
2 - Other Freeway or Expressway	0.88%	1.89%	2.90%	0.59%	1.13%	1.67%
3 - Other Principal Arterial	0.07%	0.26%	0.46%	-0.02%	0.13%	0.29%
4 - Minor Arterial	-0.08%	0.08%	0.25%	0.45%	0.57%	0.70%
5 - Major Collector	-0.06%	0.02%	0.10%	0.07%	0.33%	0.60%
6 - Minor Collector	-1.61%	-0.61%	0.39%	0.57%	0.84%	1.11%
7 - Local	-1.39%	-0.56%	0.26%	1.01%	1.44%	1.87%

$$GF_{adj} = \begin{cases} CI_{99\%,l}, & \text{if } GF < CI_{99\%,l} \\ GF, & \text{if } CI_{99\%,l} \leq GF \leq CI_{99\%,u} \\ CI_{99\%,u}, & \text{if } GF > CI_{99\%,u} \end{cases}$$

NCHRP 255 Adjustment Procedure

- **Ratio adjustment** $A_{ratio} = \frac{COUNT}{A_b} \times A_f$
- **Difference adjustment** $A_{difference} = (COUNT - A_b) + A_f$
- **Final adjustment** $RA_f = \frac{A_{ratio} + A_{difference}}{2}$

where:

$COUNT$ = base year traffic count

A_b = base year model volume

A_f = future year model volume

A_{ratio} = future year volume based on ratio adjustment

$A_{difference}$ = future year volume based on difference adjustment

RA_f = final adjusted future year volume

Capacity Estimation (by LOS)

■ LOS E Capacity:

- ISTDM8 daily capacity estimates

■ LOS A-D Capacity

- LOS E Capacity × reduction factor
- Reduction factor: Highway Capacity Manual (HCM) Level of Service criteria by facility type & speed
- Widely used by Indiana Department of Transportation (INDOT)

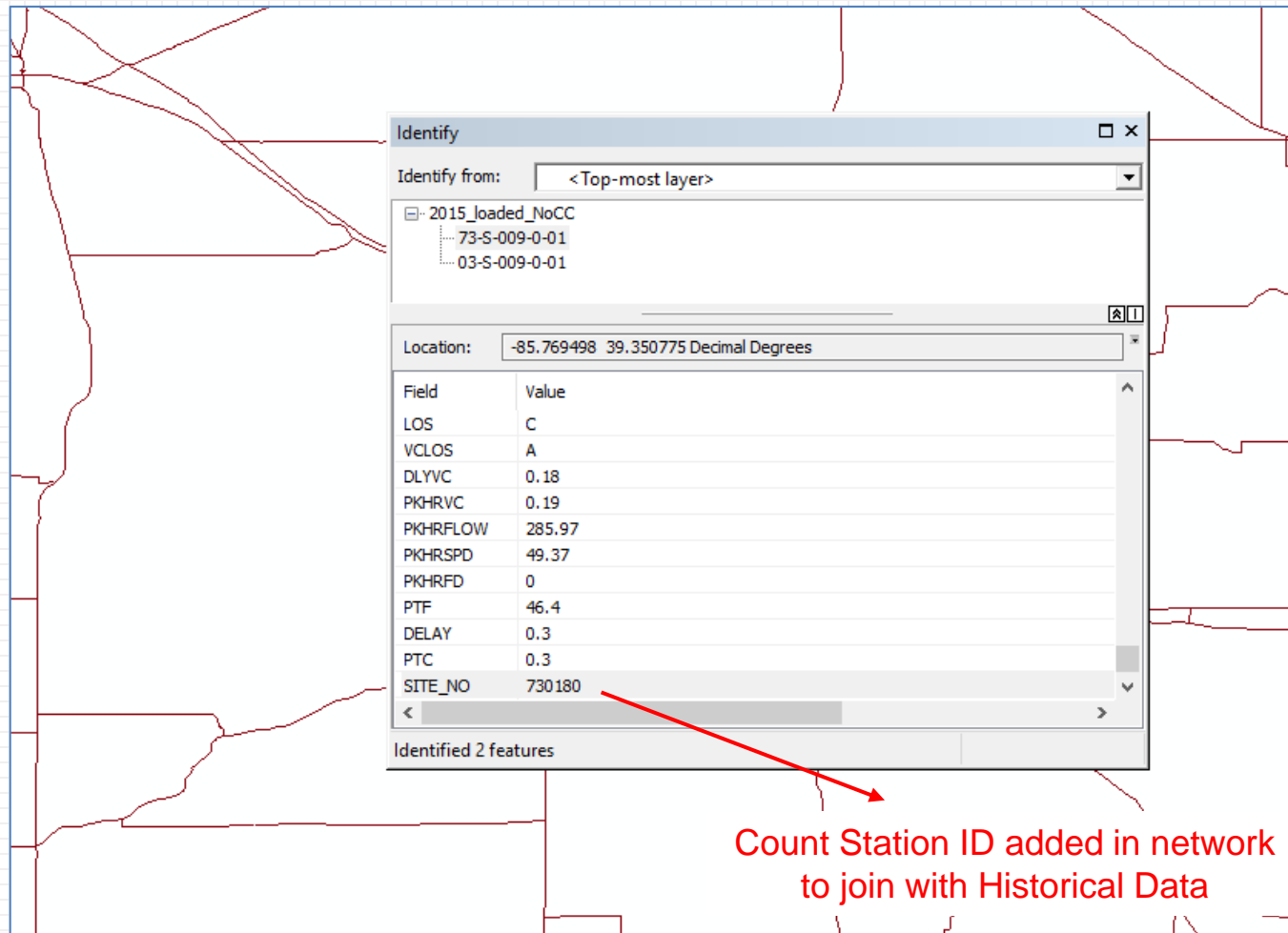
```
if joins.S_FClass = 1 or joins.S_FClass = 11 then do // factype = "freeway"
  joins.DCAP_E = joins.S_AB_DailyCap + joins.S_BA_DailyCap
  linkspd = (joins.AB_FFS + joins.BA_FFS)/2
  LANES = (joins.AB_LANES + joins.BA_LANES)
  if linkspd >= 70 then do
    joins.DCAP_A = joins.DCAP_E * 0.32
    joins.DCAP_B = joins.DCAP_E * 0.53
    joins.DCAP_C = joins.DCAP_E * 0.74
    joins.DCAP_D = joins.DCAP_E * 0.90
  end
  if linkspd >= 65 and linkspd < 70 then do
    joins.DCAP_A = joins.DCAP_E * 0.30
    joins.DCAP_B = joins.DCAP_E * 0.50
    joins.DCAP_C = joins.DCAP_E * 0.71
    joins.DCAP_D = joins.DCAP_E * 0.89
  end
  if linkspd >= 60 and linkspd < 65 then do
    joins.DCAP_A = joins.DCAP_E * 0.29
    joins.DCAP_B = joins.DCAP_E * 0.47
    joins.DCAP_C = joins.DCAP_E * 0.68
    joins.DCAP_D = joins.DCAP_E * 0.88
  end
  if linkspd < 60 then do
    joins.DCAP_A = joins.DCAP_E * 0.27
    joins.DCAP_B = joins.DCAP_E * 0.44
    joins.DCAP_C = joins.DCAP_E * 0.64
    joins.DCAP_D = joins.DCAP_E * 0.85
  end
end
end
```

Data

- **All the required data is deployed to the hosting server along with the R scripts and related files**
- **The files are not visible to the users**
- **Any changes needed should be made by the admin and then redeployed to the hosting server**

Data (cont.)

- ISTDM8 Loaded Network (Base Years) – shapefiles



Data (cont.)

- Historical Data – CSV file

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Location_ID	2001_ADT	2002_ADT	2003_ADT	2004_ADT	2005_ADT	2006_ADT	2007_ADT	2008_ADT	2009_ADT	2010_ADT	2011_ADT	2012_ADT	2013_ADT	2014_ADT	2015_ADT	AREATYPE_MS2	FC	K-factor	Base_Trk_Pct	
1262	60700	0	0	0	0	0	0	0	0	0	3906	3922	3922	4031	4071	4095	1	5	0.10295	0.078877	
1262	459302	0	0	0	0	0	0	0	0	3495	0	0	4009	3961	4048	4095	2	3	0.12503	0.065934	
1262	880160	0	0	0	0	0	0	0	0	3711	0	0	3841	3964	4019	4095	1	4		0.160195	
1262	971683	0	0	0	0	0	0	0	0	0	0	3091	3119	3082	3919	4095	2	1	0.09875	0.021001	
1262	R76W106	0	0	0	0	0	0	0	0	0	0	0	0	0	4007	4095	2	5	0.11979	0.081319	
1262	270940	0	0	0	0	0	0	0	0	0	0	4453	4449	4387	4008	4096	2	4	0.106287		
1262	370072	5040	0	0	0	0	0	0	0	0	0	4413	4444	4586	4650	4096	1	3	0.096436	0.352783	
1262	660074	0	0	0	0	0	0	0	0	0	0	5302	5339	5510	4020	4096	1	4	0.086567	0.139404	
1263	290822	0	0	0	0	0	0	0	0	4377	0	0	4025	3969	4009	4097	2	4		0.025384	
1263	250123	0	4460	0	0	0	0	0	0	0	0	4021	4017	3961	4011	4099	2	3	0.087759	0.131983	
1263	740833	5530	0	0	0	0	0	0	0	0	4704	4723	4723	4756	4075	4099	1	5	0.104295	0.05416	
1263	82W092	0	0	0	0	0	0	0	0	0	0	0	0	0	4012	4100	2	5	0.117398		
1263	10180	0	0	0	0	0	0	0	0	0	4023	4027	4055	3969	4025	4101	1	3	0.088435	0.290417	
1263	620100	0	4150	0	0	0	0	0	0	0	0	3820	3847	3970	4026	4102	1	3		0.153096	
1263	978424	0	0	0	0	0	0	0	0	0	0	0	3683	3639	3925	4102	2	1	0.092484	0.013164	
1263	49W683	0	0	0	0	0	0	0	0	0	0	0	0	3842	3927	4104	2	2	0.11999		
1263	640454	0	0	0	0	0	0	0	0	3464	0	0	3299	3253	3286	4104	2	3	0.100634	0.038012	
1263	920310	0	4140	0	0	0	0	0	0	0	4028	4032	4060	3971	4027	4104	1	4	0.105263	0.116959	
1264	R43162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4104	2	4	0.09576	0.072612	
1264	130263	0	4340	0	0	0	0	4040	0	3771	0	0	4013	4041	4081	4105	1	5		0.224361	
1264	U20137	0	0	0	0	0	0	0	0	0	0	0	0	0	4017	4105	4	4	0.106298	0.056516	
1264	10W314	0	0	0	0	0	0	0	0	0	0	0	0	3979	4019	4107	2	4	0.103544	0.051863	
1264	18W254	0	0	0	0	0	0	0	0	0	0	0	0	3979	4019	4107	2	4	0.105052	0.03774	
1264	975124	0	0	0	0	0	0	0	0	4410	0	0	4708	4652	4754	4107	2	1	0.087899	0.27441	
1264	50122	0	0	0	0	0	0	0	0	0	3494	3557	3553	3980	4020	4108	2	4	0.089198	0.061831	
1264	35W148	0	0	0	0	0	0	0	0	0	0	0	0	3980	4020	4108	2	4	0.094221	0.417965	
1264	45W317	0	0	0	0	0	0	0	0	0	0	0	4039	3982	4022	4110	2	4		0.06618	
1264	640233	0	0	3370	0	0	0	0	0	3126	0	0	3537	3487	3522	4110	2	4	0.118735	0.059854	
HistoricalData																					

Count
Station
ID

■ AADT counts for the most recent 15 years (2001, 2002 ... 2015)

Area Type
and
Functional
Classification

K- Factor

Truck
Percentage

Data (cont.)

- Future year total volumes by link ID – CSV file

A	B
ID	Tot_Flow
28574	16101.43
28580	2035.799
28586	2035.799
28644	16101.43
28738	4085.333
29380	16101.43
29405	9425.651
29437	13975.56
29526	2035.799
29541	11939.76
29547	11701.58
29564	2732.19
29583	2732.19
29606	9425.651
29631	2732.19
29732	10009.78

Network Link ID

Total Volume

Online TFT Application Tabs

“Quick Guide” Tab

- Brief step-by-step instructions on how to use the online tool (There will be detailed documentation on all the steps and analysis of the outputs)

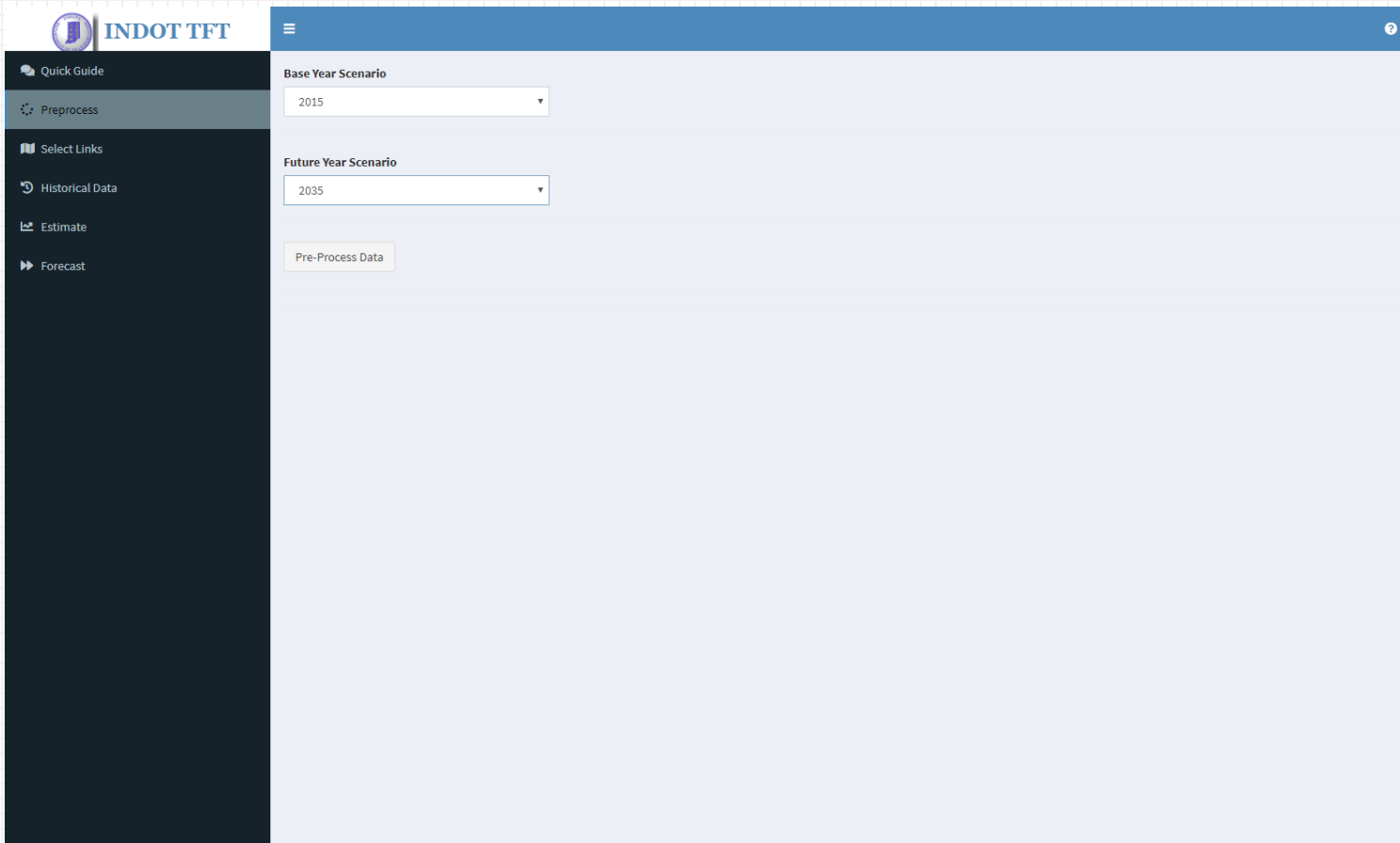
The screenshot displays the INDOT TFT Quick Guide interface. On the left is a dark sidebar with the INDOT TFT logo and a list of navigation options: Quick Guide, Preprocess, Select Links, Historical Data, Estimate, and Forecast. The main content area has a light blue header with a menu icon and a help icon. Below the header is a vertical timeline with five steps, each represented by a green circle with an icon and a title. The steps are: 1. Preprocess Data (hourglass icon), 2. Select Links (map icon), 3. Historical Data (circular arrow icon), 4. Estimate (bar chart icon), and 5. Forecast (play button icon). Each step has a corresponding instruction box with a title, a list of steps (a, b), and a duration indicator (clock icon with a number). The instructions are as follows:

- Preprocess Data** (1):
 - a. Select the desired base and future year. At this point please only select **2015** for base year and **2035** for future year for the demo purposes.
 - b. Click the **Pre-Process Data** button and wait for a message stating the completion of the process.
- Select Links** (2):
 - It may take up to a minute or two for the map to load! Do not switch among tabs before the map is loaded.*
 - a. Select the County where the desired roadway exists.
 - b. Zoom in and pan around to find the exact link of interest (only Green links have available counts).
 - c. Click on the desired Green links in the map to select them. You should see a list of the selected link IDs appear below the map. click again on the same link to remove it from the selected links list.
 - d. Once you are done selecting Desired links you can move to the next tab. Note that you can come back to this tab at any time to select more links.
- Historical Data** (3):
 - a. Select a link ID and click the button below it. A table will be displayed below the button with available Historical count data for the link.
 - b. Change the link ID from the dropdown window and click the button again to update the table with the info for the new selected link.
- Estimate** (4):
 - a. Select a link ID and click the button below it. A table and a graph will be displayed below the button with Estimation data for the link (it may take a few seconds for the data to appear).
 - b. Change the link ID from the dropdown window and click the button again to update the table and graph with the info for the new selected link.
- Forecast** (5):
 - a. Select a link ID and click the button below it. A table and a graph will be displayed below the button with Forecast data for the link (it may take a few seconds for the data to appear).
 - b. Change the link ID from the dropdown window and click the button again to update the table and graph with the info for the new selected link.

“Preprocess” Tab

Select desired base and future year scenarios

- Note that additional scenarios can only be added by the admin



The screenshot displays the 'Preprocess' tab within the INDOT TFT application. The interface features a dark blue sidebar on the left with navigation links: 'Quick Guide', 'Preprocess' (highlighted), 'Select Links', 'Historical Data', 'Estimate', and 'Forecast'. The main content area has a light blue header with a hamburger menu icon and a help icon. Below the header, the 'Base Year Scenario' is set to '2015' and the 'Future Year Scenario' is set to '2035'. A 'Pre-Process Data' button is located at the bottom of the main content area.

INDOT TFT

Quick Guide

Preprocess

Select Links

Historical Data

Estimate

Forecast

Base Year Scenario

2015

Future Year Scenario

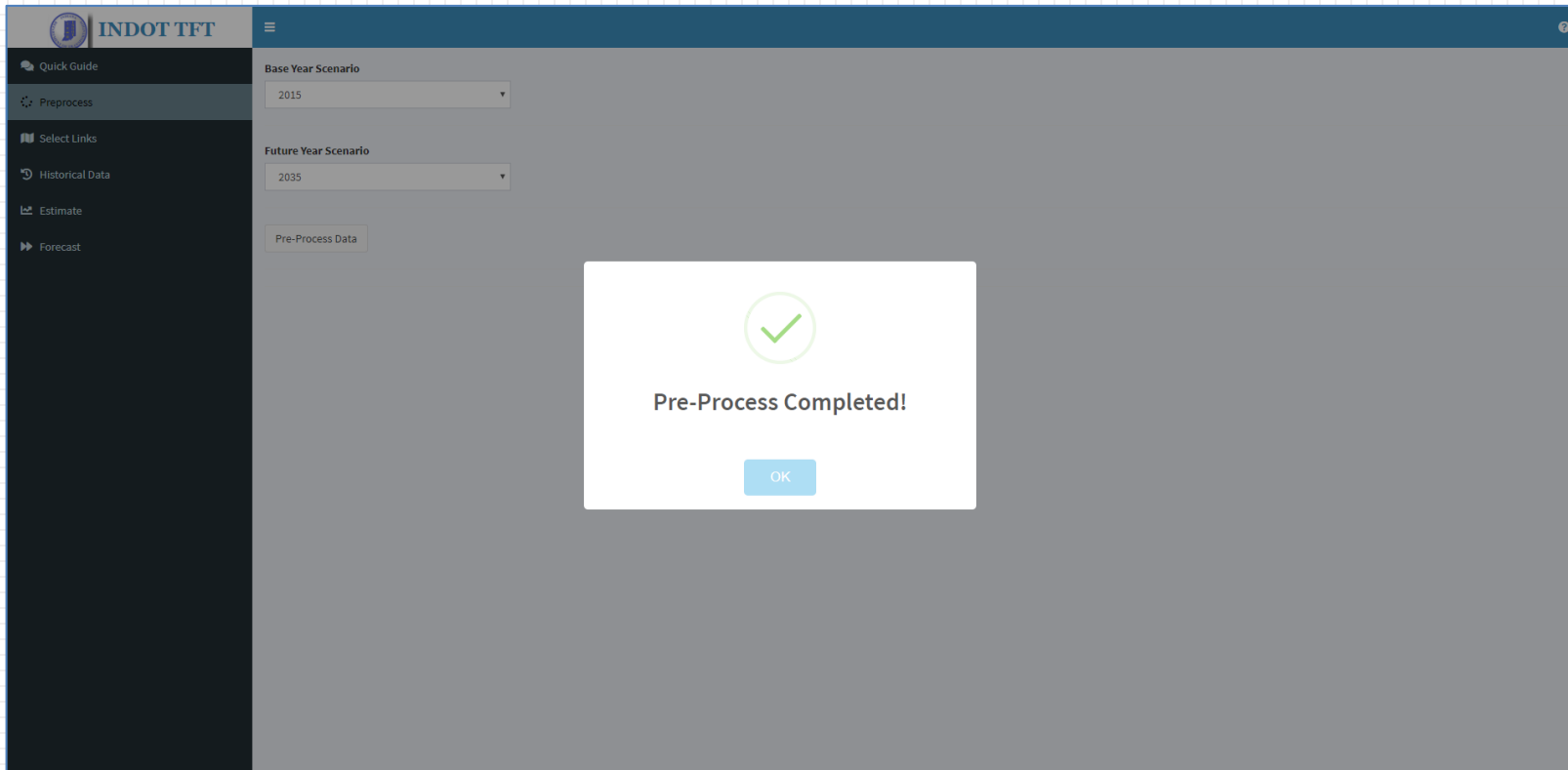
2035

Pre-Process Data

“Preprocess” Tab (cont.)

Click “Pre-process Data” button to process data for each link:

- Estimate capacities by LOS
- Join Base Year model network with historical traffic counts and the future link volume data
- A message will pop up to confirm the completion of pre-processing data.



“Select Links” Tab (cont.)

- It may take up to a minute or two for the map to load! Do not switch among tabs before the map is loaded
- A dropdown menu is provided for easier navigation through the network by choosing the County where desired roadway exists
- The highlighted green links are the ones with available historical count data (the final version will cover all state-owned roads)
- Once clicked, the link will be highlighted red and link ID of the selected link will be displayed at the bottom of the page

The screenshot displays the INDOT TFT 'Select Links' interface. On the left is a dark sidebar with navigation links: Quick Guide, Preprocess, Select Links (active), Historical Data, Estimate, and Forecast. The main area features a map of Indianapolis with a grid of road links. Most links are green, indicating available historical count data. A few links are highlighted in red, representing the final version of the data. Above the map is a 'Select a County' dropdown menu with 'Marion' selected. Below the map is a 'Clear All the Selected Links' button. At the bottom, there is a 'Show 10 entries' dropdown, a search bar, and a table of selected links. The table has two columns: 'LinkID' and 'LinkName'. The first two entries are 110009874 and 313559. At the bottom right, there are 'Previous', '1', and 'Next' navigation buttons.

INDOT TFT

Quick Guide

Preprocess

Select Links

Historical Data

Estimate

Forecast

Select a County

Marion

Clear All the Selected Links

Show 10 entries

Search:

LinkID	LinkName
110009874	
313559	

Showing 1 to 2 of 2 entries

Previous 1 Next

“Select Links” Tab (cont.)

- Clicking the non-highlighted links will trigger a warning message

The screenshot displays the INDOT TET (Traffic Engineering Tool) interface. On the left, a sidebar contains navigation options: Quick Guide, Progress, Select Links (highlighted), Historical Data, Estimate, and Forecast. The main area features a map of Indianapolis with various road links highlighted in green and others in red. A white modal box titled "Message" is centered on the screen, displaying the text: "There is no available data for link 110009889 ! Please only select highlighted green links". Below the map, there is a "Clear All the Selected Links" button, a "Show: 10 entries" dropdown, and a table with two rows of link IDs: 110009874 and 110009889. At the bottom, it says "Showing 1 to 2 of 2 entries" and includes "Previous" and "Next" navigation buttons.

INDOT TET

Quick Guide

Progress

Select Links

Historical Data

Estimate

Forecast

Select Links

Message

There is no available data for link 110009889 ! Please only select highlighted green links

Clear All the Selected Links

Show: 10 entries

LinkID
110009874
110009889

Showing 1 to 2 of 2 entries

Previous Next

“Select Links” Tab (cont.)

- Selected links can be individually unselected by re-clicking them or can be unselected all at once by clicking the “Clear All Selected Links” button

The screenshot displays the INDOT TFT web application interface. On the left is a dark sidebar with navigation links: Quick Guide, Preprocess, Select Links (active), Historical Data, Estimate, and Forecast. The main content area has a blue header with the INDOT TFT logo and a hamburger menu. Below the header is a 'Select a County' dropdown menu set to 'Marion'. The central part of the screen shows a map of Marion County, Indiana, with several links highlighted in green. A red box highlights a button labeled 'Clear All the Selected Links'. Below the map is a table showing a list of selected links. The table has a 'LinkID' column and lists three entries: 310598, 313875, and 313559. At the bottom right, there is a search bar and pagination controls showing 'Showing 1 to 3 of 3 entries' and 'Previous 1 Next'.

Select a County

Marion

Clear All the Selected Links

Show 10 entries

Search:

LinkID
310598
313875
313559

Showing 1 to 3 of 3 entries

Previous 1 Next

“Historical Data” Tab

- All the selected link IDs can be seen in the dropdown menu
- User can select the desired link ID and then click “Generate Historical Data Report” to generate the table with historical information

The screenshot shows the INDOT TFT web application interface. On the left is a dark sidebar with navigation links: Quick Guide, Preprocess, Select Links, Historical Data (highlighted), Estimate, and Forecast. The main content area has a header with the INDOT TFT logo and a hamburger menu. Below the header, there's a 'Select a Link ID' dropdown menu with '313559' selected. A 'Generate Historical Data Report' button is below the dropdown. To the right of the button is a search bar. Below the search bar, it says 'Show 25 entries'. The main data area is titled 'Historical Data' and contains a table with columns: Name, LinkInfo, Year, and AADT. The table has 15 rows of data. At the bottom of the table, it says 'Showing 1 to 15 of 15 entries'. To the right of this text are 'Previous', '1', and 'Next' buttons. At the bottom left of the main area is a 'Save HTML file' button.

Select a Link ID

313559

Generate Historical Data Report

Search:

Show 25 entries

Historical Data

	Name	LinkInfo	Year	AADT
	All	All	All	All
1	Link ID	313559	2001	0
2	Count Station	49W538	2002	0
3	County	Marion	2003	0
4	Route Name	49-O-031-0-01	2004	0
5	Functional Class	Other Principal Arterial	2005	0
6	# of Lanes	4	2006	0
7	Area Type	URBAN	2007	0
8	Beginning Point	0	2008	0
9	Ending Point	0	2009	0
10	K Factor	0.131659	2010	0
11	% Truck	0 %	2011	0
12			2012	0
13			2013	4937
14			2014	4986
15			2015	5096

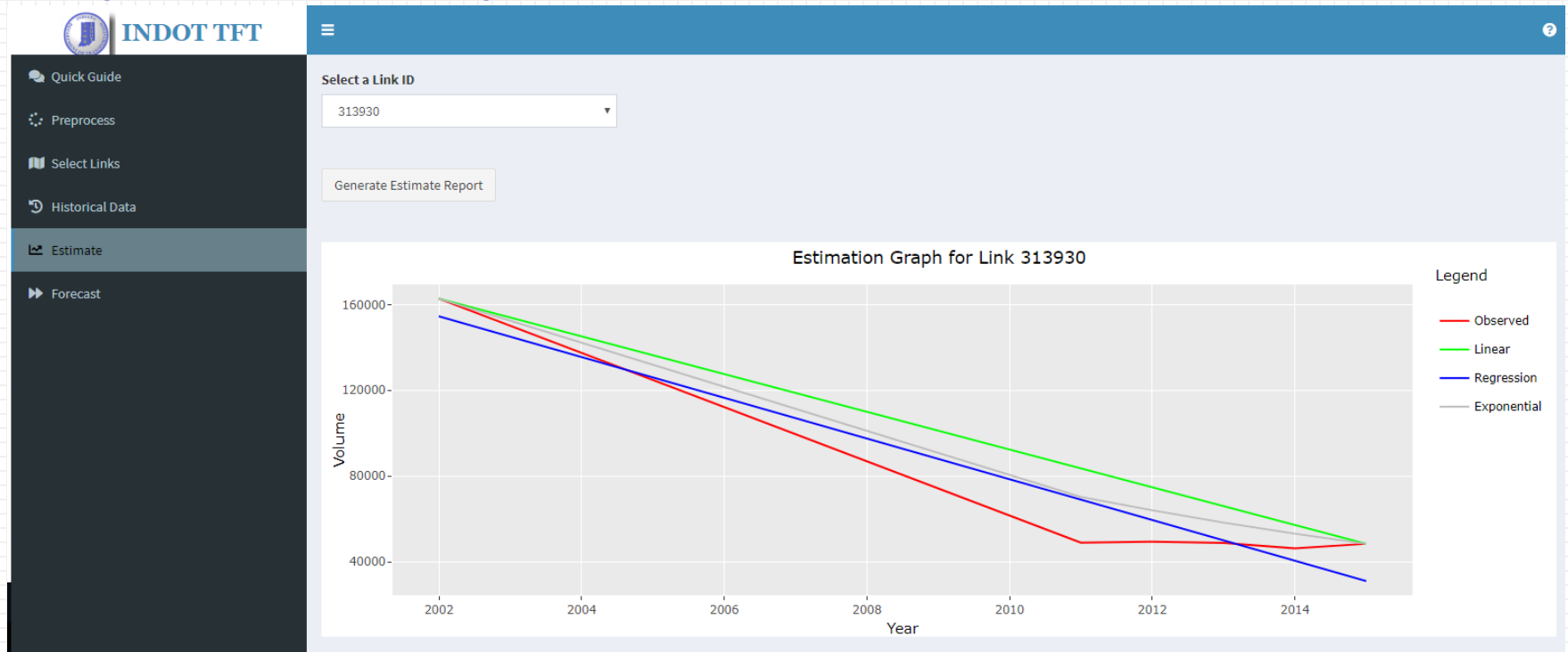
Showing 1 to 15 of 15 entries

Previous 1 Next

Save HTML file

“Estimation” Tab

- All the selected link IDs can be seen in the dropdown menu
- User can select the desired link ID and then click “Generate Estimate Report” to generate the estimate graph and table



“Estimation” Tab

- All the selected link IDs can be seen in the dropdown menu
- User can select the desired link ID and then click “Generate Estimate Report” to generate the estimate graph and table

Show 25 entries

Search:

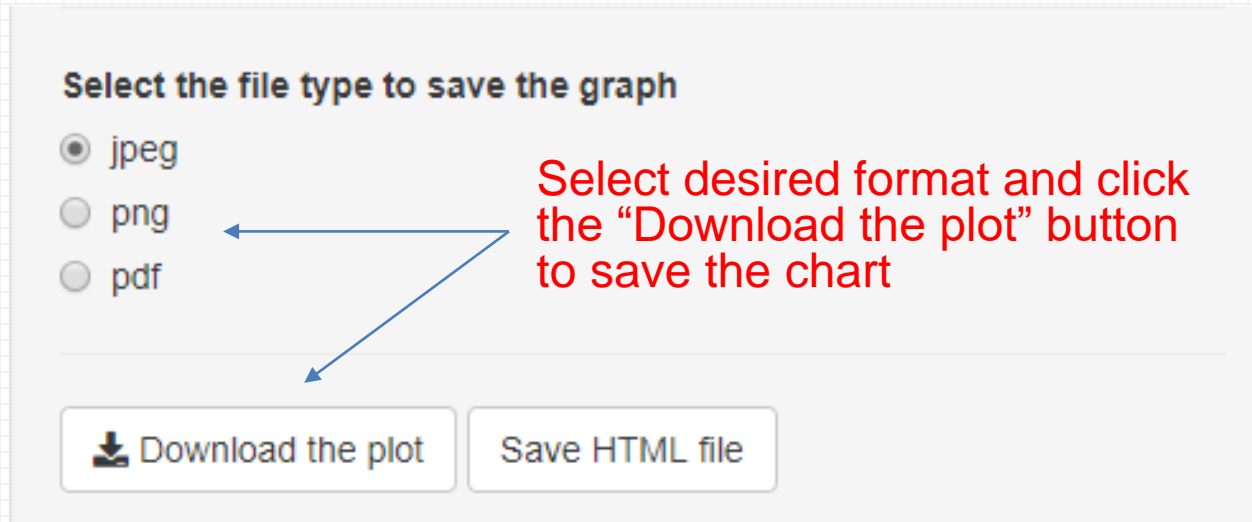
Estimation Data

	Name	LinkInfo	Estimation	History	ISTDM
	All	All	All	All	All
1	Link ID	313930	--Linear--	--Linear--	--Linear--
2	Count Station	971332	Estimated Line	Y = 162850 - 8803.00 (X - 2002)	Y = 116486.99 + 17.21 (X - 2015)
3	County	Marion	R-Square	90.48 %	N/A
4	Route Name	49-I-065-0-01			
5	Functional Class	Interstate	--Regression--	--Regression--	--Regression--
6	# of Lanes	8	Estimated Line	Y = 19183365.1 - 9504.88 X	Y = 81814.65 + 17.21 X
7	Area Type	URBAN	R-Square	91.66 %	N/A
8	Beginning Point	10.45			
9	Ending Point	10.95	--Exponential--	--Exponential--	--Exponential--
10	K Factor	0.111967	Estimated Line	Y = 162850 (1 - 8.909%)^n	Y = 116486.99 (1 + 0.015%)^n
11	% Truck	15.209 %	R-Square	89.43 %	N/A
12	ISTDM Base Volume	116487	Annual Growth Rate	-8.909%	0.015%
13	ISTDM Future Volume	116831	Annual Growth Rate - adj.	1.038%	1.038%

“Estimation” Tab (cont.)

“Report and Graph” HTML Report

- Download Estimation Graphs (By default will be saved under the browser’s main download folder)
 - Static jpg, png, or pdf file



Select the file type to save the graph

☒ jpeg
☐ png
☐ pdf

Download the plot Save HTML file

Select desired format and click the “Download the plot” button to save the chart

The screenshot shows a web interface for saving an estimation graph. It features three radio buttons for file formats: 'jpeg' (selected), 'png', and 'pdf'. Below these are two buttons: 'Download the plot' (with a download icon) and 'Save HTML file'. A red text annotation with two blue arrows points to the 'png' radio button and the 'Download the plot' button, instructing the user to select a format and click the download button to save the chart.

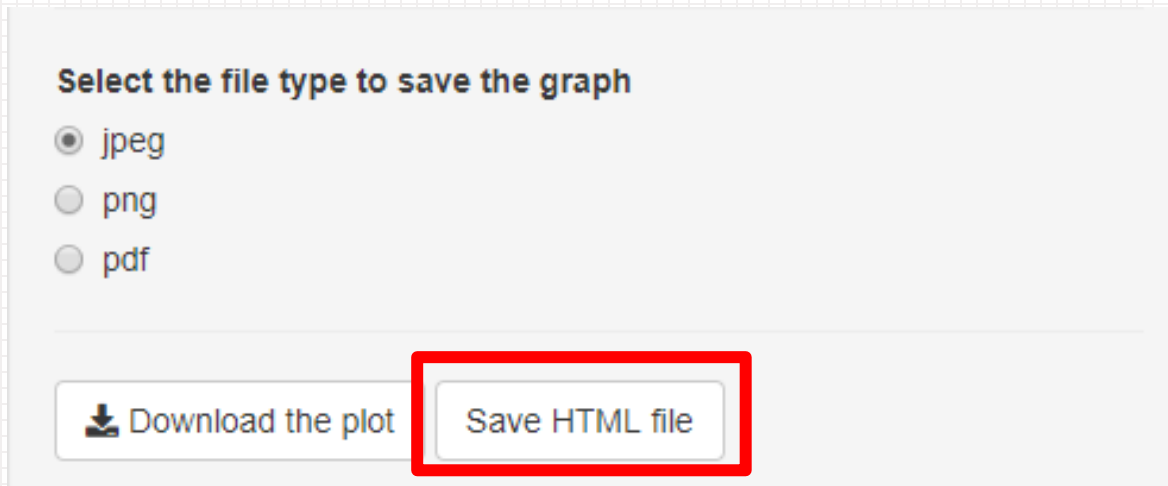


“Estimate Graphs – Link XXX.jpg” → XXX is the link ID

“Estimation” Tab (cont.)


“Report and Graph” HTML Report

- Save the entire HTML file to Dropbox
 - The saved HTML file has live charts and can be shared with others (they only need a web browser to open the file)



Select the file type to save the graph

☒ jpeg
☐ png
☐ pdf

 Download the plot **Save HTML file**

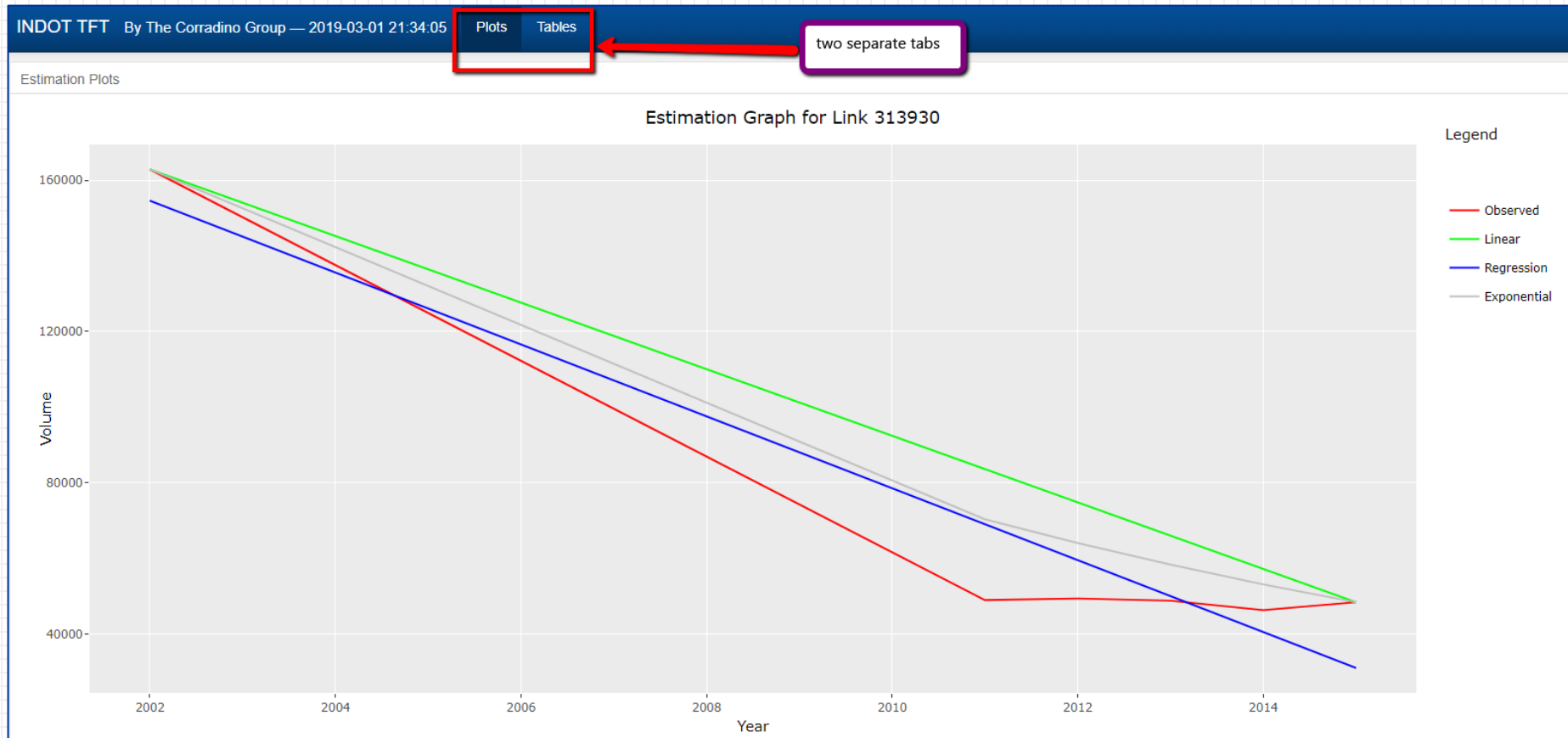


“EstimateReport_ LinkXXX.html”→XXX is the link ID

“Estimation” Tab (cont.)

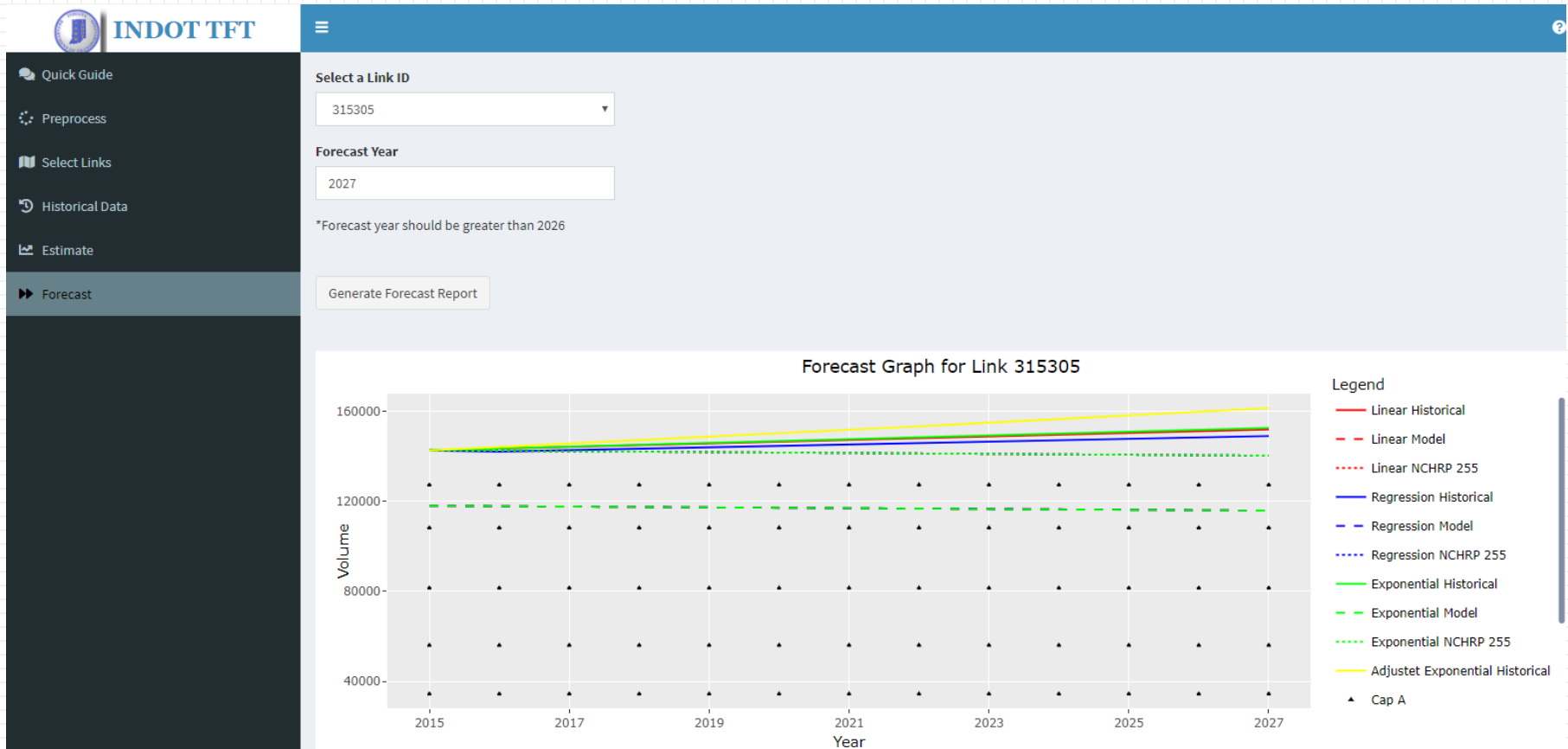
“Report and Graph” HTML Report

- Saved HTML file inside Dropbox folder (still “live” plots)



“Forecast” Tab

- All the selected link IDs can be seen in the dropdown menu
- User can select the desired link ID and then click “Generate Forecast Report” to generate the forecast graph and table



“Forecast” Tab

- All the selected link IDs can be seen in the dropdown menu
- User can select the desired link ID and then click “Generate Forecast Report” to generate the forecast graph and table

Show **25** entries

Forecast Data

Name	LinkInfo	Year	Lin_History	Lin_ISTDM	Lin_NCHRP_255	Break1	Reg_History	Reg_ISTDM	Reg_NCHRP_255	Break2	Exp_History	Exp_ISTDM	Exp_NCHRP_255	Break3	Exp_Adj_History
All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
1	Link ID	315305	2015	142678	118034	142678	142678	118034	142678		142678	118034	142678		142678
2	Count Station	971340	2016	143452	117857	142482	142129	117857	142482		143483	117855	142480		144159
3	County	Marion	2017	144227	117880	142287	142760	117880	142287		144293	117675	142281		145655
4	Route Name	49-I-065-0-01	2018	145001	117503	142091	143391	117503	142091		145108	117496	142083		147167
5	Functional Class	Interstate	2019	145776	117328	141896	144022	117328	141896		145927	117317	141886		148695
6	# of Lanes	8	2020	146550	117148	141699	144653	117148	141699		146751	117138	141688		150238
7	Area Type	URBAN	2021	147325	116971	141504	145285	116971	141504		147579	116960	141492		151798
8	Beginning Point	11.57	2022	148099	116794	141308	145916	116794	141308		148412	116782	141295		153373
9	Ending Point	11.8	2023	148874	116617	141113	146547	116617	141113		149250	116604	141098		154965
10	K Factor	0.087136	2024	148648	116439	140916	147178	116439	140916		150093	116426	140902		156574
11	% Truck	10.54 %	2025	150423	116262	140721	147809	116262	140721		150940	116249	140706		158199
12	ISTDM Base Volume	118034	2026	151197	116085	140525	148440	116085	140525		151792	116072	140511		159841
13	ISTDM Future Volume	114490	2027	151972	115908	140330	149072	115908	140330		152849	115895	140315		161501

Showing 1 to 13 of 13 entries

Previous **1** Next

Select the file type to save the graph

☒ jpeg
☐ png
☐ pdf

“Forecast” Tab (cont.)

“Report and Graph” HTML Report

- Download forecasting plot as .JPG, PNG, or PDF
- Save the entire HTML file (inside Dropbox folder)



“ForecastReport_ LinkXXX_.html”→XXX is the link ID

Acknowledgements

- **Johnny Han (jhan@corrardino.com) – Corradino Indianapolis.**
- **Roy Nunnally, Greg Katter, Korey Chu – Indiana DOT**

Questions ?