INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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ANNUAL AVERAGE DAILY TRAFFIC (AADT) ESTIMATES

The Indiana Department of Transportation (INDOT), through its Traffic Monitoring Section, collects, summarizes and interprets information on the traffic traveling on the state's highway system. The data is used to assess transportation needs, system performance and to develop highway planning and programming recommendations. Traffic data also plays a very important role in route planning and in the design of highway projects.

To collect this information, the Department operates two traffic monitoring systems:

1. A Statewide Traffic Monitoring System consisting of 110 permanent continuous count stations that collect volume, speed and vehicle classification data 24 hours per day, 365 days per year. Fifty of these sites also utilize weigh-in motion (WIM) technology to collect continuous truck weight data. These sites are located throughout the state to monitor overall traffic trends. Information from these counters is used to determine ANNUAL TRAFFIC GROWTH trends as well as develop AXLE, WEEKDAY and SEASONAL adjustment factors used with the state's coverage count program to determine estimates of annual average daily traffic (AADT).

2. The statewide coverage count program utilizes portable pneumatic road-tubes traffic counters to collect 48 hour traffic counts on all State Highway System traffic sections and in rural and small urban areas and all highway performance monitoring sections (HPMS). The coverage count program operates on a three-year cycle, counting one-third of all sections annually, or approximately 10,000 of the 30,000 count sites. Where possible, portable classifiers are used so that approximately 65% of all coverage counts collected are classification counts. Additional counts are taken within this program to support specific state projects. INDOT is transitioning the coverage count data collection from a central office operation to the 6 INDOT districts. In addition INDOT also contracts with 3 Metropolitan Planning Organizations (MPOs) to collect coverage count data within their areas.

ADJUSTMENT FACTORS

Adjustment factors are necessary to convert an Average Daily Traffic (ADT) volume into an Annual Average Daily Traffic (AADT) estimate. Depending on the type of counter, the seasonal period of the setting, multiple factors may be necessary. These include axle, weekday and seasonal adjustment factors. For the 2/3's of the system not counted in the current year, the previously derived AADTs can be adjusted to the current year by utilizing the annual growth factors.

AXLE ADJUSTMENT FACTORS

There are times when portable classifiers cannot be set due to number of lanes or the lack of free-flow speeds. In these cases, portable traffic counters utilizing single pneumatic road-tubes stretched across a lane or roadway are used. These types of counters register two axle impacts as one vehicle so when vehicles with three or more axles cross the road-tube they will be counted as multiple vehicles. Whenever possible axle adjustment factors should be developed from vehicle classification counters set on the same route within the vicinity of the axle counter and during the same relative time period. If this is not possible then the use of these factors applied by functional classification and volume groups are deemed acceptable.

WEEKDAY ADJUSTMENT FACTORS

The purpose of these factors is to normalize the variability of traffic counts that exists between counts taken during the weekday, Friday, Saturdays and/or Sundays. In developing the weekday factors we found no significant statistical difference in the Monday through Thursday trends and for this reason combine these into a weekday factor. This is further justified as counts taken for INDOT will usually span a Monday through Wednesday or a Tuesday through Thursday count period.

SEASONAL (MONTHLY) ADJUSTMENT FACTORS

Seasonal or monthly adjustment factors convert average daily traffic (ADT) to annual average daily traffic (AADT). Observed traffic volumes at a location often vary from month to month with higher summer traffic volumes and lower winter traffic volumes. To compare traffic volume data collected in different months, seasonal adjustment factors must be applied. The ADT is multiplied by the seasonal factor to obtain the AADT value. The continuous counter sites are grouped into five major factor groups (FG). Currently there are two urban factor groups and three rural factor groups which are based on grouped functional classifications.

ANNUAL GROWTH FACTORS

As not all road sections are counted each year, there are times when previous years AADTs will need to be factored in order to estimate current year values. Annual Growth Factors are used in these situations and are developed by comparisons of previous years AADTs at INDOT's 110 continuous counting telemetry sites and averaged for the five factor groups (FG).

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2007 Factor Year

AVERAGE AXLE ADJUSTMENT FACTORS (2004-2007)

Urban - Interstate (11), Freeways and Expressways (12)

Volume Groups	1 to 4000	4001 to 10000	10001 to 30000	30001 and up
2004	0.914	0.874	0.811	0.825
2005	0.914	0.844	0.847	0.872
2006	0.902	0.902	0.794	0.848
2007	***	***	0.871	0.768
AVERAGE 04-07	**0.910**	**0.874**	**0.831**	**0.828**

Urban - Principal Arterials (14), Minor Arterials (16), Collectors (17)

Volume Groups	1 to 7000	7001 to 12000	12001 to 20000	20001 and up
2004	0.928	0.924	0.938	0.936
2005	0.928	0.928	0.841	0.918
2006	0.978	0.959	0.945	0.940
2007	0.966	0.940	0.941	0.938
AVERAGE 04-07	**0.950**	**0.938**	**0.916**	**0.933**

Rural - Interstate (01), Principal (02), Minor Arterials (06)

Volume Groups	1 to 5000	5001 to 7000	7001 to 10000	10001 and up
2004	0.859	0.845	0.846	0.842
2005	0.858	0.854	0.858	0.854
2006	0.867	0.963	0.843	0.865
2007	0.882	0.847	0.862	0.844
AVERAGE 04-07	**0.866**	**0.877**	**0.852**	**0.851**

Rural - Major Collectors (07), Minor Collectors (08)

Volume Groups	1 to 1200	1201 to 2400	2401 to 4000	4001 and up
2004	0.929	0.913	0.908	0.927
2005	0.938	0.922	0.717	0.925
2006	0.922	0.916	0.925	0.932
2007	0.948	0.928	0.916	0.923
AVERAGE 04-07	**0.934**	**0.920**	**0.866**	**0.927**

Locals (09 or 19)

	Rural (09)	Urban (19)
2004	0.969	0.976
2005	**	**
2006	0.965	0.983
2007	0.950	0.996
AVERAGE 04-07	**0.961**	**0.985**

Note: These factors are used to eliminate excess vehicles generated by axle counters.

** (In 2005 There were insufficient data samples to develop unique Rural & Urban Local grouping)

*** (There were insufficient data samples to develop factors for this volume group)

Source:
Indiana Department of Transportation
Engineering Programs Division
Traffic Monitoring Section

April 2008

2007 WEEKDAY FACTORS

Urban - Interstate (11), Freeways and Expressways (12)

	Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays	**0.958**	**0.940**	**0.956**	**0.955**	**0.952**	**0.962**	**0.962**	**0.978**	**0.968**	**0.962**	**0.963**	**0.948**	**0.953**
Friday	0.856	0.844	0.813	0.853	0.863	0.854	0.880	0.861	0.864	0.861	0.862	0.897	0.824
Saturday	1.134	1.136	1.181	1.121	1.158	1.135	1.127	1.103	1.116	1.125	1.131	1.135	1.138
Sunday	1.341	1.531	1.428	1.366	1.319	1.312	1.266	1.225	1.267	1.308	1.282	1.311	1.479

Urban - Principal Arterials (14), Minor Arterials (16), Collectors (17)

	Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays	**0.958**	**0.960**	**0.969**	**0.959**	**0.954**	**0.960**	**0.945**	**0.958**	**0.954**	**0.972**	**0.955**	**0.951**	**0.960**
Friday	0.861	0.845	0.825	0.873	0.868	0.861	0.880	0.866	0.879	0.858	0.872	0.873	0.837
Saturday	1.090	1.066	1.093	1.083	1.101	1.090	1.117	1.107	1.100	1.068	1.086	1.085	1.086
Sunday	1.395	1.490	1.428	1.359	1.384	1.383	1.395	1.354	1.358	1.363	1.360	1.399	1.468

Rural - Interstate (01)

	Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays	**1.008**	**0.967**	**0.993**	**1.001**	**0.999**	**1.011**	**1.018**	**1.046**	**1.027**	**1.014**	**1.032**	**0.995**	**0.991**
Friday	0.843	0.842	0.802	0.829	0.841	0.824	0.847	0.852	0.844	0.846	0.831	0.925	0.827
Saturday	1.093	1.118	1.152	1.111	1.148	1.095	1.067	1.039	1.071	1.062	1.066	1.099	1.085
Sunday	1.123	1.322	1.230	1.141	1.096	1.112	1.074	0.984	1.040	1.093	1.044	1.063	1.277

Rural - Principal Arterials (02), Minor Arterials (06)

	Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays	**0.974**	**0.949**	**0.962**	**0.964**	**0.965**	**0.989**	**0.982**	**1.000**	**0.993**	**0.993**	**0.987**	**0.953**	**0.955**
Friday	0.847	0.827	0.794	0.851	0.862	0.841	0.864	0.848	0.839	0.860	0.856	0.887	0.840
Saturday	1.089	1.126	1.163	1.102	1.118	1.059	1.066	1.061	1.057	1.026	1.056	1.125	1.110
Sunday	1.343	1.548	1.480	1.343	1.298	1.286	1.262	1.206	1.264	1.265	1.271	1.365	1.527

Rural - Major Collectors (07), Minor Collectors (08), Locals (09)

	Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekdays	**0.971**	**0.956**	**0.978**	**0.960**	**0.965**	**0.983**	**0.973**	**0.991**	**0.975**	**0.985**	**0.981**	**0.952**	**0.949**
Friday	0.861	0.839	0.810	0.870	0.892	0.862	0.876	0.866	0.863	0.860	0.863	0.891	0.839
Saturday	1.067	1.080	1.081	1.078	1.092	1.048	1.034	1.044	1.074	1.032	1.040	1.088	1.111
Sunday	1.335	1.501	1.409	1.348	1.268	1.257	1.299	1.236	1.276	1.275	1.289	1.360	1.499

Note: Weekday factors are used to normalize the variability of traffic counts that exists between counts taken on the Weekdays, Friday, Saturday and or Sunday.

Source:
Indiana Department of Transportation
Engineering Programs Division
Traffic Monitoring Section

April 2008

SEASONAL ADJUSTMENT FACTORS BY FUNCTIONAL CLASS
2003-2007

Urban - Interstate (11), Freeways and Expressways (12)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	**1.088**	**1.114**	**1.008**	**0.985**	**0.972**	**0.946**	**0.944**	**0.939**	**0.984**	**0.977**	**1.014**	**1.088**
2006	1.111	1.069	1.032	0.999	0.971	0.944	0.963	0.959	0.978	0.983	1.014	1.048
2005	1.155	1.067	1.031	1.001	0.969	0.931	0.931	0.932	0.996	0.982	1.002	1.059
2004	1.186	1.086	1.049	1.004	0.997	0.920	0.951	0.938	0.966	0.978	1.009	1.065
2003	1.202	1.156	1.041	1.022	0.980	0.947	0.906	0.921	0.982	0.981	1.012	1.068
5 YR AVG	**1.148**	**1.098**	**1.032**	**1.002**	**0.978**	**0.938**	**0.939**	**0.938**	**0.981**	**0.980**	**1.010**	**1.066**

Urban - Principal Arterials (14), Minor Arterials (16), Collectors (17)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	**1.063**	**1.074**	**0.970**	**0.967**	**0.952**	**0.968**	**0.993**	**0.967**	**0.991**	**0.987**	**1.037**	**1.088**
2006	1.067	1.019	1.023	0.985	0.975	0.952	0.984	0.966	0.983	0.971	1.019	1.027
2005	1.095	1.008	1.039	0.975	0.982	0.944	0.957	0.956	0.990	0.987	1.039	1.089
2004	1.114	1.016	1.004	0.972	0.971	0.941	0.989	0.972	0.961	0.976	1.032	1.062
2003	1.101	1.087	1.032	0.965	0.965	0.979	0.980	0.969	0.978	0.979	1.024	1.051
5 YR AVG	**1.088**	**1.041**	**1.014**	**0.973**	**0.969**	**0.957**	**0.981**	**0.966**	**0.981**	**0.980**	**1.030**	**1.063**

Rural - Interstate (01)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	**1.164**	**1.183**	**1.048**	**1.004**	**0.961**	**0.908**	**0.897**	**0.898**	**0.971**	**0.957**	**0.978**	**1.100**
2006	1.177	1.131	1.048	1.012	0.973	0.909	0.906	0.912	0.985	0.975	0.997	1.078
2005	1.222	1.120	1.044	1.021	0.961	0.900	0.878	0.905	1.002	0.985	0.999	1.087
2004	1.246	1.126	1.040	0.984	0.992	0.912	0.895	0.896	0.959	0.982	1.011	1.114
2003	1.223	1.239	1.070	1.032	0.967	0.925	0.887	0.909	0.982	0.971	0.987	1.043
5 YR AVG	**1.206**	**1.160**	**1.050**	**1.011**	**0.971**	**0.911**	**0.893**	**0.904**	**0.980**	**0.974**	**0.994**	**1.084**

Rural - Principal Arterials (02), Minor Arterials (06)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	**1.121**	**1.137**	**1.017**	**0.993**	**0.960**	**0.925**	**0.946**	**0.941**	**0.961**	**0.964**	**1.028**	**1.092**
2006	1.087	1.055	1.028	0.991	0.965	0.936	0.963	0.971	0.977	0.994	1.032	1.062
2005	1.164	1.074	1.046	0.988	0.940	0.907	0.921	0.934	0.974	0.985	1.042	1.103
2004	1.198	1.091	1.038	0.987	0.962	0.918	0.917	0.925	0.957	0.992	1.040	1.104
2003	1.166	1.149	1.064	1.013	0.954	0.905	0.906	0.903	0.956	0.964	1.024	1.086
5 YR AVG	**1.147**	**1.101**	**1.039**	**0.994**	**0.956**	**0.918**	**0.931**	**0.935**	**0.965**	**0.980**	**1.033**	**1.089**

Rural - Major Collectors (07), Minor Collectors (08), Locals (09)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	**1.108**	**1.119**	**1.013**	**0.977**	**0.927**	**0.927**	**0.962**	**0.948**	**0.957**	**0.973**	**1.043**	**1.109**
2006	1.095	1.060	1.037	0.973	0.946	0.925	0.958	0.960	0.972	0.997	1.029	1.058
2005	1.123	1.066	1.060	0.980	0.958	0.936	0.937	0.928	0.982	0.980	1.032	1.110
2004	1.180	1.081	1.056	0.973	0.941	0.948	0.948	0.966	0.948	0.973	1.016	1.064
2003	1.105	1.140	1.059	1.011	0.956	0.937	0.954	0.989	0.994	0.998	1.033	1.087
5 YR AVG	**1.122**	**1.093**	**1.045**	**0.983**	**0.946**	**0.935**	**0.952**	**0.958**	**0.971**	**0.984**	**1.031**	**1.086**

Note: The seasonal adjustment factors are used to expand average 24-hour volumes to estimated Annual Average Daily Traffic (AADT).

April 2008

Source:
Indiana Department of Transportation
Engineering Programs Division
Traffic Monitoring Section

ANNUAL GROWTH FACTORS BY FUNCTIONAL CLASS 1998 - 2007

	YEAR OF COUNT:									
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
YEAR TO:										
Urban - Interstate (11), Freeways and Expressways (12)										
1998	-	0.963	0.968	0.892	0.861	0.836	0.826	0.805	0.791	0.761
1999	1.038	-	1.005	0.925	0.894	0.867	0.857	0.835	0.821	0.790
2000	1.033	0.995	-	0.921	0.890	0.863	0.853	0.831	0.817	0.786
2001	1.122	1.081	1.086	-	0.966	0.937	0.926	0.903	0.887	0.853
2002	1.161	1.118	1.124	1.035	-	0.970	0.958	0.934	0.919	0.883
2003	1.197	1.153	1.159	1.067	1.031	-	0.988	0.963	0.947	0.911
2004	1.211	1.167	1.173	1.080	1.043	1.012	-	0.975	0.958	0.922
2005	1.243	1.197	1.203	1.108	1.070	1.038	1.026	-	0.983	0.945
2006	1.264	1.218	1.224	1.127	1.089	1.056	1.043	1.017	-	0.962
2007	**1.314**	**1.266**	**1.273**	**1.172**	**1.132**	**1.098**	**1.085**	**1.058**	**1.040**	**-**
Urban - Principal Arterials (14), Minor Arterials (16), Collectors (17)										
1998	-	0.984	0.952	0.922	0.870	0.882	0.892	0.891	0.885	0.897
1999	1.016	-	0.967	0.937	0.884	0.896	0.907	0.906	0.899	0.911
2000	1.051	1.034	-	0.969	0.914	0.926	0.937	0.936	0.930	0.942
2001	1.084	1.067	1.032	-	0.943	0.956	0.967	0.966	0.960	0.972
2002	1.149	1.131	1.094	1.060	-	1.013	1.025	1.024	1.017	1.031
2003	1.134	1.116	1.080	1.046	0.987	-	1.012	1.011	1.004	1.017
2004	1.121	1.103	1.067	1.034	0.975	0.988	-	0.999	0.992	1.005
2005	1.122	1.104	1.068	1.035	0.976	0.989	1.001	-	0.993	1.006
2006	1.130	1.112	1.075	1.042	0.983	0.996	1.008	1.007	-	1.013
2007	**1.115**	**1.097**	**1.061**	**1.028**	**0.970**	**0.983**	**0.995**	**0.994**	**0.987**	-
Rural - Interstate (01)										
1998	-	0.968	1.010	0.978	0.933	0.928	0.916	0.911	0.904	0.897
1999	1.033	-	1.044	1.010	0.963	0.959	0.946	0.941	0.934	0.927
2000	0.990	0.958	-	0.968	0.923	0.918	0.906	0.902	0.895	0.888
2001	1.022	0.990	1.033	-	0.953	0.949	0.936	0.932	0.924	0.917
2002	1.072	1.038	1.084	1.049	-	0.995	0.982	0.977	0.970	0.962
2003	1.078	1.043	1.089	1.054	1.005	-	0.987	0.982	0.974	0.967
2004	1.092	1.057	1.103	1.068	1.018	1.013	-	0.995	0.987	0.979
2005	1.097	1.062	1.109	1.073	1.023	1.018	1.005	-	0.992	0.984
2006	1.106	1.071	1.118	1.082	1.031	1.026	1.013	1.008	-	0.992
2007	**1.115**	**1.079**	**1.127**	**1.091**	**1.040**	**1.034**	**1.021**	**1.016**	**1.008**	-
Rural - Principal Arterials (02), Minor Arterials (06)										
1998	-	0.998	1.043	1.020	1.007	1.030	1.002	1.003	0.994	0.994
1999	1.002	-	1.045	1.022	1.009	1.032	1.004	1.005	0.996	0.996
2000	0.959	0.957	-	0.978	0.966	0.988	0.961	0.962	0.953	0.953
2001	0.980	0.978	1.022	-	0.987	1.009	0.982	0.983	0.974	0.974
2002	0.993	0.991	1.035	1.013	-	1.022	0.995	0.996	0.987	0.987
2003	0.971	0.969	1.013	0.991	0.978	-	0.973	0.974	0.965	0.965
2004	0.998	0.996	1.041	1.018	1.005	1.028	-	1.001	0.992	0.992
2005	0.997	0.995	1.040	1.017	1.004	1.027	0.999	-	0.991	0.991
2006	1.006	1.004	1.049	1.027	1.013	1.036	1.008	1.009	-	1.000
2007	**1.006**	**1.004**	**1.049**	**1.027**	**1.013**	**1.036**	**1.008**	**1.009**	**1.000**	-
Rural - Major Collectors (07), Minor Collectors (08), Locals (09)										
1998	-	0.970	0.924	0.926	0.906	0.903	0.899	0.911	0.916	0.909
1999	1.031	-	0.952	0.954	0.934	0.931	0.927	0.939	0.944	0.938
2000	1.083	1.050	-	1.002	0.980	0.978	0.974	0.986	0.991	0.984
2001	1.080	1.048	0.998	-	0.978	0.976	0.972	0.984	0.989	0.983
2002	1.104	1.071	1.020	1.022	-	0.997	0.993	1.006	1.011	1.004
2003	1.107	1.074	1.023	1.025	1.003	-	0.996	1.009	1.014	1.007
2004	1.112	1.078	1.027	1.029	1.007	1.004	-	1.013	1.018	1.011
2005	1.097	1.064	1.014	1.016	0.994	0.991	0.987	-	1.005	0.998
2006	1.092	1.059	1.009	1.011	0.989	0.986	0.982	0.995	-	0.993
2007	**1.100**	**1.067**	**1.016**	**1.018**	**0.996**	**0.993**	**0.989**	**1.002**	**1.007**	-

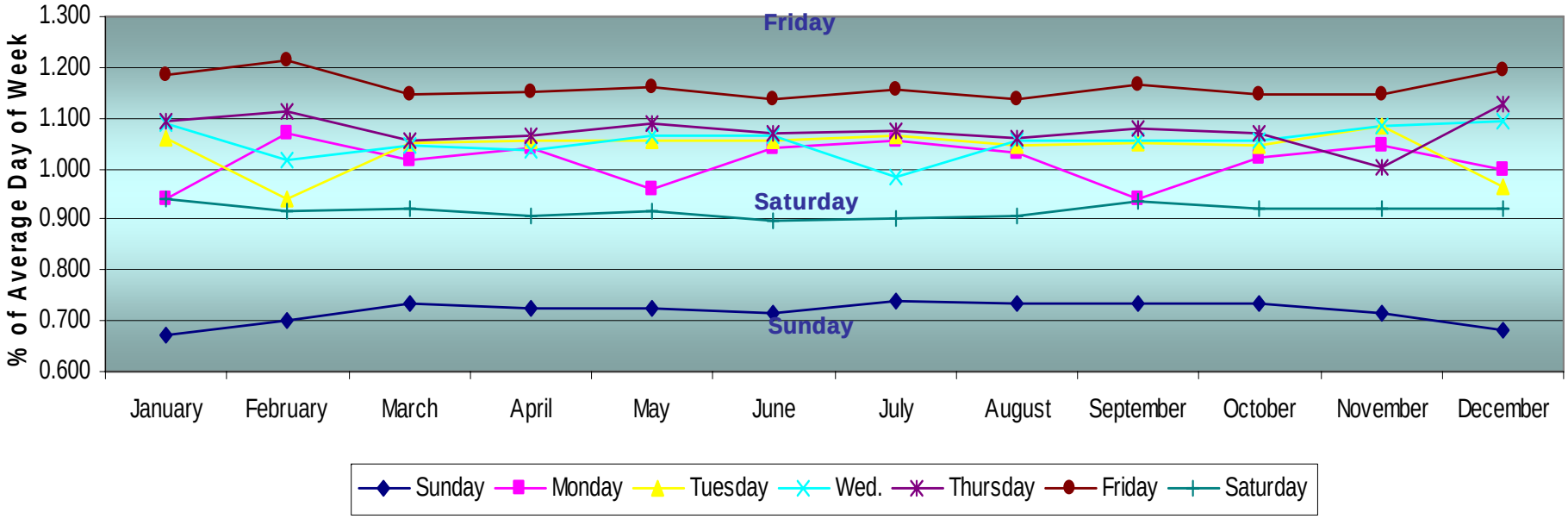
Note: Factors in this table are used to adjust previous year AADTs to a more current year for similarly classed roads (e.g. to adjust a 2004 urban interstate AADT to a 2007 equivalent, you would multiply the 2004 AADT by 1.085). This table is completely updated and supersedes any previous listing of year-to-year adjustment factors.

Source:
Indiana Department of Transportation
Engineering Programs Division
Traffic Monitoring Section

April 2008

Example - Average Day-Of-Week Variation by Month for 2007

FG= 14: Urban Principal Arterials (14), Urban Minor Arterials (16) and Urban Collectors (17)
(14 telemetry sites)



In developing the weekday factors no significant statistical difference in the Monday through Thursday trends were found to exist and for this reason have been combine into a "weekday" factor. This is further justified as counts collected for INDOT will usually span a Monday through Wednesday or a Tuesday through Thursday counting period (48 hours).

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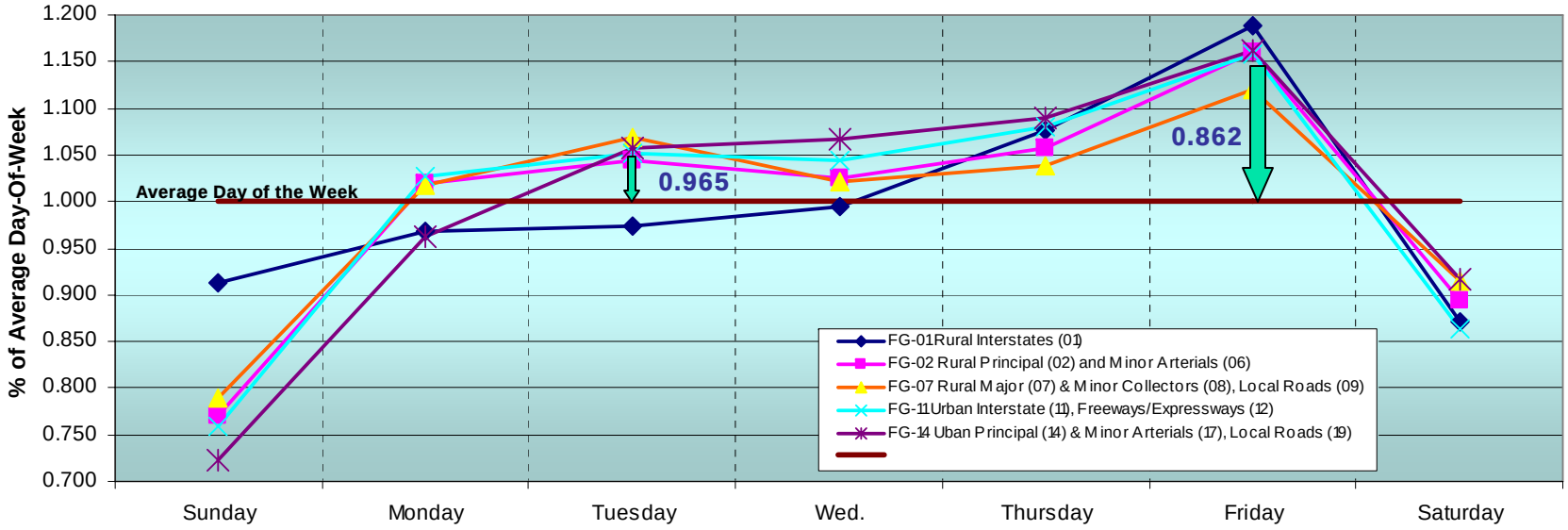
Example - Day-Of-Week Variation for APRIL-2007
(all factor groups)

The purpose of these factors is to normalize the variability of traffic counts that exists between counts taken during the Weekday, Friday, Saturdays and/or Sundays.



In this example the two classification counts were taken in April 2007 on a road classified as Urban Minor Arterial (FG-14), one during the weekday (Monday-Thursday) with a count of 7640 and one on Friday with a count 9360:

	Count * Axle Factor * **DOW Factor** = ADT
Example:	**7640 * 1.000 * 0.965 = 7370 ADT**
	9360 * 1.000 * 0.862 = 8070 ADT

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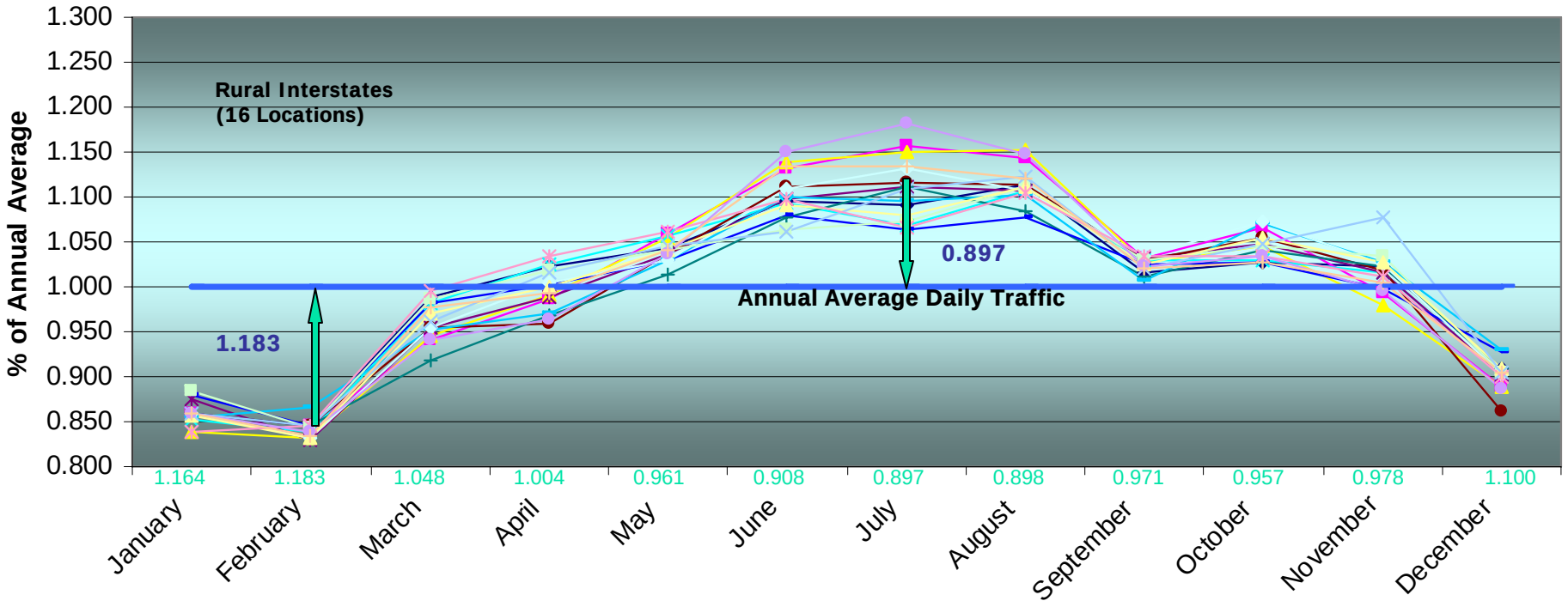
Example - Seasonal Adjustments

Seasonal or monthly adjustment factors convert average daily traffic (ADT) to annual average daily traffic (AADT).



Observed traffic volumes at a location often vary from month to month with higher summer traffic volumes and lower winter traffic volumes. To compare traffic volume data collected in different months, seasonal adjustment factors must be applied. The ADT is multiplied by the seasonal factor to obtain the AADT value.

Example1:	**ADT: 35,200**	**Count taken February 2007**	**35,200 * 1.183 = 41,640 AADT**
Example2	**ADT: 46,350**	**Count taken July 2007**	**46,420 * 0.897 = 41,640 AADT**

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