STATE OF FLORIDA

RESILIENT MODULUS OF ROADBED SOILS

FACTS & FIGURES

Research Report
FL/DOT/SMO/03-466

September 2003

STATE MATERIALS OFFICE

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Pavement Systems Evaluation Section

The mission of the Pavement Systems Evaluation Section (PSES) is to monitor, assess, and report on the condition, structural adequacy, and performance of Florida's roadway system as well as to provide technical expertise for safe and long-lasting pavement systems.

Our vision is to be acknowledged by our customers and partners as achievers of excellence in the evaluation and performance-prediction of pavement systems.

To learn more about our people, functions, and services, we invite you to visit us at

http://www11.myflorida.com/statematerialsoffice/PavementEvaluation/pavementoverview.htm

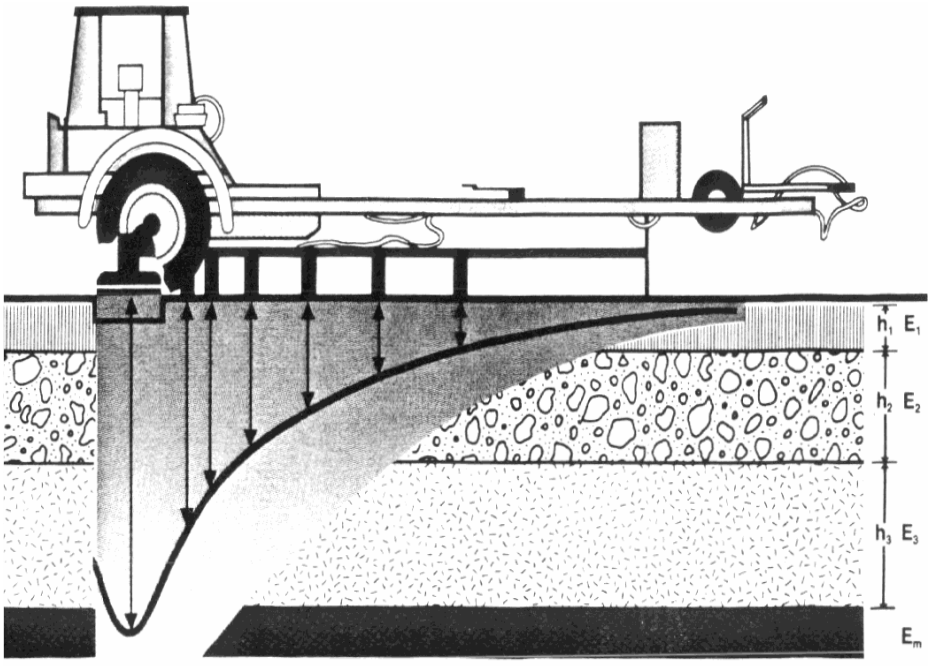
EXECUTIVE SUMMARY

One of the primary functions of the Non-Destructive Testing Group, a unit of the State Materials Office in Gainesville, Florida, is to characterize the in-situ properties of Florida's roadbed materials for pavement design purposes. The basis for such a characterization herein is the resilient modulus (M_R). The resilient modulus is a measure of the material elastic property while recognizing certain nonlinear characteristics. It is estimated, in our case, in-place from deflection measurements. This information has been critical to the Department's effort to support informed highway planning, policy, and decision making. This includes the apportionment and allocation of funds as well as the determination of appropriate cost-effective strategies to rehabilitate and preserve existing highway transportation infrastructure.

The present report is intended to provide information regarding our program testing procedures, to report current and past M_R values on a statewide basis, and to identify historical regional M_R trends in the various districts.

PART I:

OVERVIEW



INTRODUCTION

One of the primary functions of the Non-Destructive Testing (NDT) program is to characterize the in-situ properties of the Florida's roadbed (embankment) materials for pavement design purposes. The basis for such a characterization is the resilient modulus (M_R). The resilient modulus is a measure of a material elastic property recognizing its nonlinear characteristics. It is estimated directly using deflection-based techniques.

Deflection-Based Techniques

Due to their speed and ease of operation, deflection-based techniques have been widely used in the evaluation of the structural integrity and for estimating the elastic moduli of in-place pavement systems. The deflections can be non-destructively induced and measured using various commercially available devices. These devices are designed based on a variety of loading modes and measuring sensors. The loading modes include static, steady-state vibratory, and impulse loading, while the resulting responses are measured with sensors that include geophones, accelerometers, and linear voltage differential transducers (LVDT).

USE OF DEFLECTION-BASED DEVICES: FLORIDA HISTORICAL PERSPECTIVE

The Department implemented the use of the Falling Weight Deflectometer (FWD) in the early 1980s for pavement evaluation activities. For pavement design purposes, the Department had initially specified the use of the Benkelman Beam, which was later replaced until recently with a vibratory-type device known as the Dynaflect.

Benkelman Beam

The Benkelman Beam was the first deflection-based device used in Florida for pavement design purposes. It was developed by A.C. Benkelman during the Western Association of State Highway Officials (WASHO) Road Test. It consists of a measurement probe hinged to a three-legged reference beam, as schematically illustrated in Figure 1. The probe is positioned between the rear dual tires of a track, and the rebound deflection is measured by a dial placed on the reference beam when the truck is slowly driven away. Although this method is simple and relatively inexpensive, it is also slow and labor intensive. In addition, the measurements are usually limited to maximum deflections only and are produced under unrealistic load durations. Furthermore, the leveled position of the reference beam may, in some cases, be unduly influenced by the pavement deflection basin.

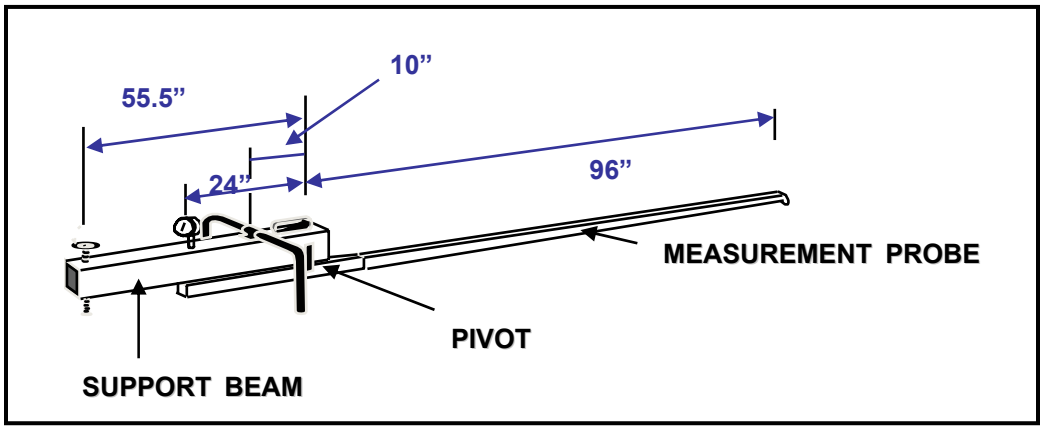


Figure 1: Schematic Illustration of a Benkelman Beam

Dynaflect

In the mid-1980s, the Department switched to a steady-state vibratory device, known as the Dynaflect. This device consists of a relatively lightweight (2,000 lbs.), two-wheel trailer equipped with an automated data acquisition and control system. The deflections are generated by a combination of a sinusoidal dynamic load and the static weight of the trailer. The dynamic loading of a pavement surface is induced using two counter-rotating eccentric steel weights. These steel weights, rotating at a constant frequency of eight cycles per second (8 Hz), generate a peak-to-peak dynamic load of approximately 1000 pounds in magnitude. The resulting deflections of a pavement system are measured with geophones. The geophones are electromechanical devices that use a magnetic field to produce an electrical impulse. These geophones are placed on the pavement surface at preset intervals along the centerline of the trailer.

Figure 2: Dynaflect Device

A primary advantage of the Dynaflect over a static-loading device, such as a Benkelman beam, is that a reference frame is not required. In addition, the Dynaflect generates a complete deflection basin at each test location. However, the fixed magnitude and the loading frequency are its major limitations. A photographic illustration of a Dynaflect is given in Figure 2.

Falling Weight Deflectometer (FWD)

A FWD consists of a trailer-mounted falling weight system capable of loading a pavement in a manner that simulates actual wheel loads in both magnitude and duration. An impulse load is generated by dropping a mass from a specified height. The mass is raised hydraulically, then released by an electrical signal and dropped with a buffer system on a 12-inch diameter rigid steel plate. A set of springs between the falling mass and the hit bracket mounted above the load cell buffers the impact by decelerating the mass. A thin, neoprene pad rests between the plate and the pavement surface to allow for an even load distribution. When a weight is dropped, an impulse load enters the pavement system creating body and surface waves.

The resulting vertical velocity of the pavement surface is picked up through a series of sensors located along the centerline of the trailer. These signals are then used to obtain the maximum deflection from each geophone through analog integrations. A single analog integration of a signal generates the deflection-time trace. The deflection measurements are recorded by the data acquisition system typically located in the tow vehicle. Figure 3 provides a schematic illustration of the FWD loading principle.

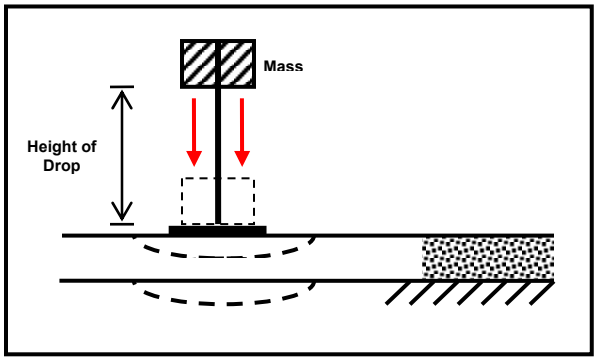


Figure 3: FWD Loading Principle

The use of the FWD testing for pavement design and rehabilitation purposes was first introduced by AASHTO in the 1993 Pavement Design Guide. In recent years, the FWD has gained further acceptance among highway agencies because of its versatility, reliability, and ease of use. A 2001 FDOT survey of states currently using FWDs indicated that 97 percent of the respondents own and operate FWD units, based on a 71 percent response rate *(1)*. In addition, FWD loading is believed to better simulate the effects of traffic on pavement structures. Therefore, the Department has recently implemented the use of FWD for all pavement-related activities, including pavement design and rehabilitation.

CURRENT FWD STATE-OF-THE-PRACTICE

In May of 2001, the Department conducted a survey to assess the current practices of using FWD by highway agencies *(1)*. The following are general findings on the current state practices in two FWD program areas, based on a 71 percent response rate:

FWD Program Management

- 70 percent of the respondents own and operate Dynatest units, while 11 percent own and operate JILS units, 8 percent own and operate KUAB units, and the remaining 8 percent own and operate a combination of Dynatest, KUAB, and/or JILS units.
- The average use of the FWD with respect to program areas is 63 percent for structural capacity evaluation, 18 percent for research, 15 percent for pavement investigation, and 4 percent for other pavement evaluation activities.
- 78 percent of the respondents use FWD at the project level, while 19 percent use it at both project and network levels.
- 61 percent of the respondents test less than 500 roadway lane miles annually.
- The average annual FWD operating budget varies among agencies depending on the number of projects, project length, and individual costs involved.
- In addition to testing state highways, 39 percent of the respondents use FWD to test city streets, 11 percent test airport runways, and 17 percent test some other type of facilities.

FWD Operation

- 72 percent of responding agencies have a Quality Control/Quality Assurance plan in effect.
- 57 percent typically use one crewmember per FWD unit.
- 72 percent perform an annual reference calibration on their FWD unit(s).
- Over 69 percent perform a monthly relative calibration on their FWD unit(s).
- Over 31 percent use in-service pavements to perform a relative calibration.
- 64 percent use a seven-sensor set-up when testing for a typical pavement rehabilitation project.
- Nearly 70 percent of the FWD units owned by these agencies operate under the DOS environment.
- Only 28 percent of the transportation agencies use a seasonal and/or temperature adjustment factor(s) for determining the effective subgrade modulus for design purposes.

FLORIDA TESTING PROCEDURE

Deflection Testing

When testing with the FWD for pavement design purposes, two 9-kip load drops are used. However, only the deflection data resulting from the second loading are considered for roadbed soil characterization. It is generally believed that the deflection data produced under the first impact load may not always be representative of the true pavement response *(2)*. Therefore, the first load is mainly used for the loading plate "seating" purposes. All the deflection data are obtained using the sensor configuration shown in Figure 4.

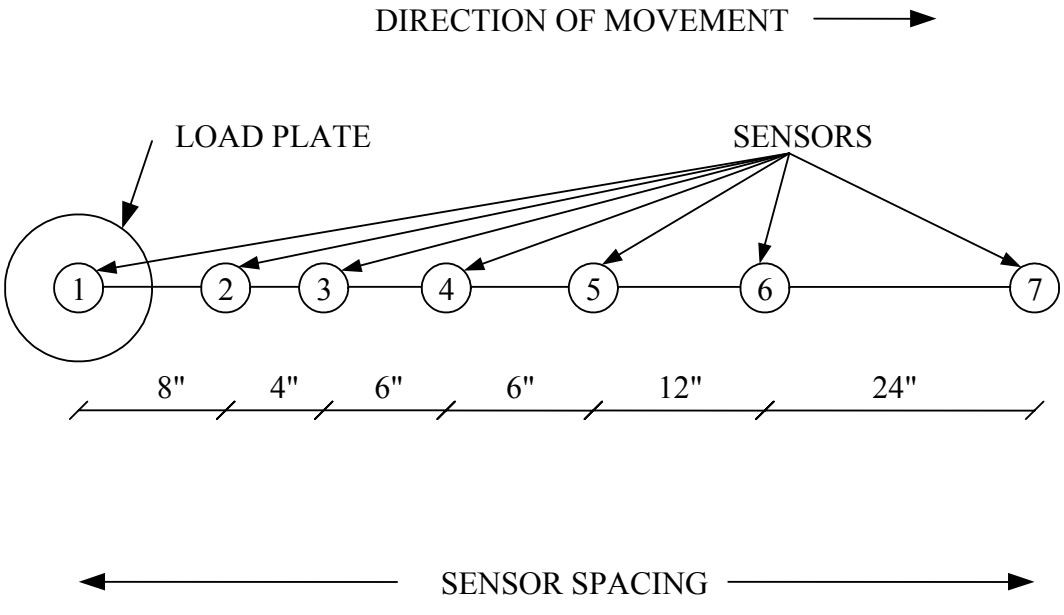


Figure 4: Schematic Illustration of Sensor Configuration

Prediction of In-Place Moduli of Embankment Material

The current procedure for predicting the in-place strength of the embankment material of a pavement system is based on the procedure described in the *AASHTO Guide for Design of Pavements Structures* calibrated to Florida conditions *(3)*. This method was originally proposed by Ullidtz *(4)*, and is based on Boussinesq's theory on a concentrated load applied on an elastic half-space *(5)*. In this procedure, the modulus of an embankment material is estimated as follows:

$$M_R = 0.24P / d_r \cdot r \qquad (2)$$

Where:

M_R = Embankment modulus, in psi;
P = Applied load, in pounds;
d_r = Deflection measured at a radial distance r, in inches; and
r = Radial distance at which the deflection is measured, in inches.

The *AASHTO Design Guide* suggests the deflection used in the above equation be measured as close as possible to the loading plate and yet be sufficiently far from the load. This is suggested to satisfy the assumption that, at points sufficiently distant from the load, the deflections measured at the pavement surface are mainly due to the embankment deformation, and are also independent of the load plate size. Florida's previous experience with non-destructive deflection testing has shown that the pavement deflections measured at 36 inches away from the load are appropriate for the determination of the embankment moduli. Therefore, in the Florida procedure, only the pavement deflections measured at 36 inches (r = 36 inches in equation 2) away from the load are considered for design purposes in the Florida procedure. Furthermore, within a project limits, the resilient modulus (Mr) value is reported based on the mean deflection plus two standard deviations (d_r = mean deflection + 2 σ).

PROJECT TESTING REQUESTS

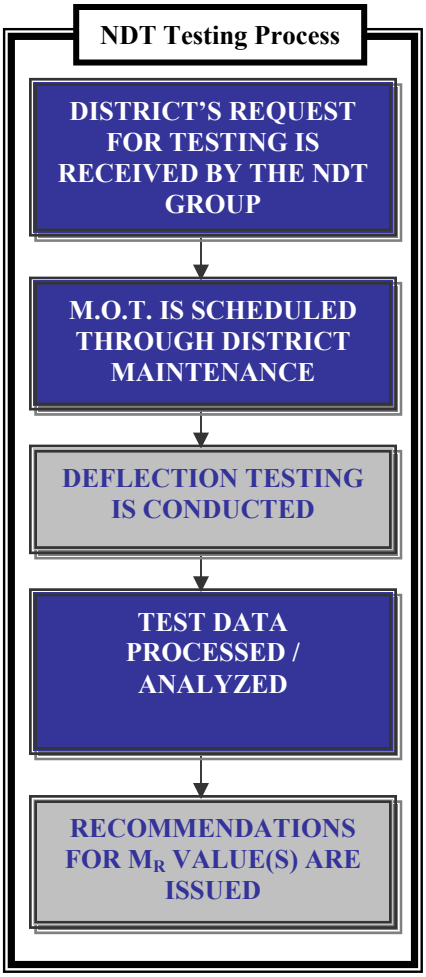
To request a project to be tested, simply contact:

Charles Holzschuher
Materials Research Park
5007 NE 39th Avenue
Gainesville, FL 32609
Phone: (352) 955-6339
Fax: (352) 955-6345
charles.holzschuher@dot.state.fl.us

NOTE: *Please Carbon Copy your District Maintenance Engineer for Maintenance of Traffic.*

Include the following information within the body of the request:

1.) Roadway Id
(e.g. SR 91, 91470000, FL Turnpike)
2.) County Name
(e.g. Okeechobee)
3.) Project ID
(e.g. MP 181.7 to MP 188.9)
4.) Exceptional Needs
(e.g. Extend testing 1000 ft past Begin/End segment limits.)
5.) Project Location Map
6.) Recommended Due Date
7.) MOT, Traffic Restrictions



After the request has been received by the NDT group, the District Maintenance Office will schedule the maintenance of traffic at the request of the SMO and deflection testing will be conducted. The flow chart to the right details the project testing process.

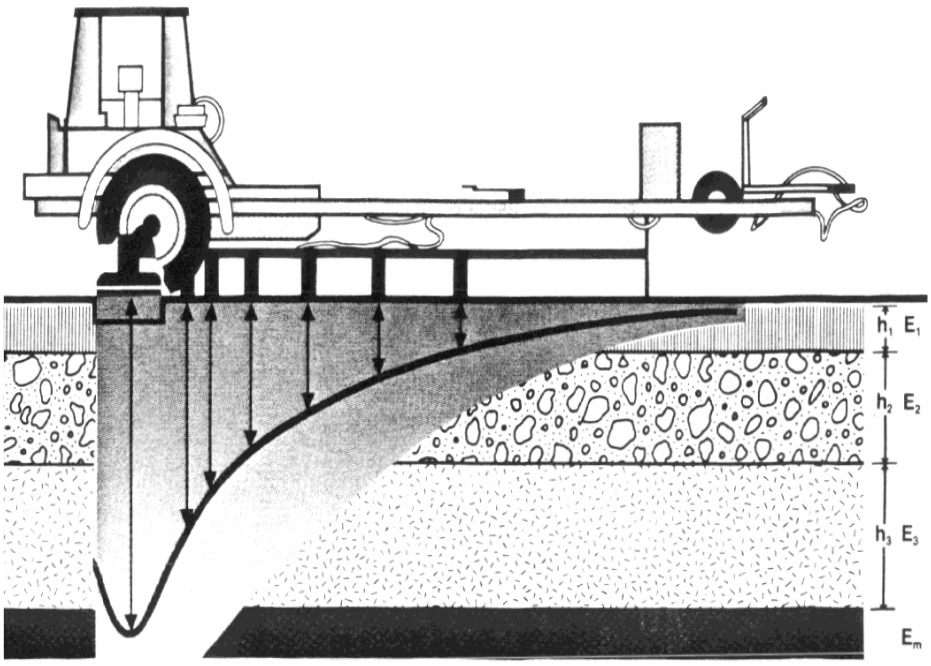
For coordination purposes, it is best to provide the State Materials Office with as much time as possible by submitting any testing requests immediately after the work program has been updated and the project schedules are set. In order to ensure that all requests may be dealt with in a timely and efficient manner, a minimum of 6 months is suggested for this testing process. Furthermore, an annual district-wide listing of test projects is preferred to properly schedule crew travel times and equipment.

Field Testing Requirements

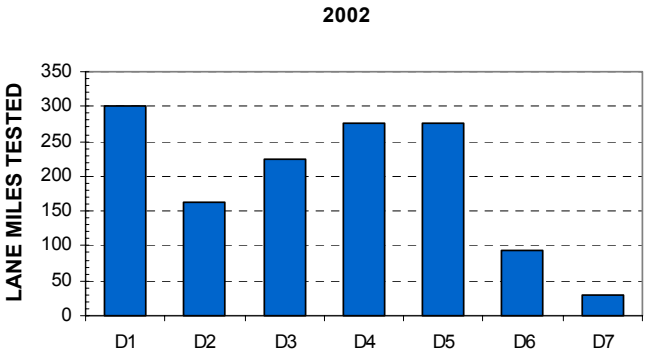
Generally, testing is only conducted on 2 lane projects greater than 1 mile long, or on multi-lane projects greater than 0.5 mile long. Testing frequency for 2 lane projects is conducted at 28 tests / mile in one direction. For multilane projects testing is conducted at 14 tests / mile / each direction.

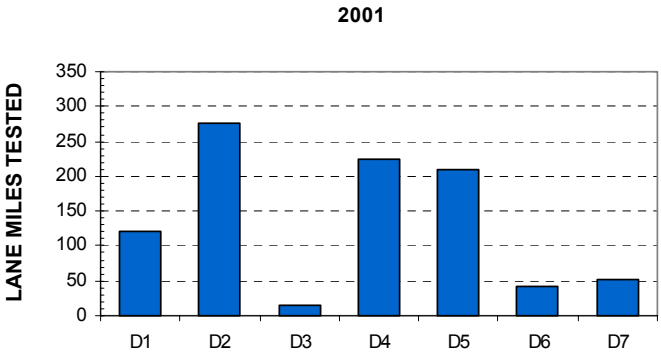
PART II:

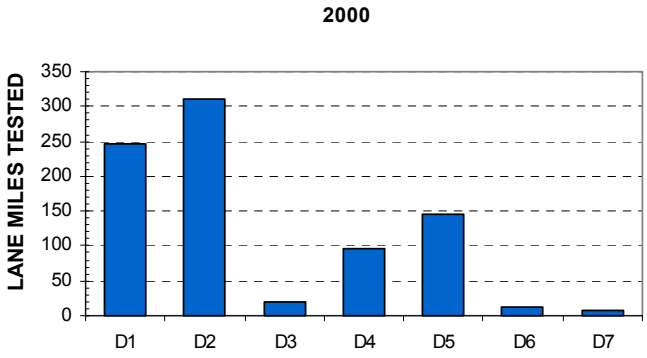
FACTS & FIGURES

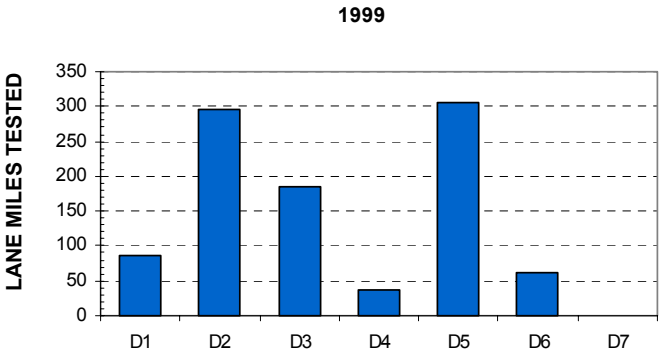


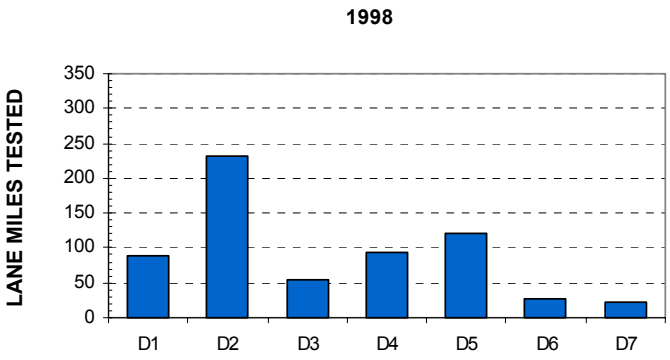
Annual Lane Miles Tested by District



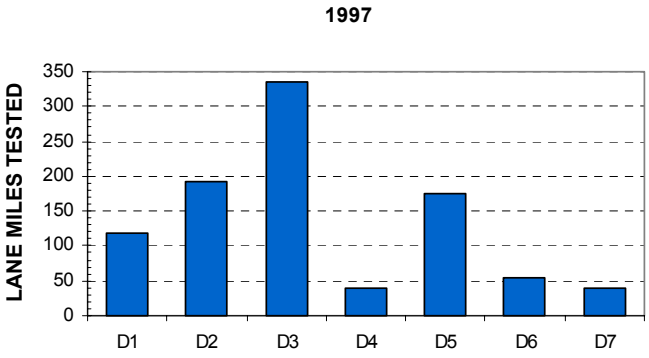


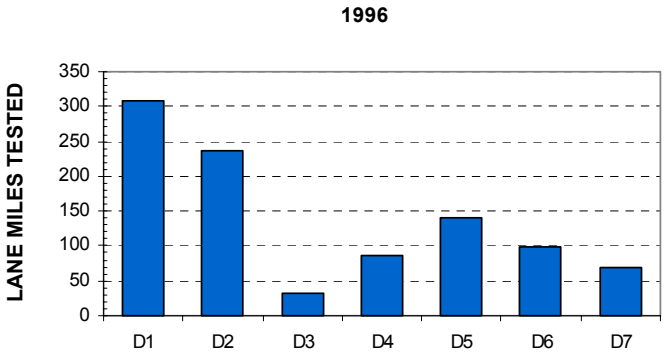


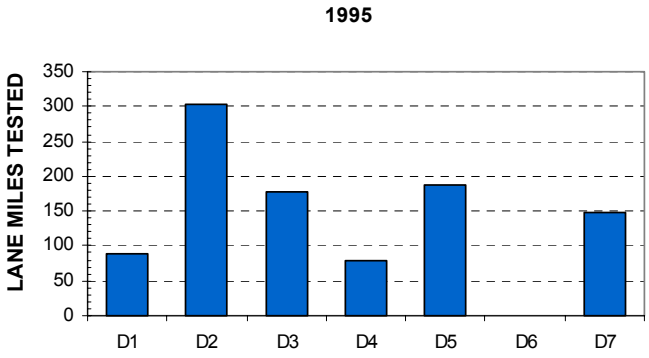


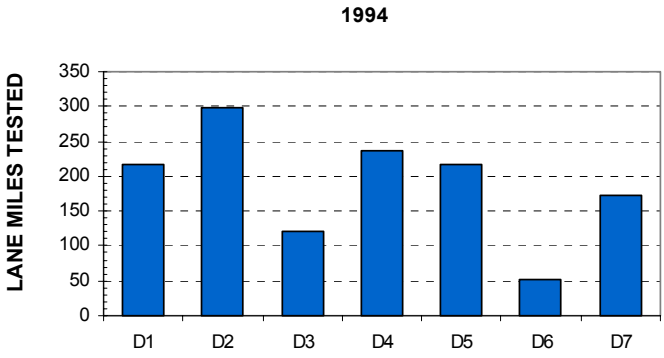


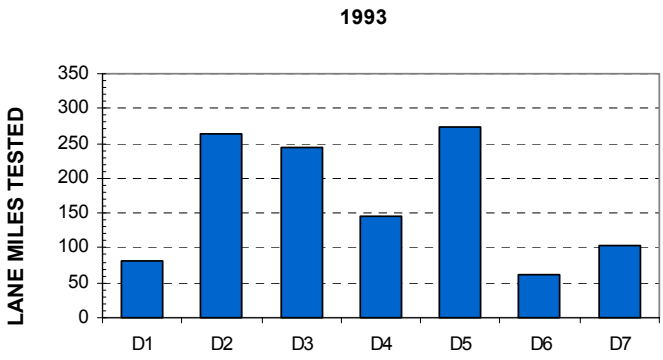
Annual Lane Miles Tested by District (continued)











Annual Lane Miles Tested By System Type & District
2002

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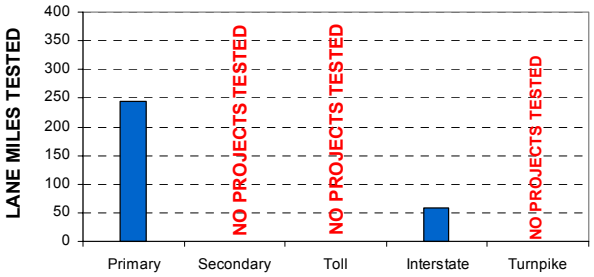

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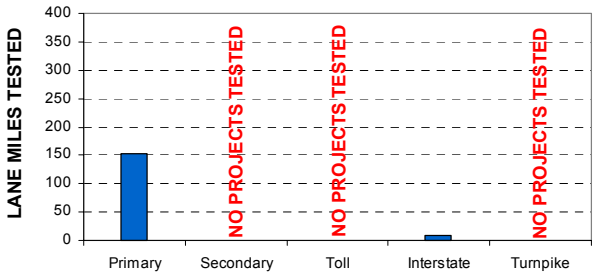

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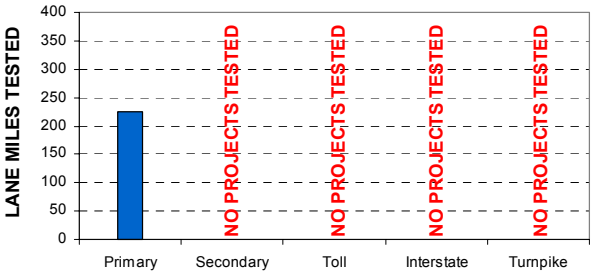

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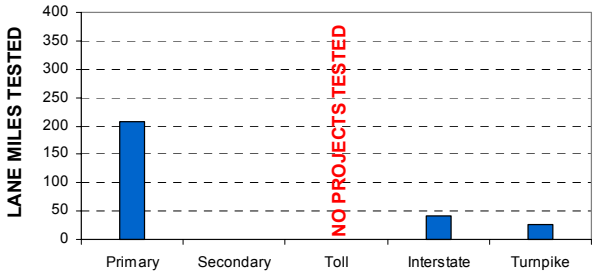

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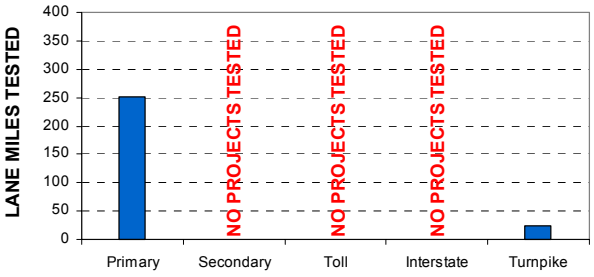

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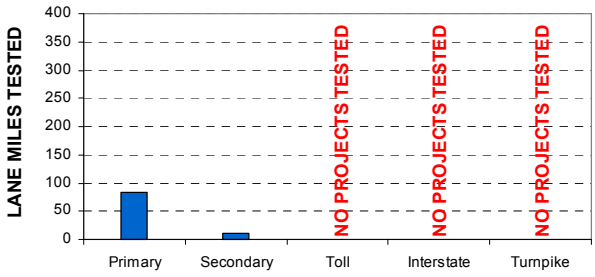

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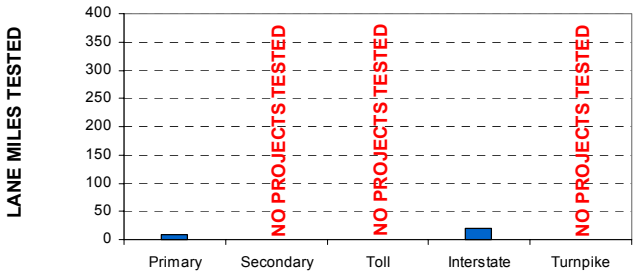

Annual Lane Miles Tested By System Type & District (continued)

2001

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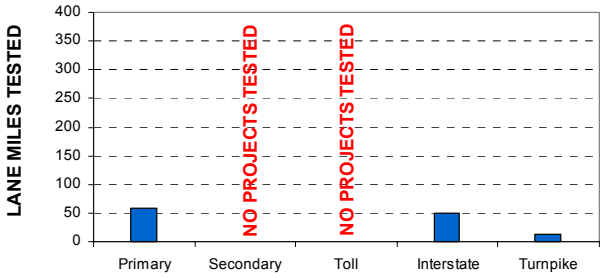

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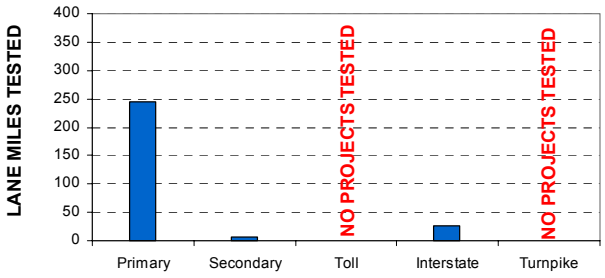

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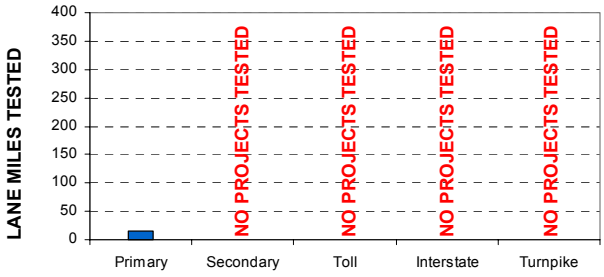

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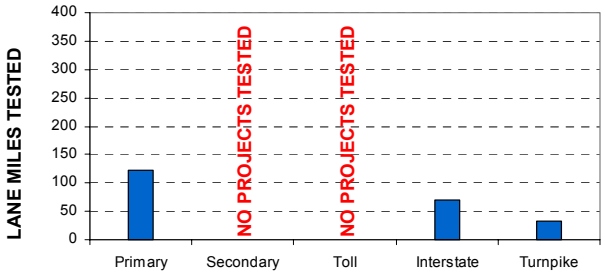

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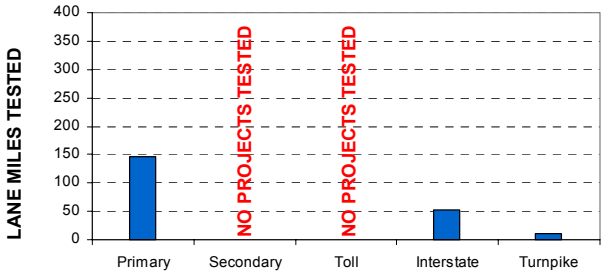

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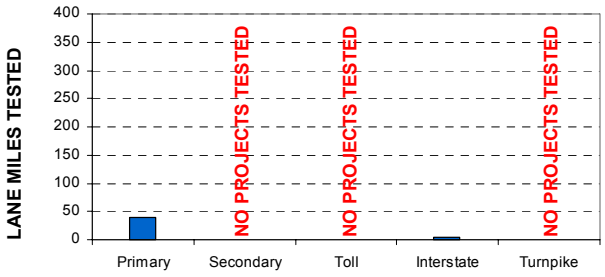

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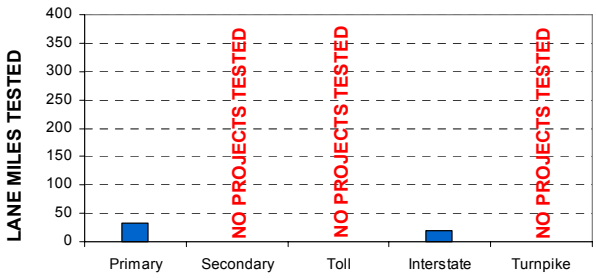

Annual Lane Miles Tested By System Type & District (continued)

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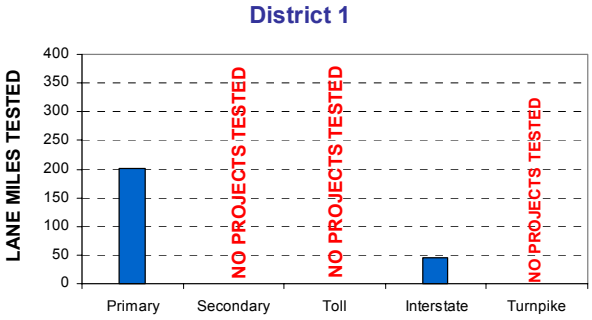
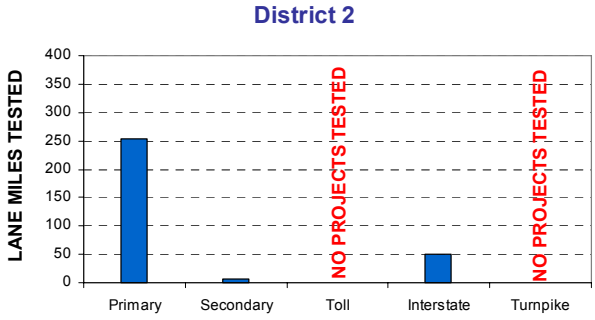
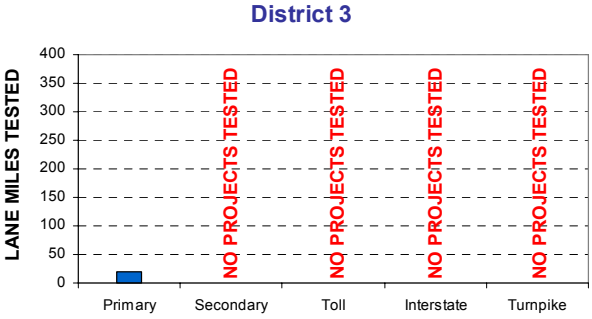
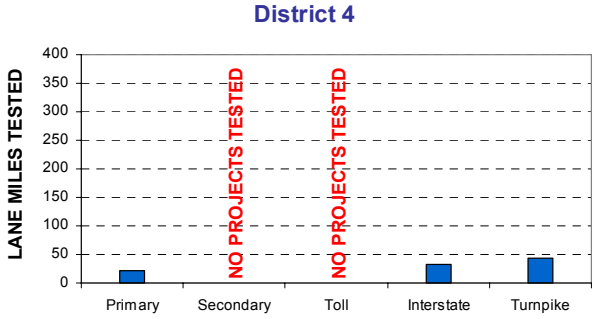
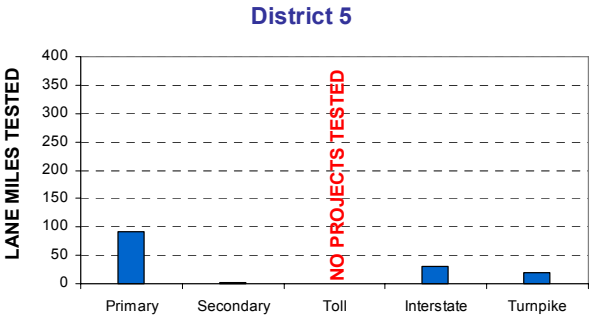
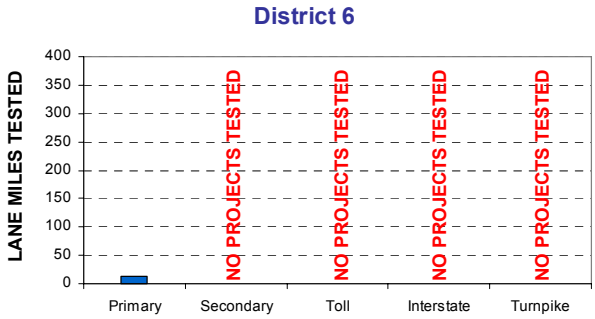


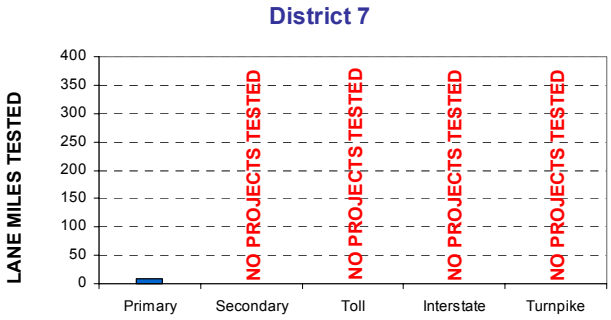








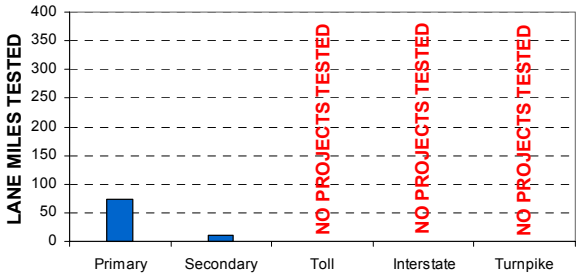




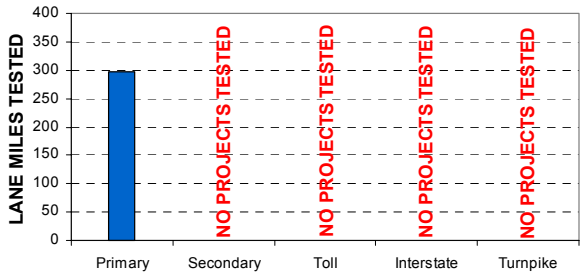
Annual Lane Miles Tested By System Type & District (continued)

1999

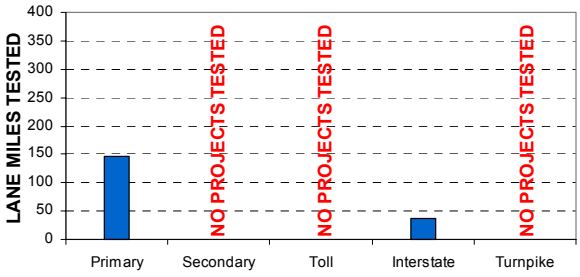
District 1



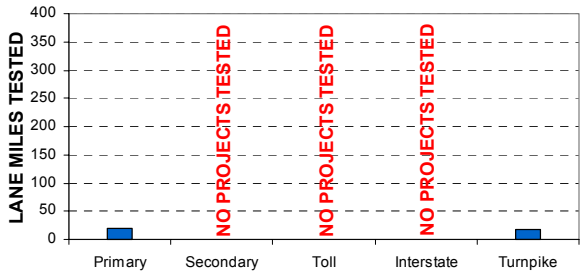
District 2



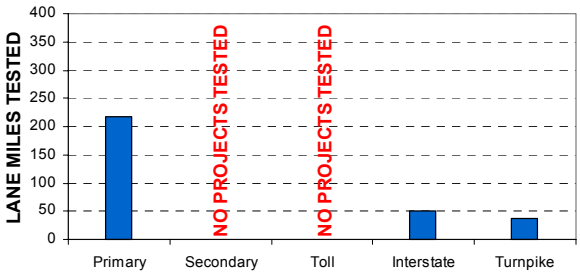
District 3



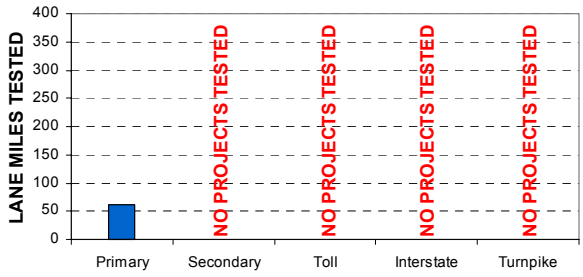
District 4



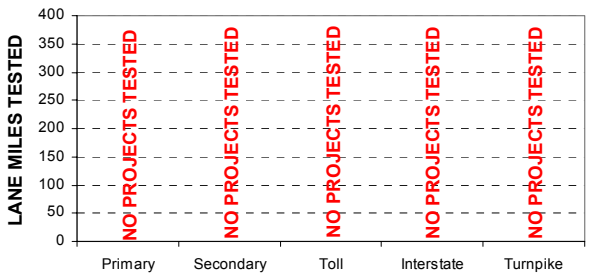
District 5



District 6

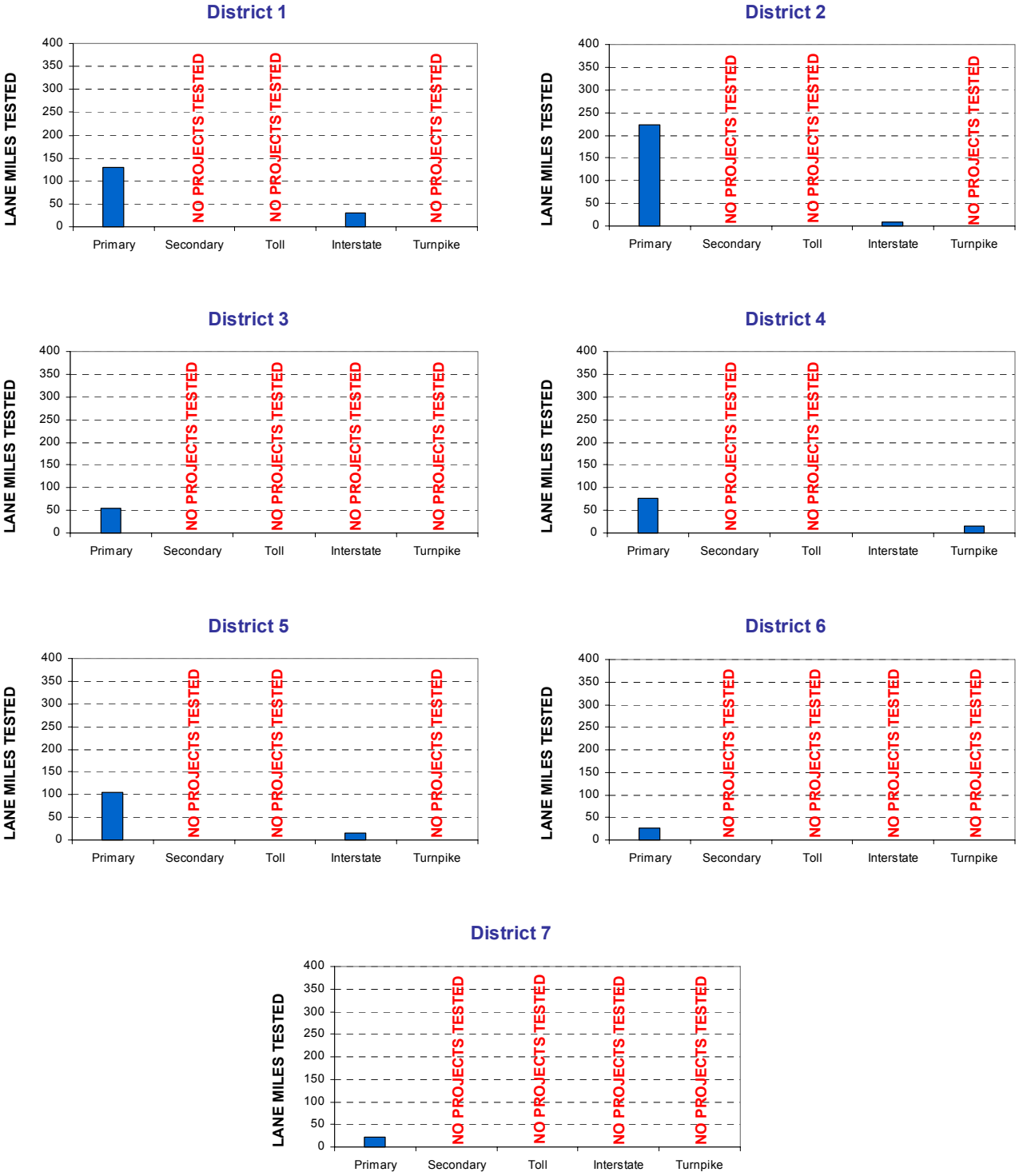


District 7



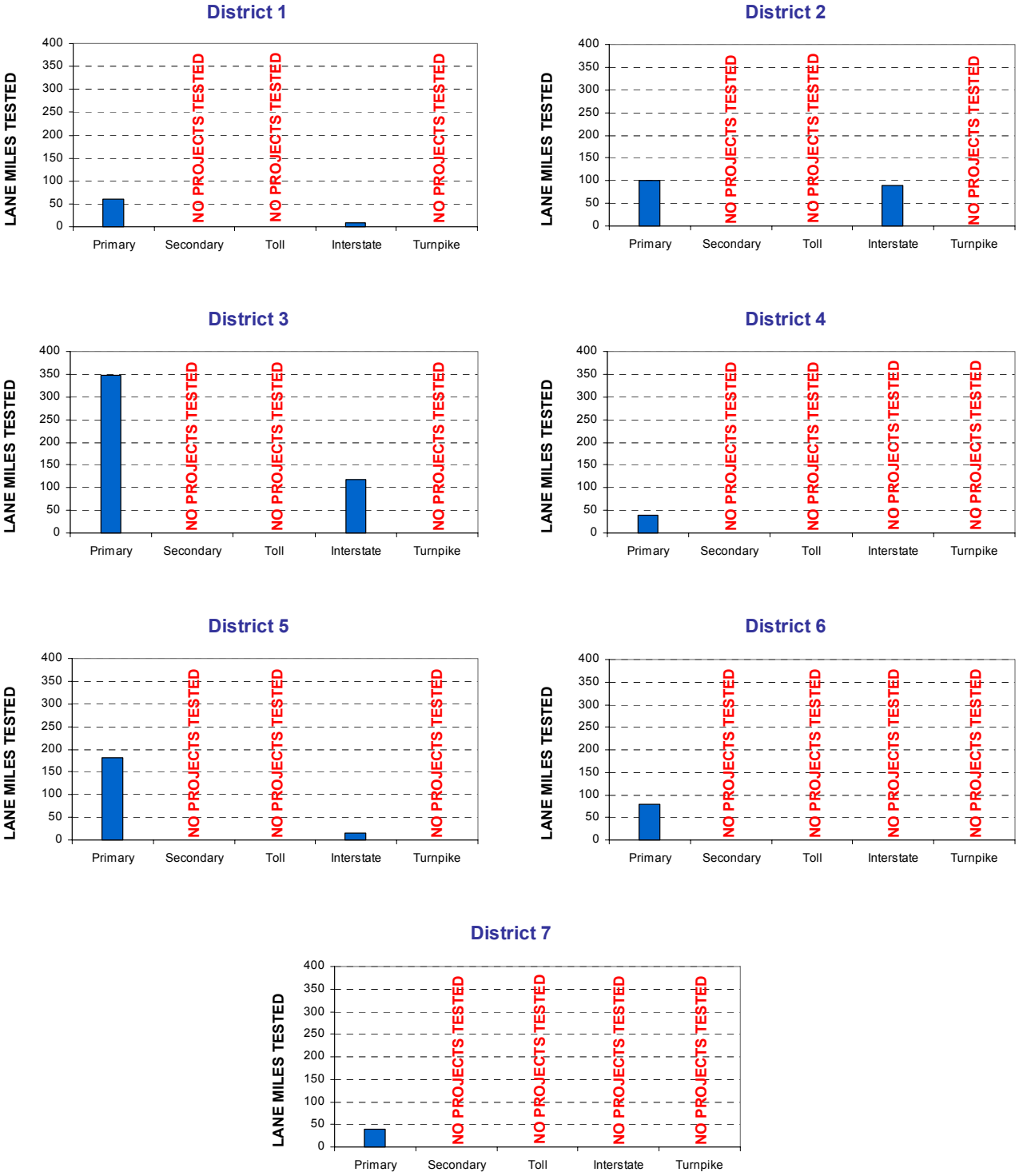
Annual Lane Miles Tested By System Type & District (continued)

1998



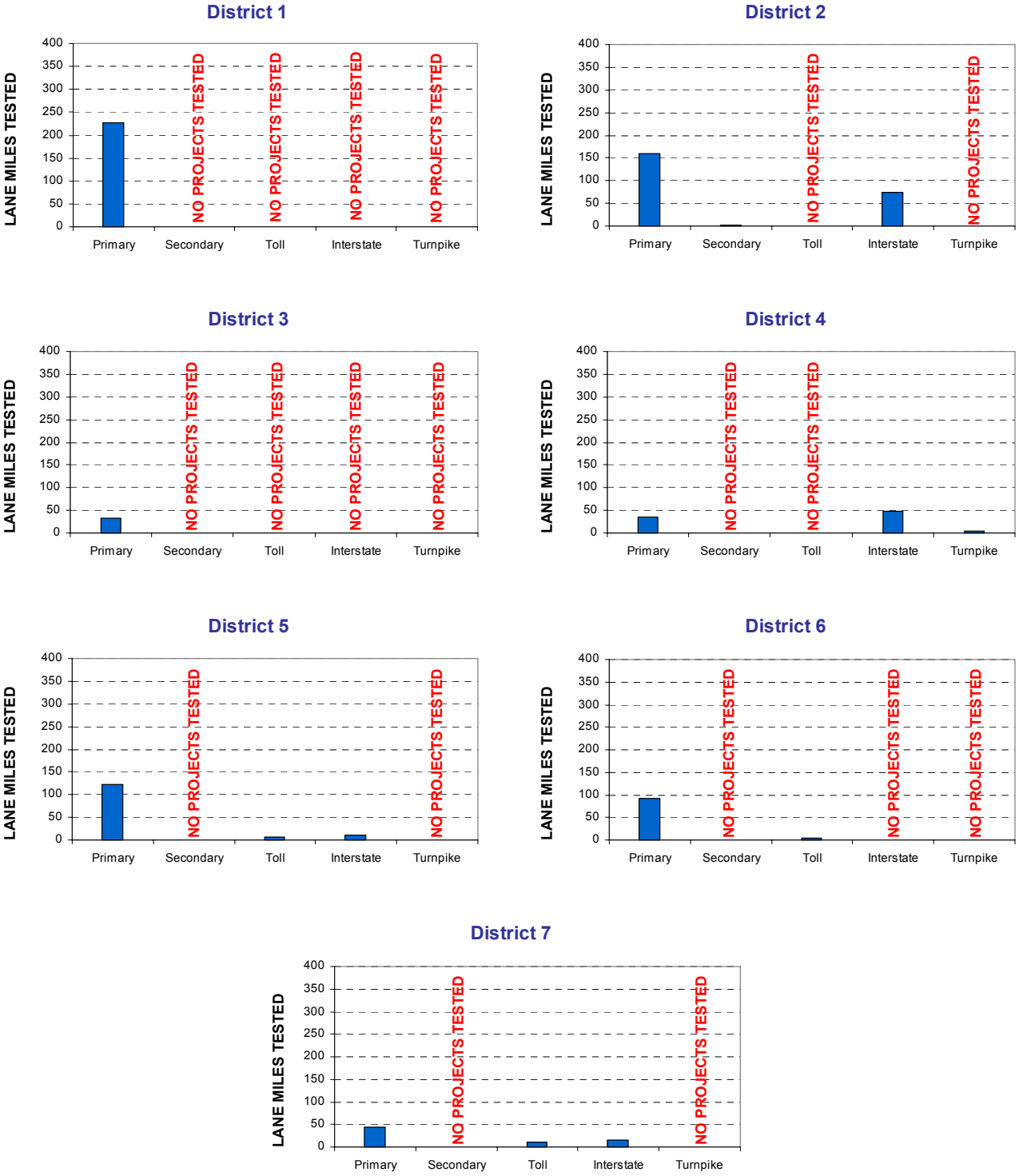
Annual Lane Miles Tested By System Type & District (continued)

1997



1999 Lane Miles Tested By System Type & District (continued)

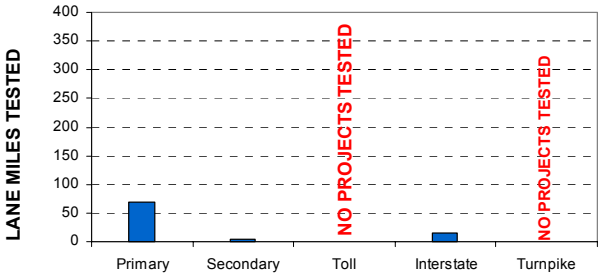
1996



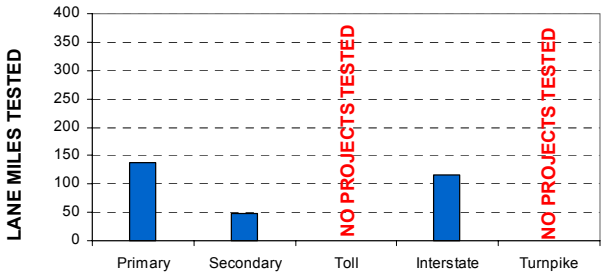
Annual Lane Miles Tested By System Type & District (continued)

1995

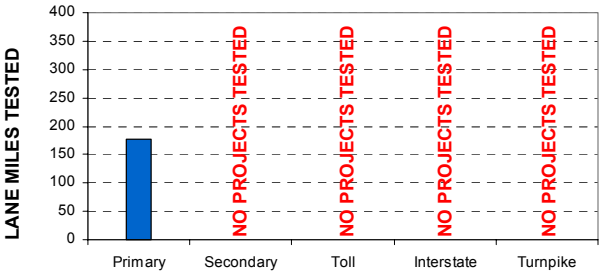
District 1



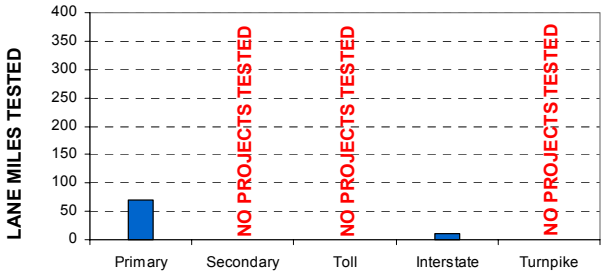
District 2



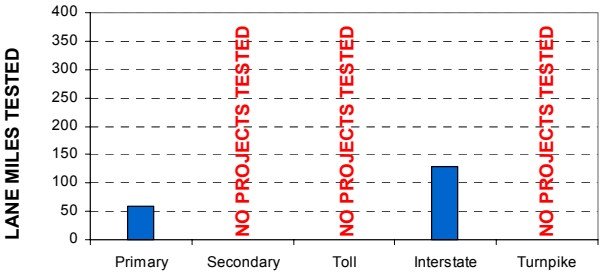
District 3



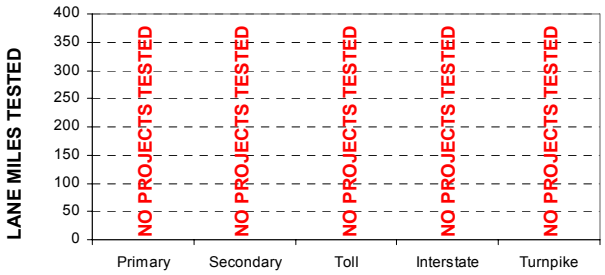
District 4



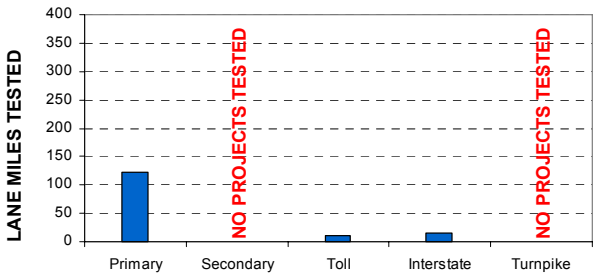
District 5



District 6

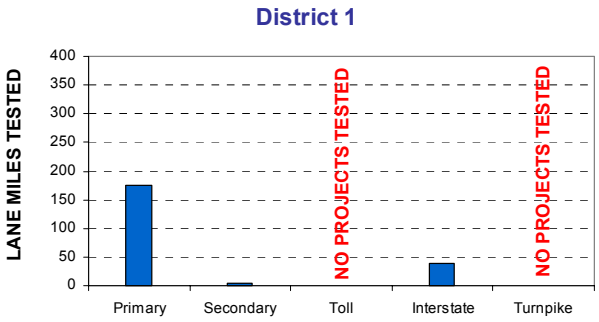


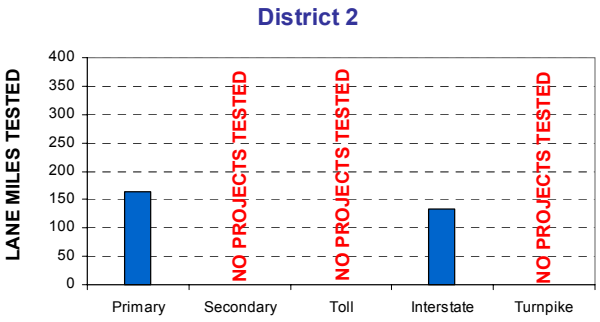
District 7

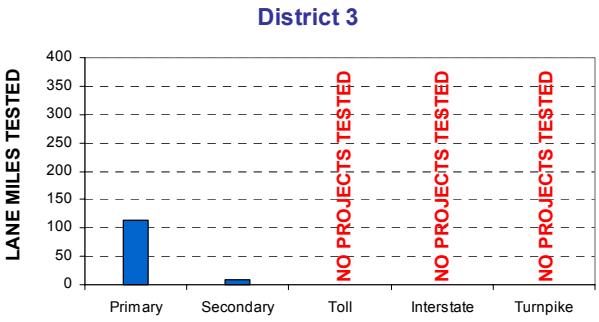


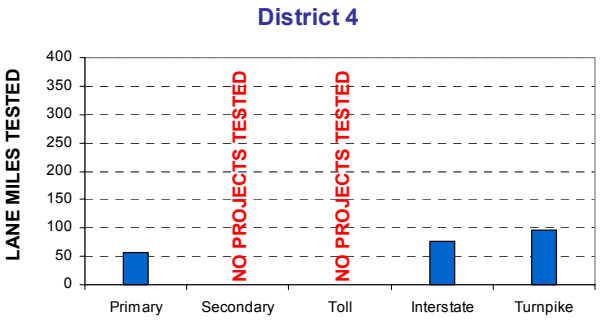
Annual Lane Miles Tested By System Type & District (continued)

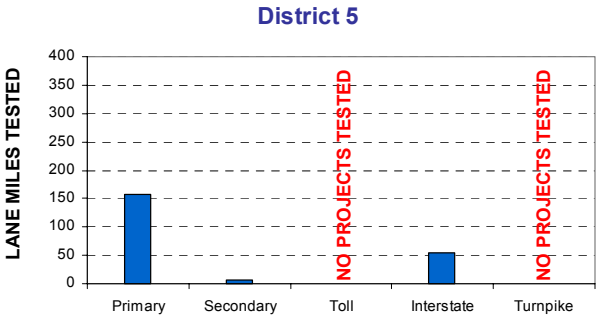
1994

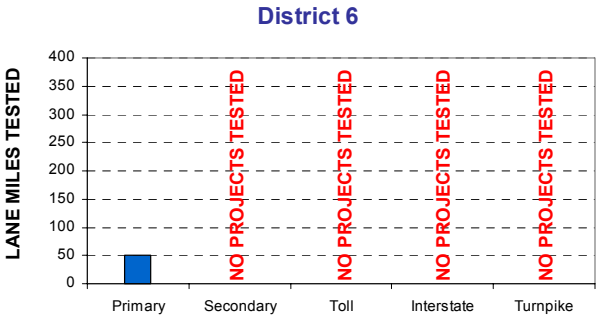


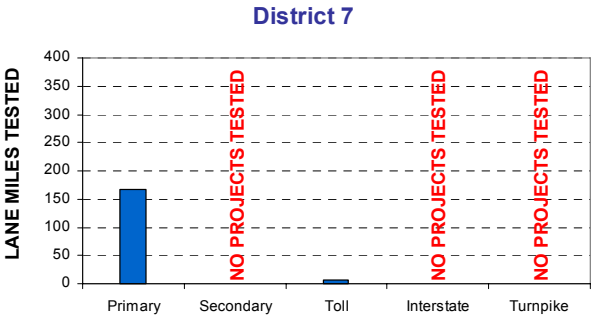






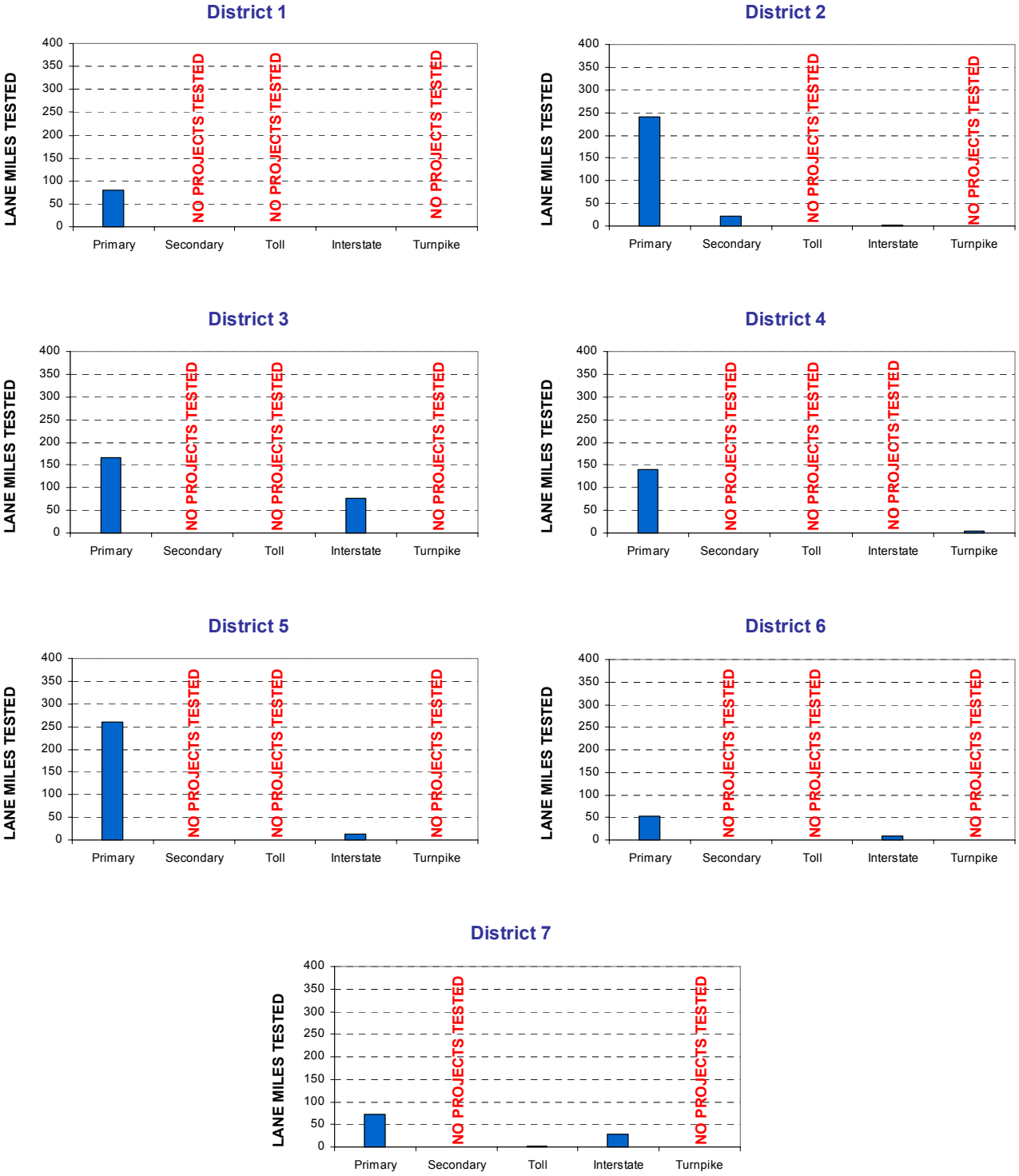






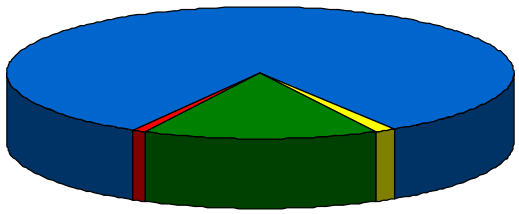
Annual Lane Miles Tested By System Type & District (continued)

1993



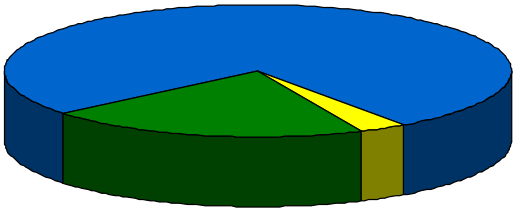
Total Lane Miles Tested from 1993 – 2002 by District

District 1



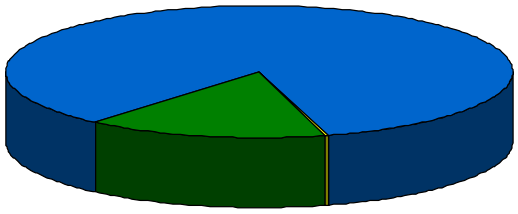
System	Lane Miles Tested	Percent Lane Miles Tested
Primary	1320.750	82.87%
Secondary	19.249	1.21%
Toll	0.000	0.00%
Interstate	239.828	15.05%
Turnpike	14.000	0.88%
All Systems	1593.827	100%

District 2



System	Lane Miles Tested	Percent Lane Miles Tested
Primary	1977.155	76.25%
Secondary	82.358	3.18%
Toll	0.000	0.00%
Interstate	533.318	20.57%
Turnpike	0.000	0.00%
All Systems	2592.831	100%

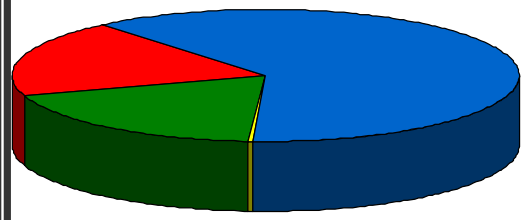
District 3



System	Lane Miles Tested	Percent Lane Miles Tested
Primary	1299.789	84.34%
Secondary	8.017	0.52%
Toll	0.000	0.00%
Interstate	233.414	15.14%
Turnpike	0.000	0.00%
All Systems	1541.220	100%

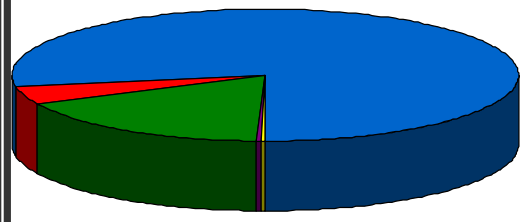
Total Lane Miles Tested from 1993 – 2002 by District (Continued)

District 4



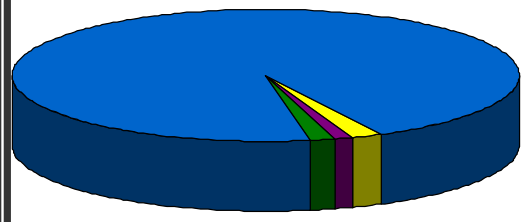
System	Lane Miles Tested	Percent Lane Miles Tested
Primary	789.405	62.06%
Secondary	0.997	0.08%
Toll	0.000	0.00%
Interstate	241.779	19.01%
Turnpike	239.769	18.85%
All Systems	1271.950	100%

District 5



System	Lane Miles Tested	Percent Lane Miles Tested
Primary	1595.299	77.77%
Secondary	7.475	0.36%
Toll	6.797	0.33%
Interstate	350.680	17.09%
Turnpike	91.127	4.44%
All Systems	2051.378	100%

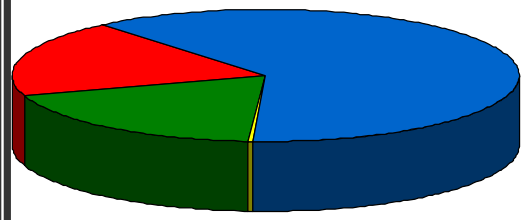
District 6



System	Lane Miles Tested	Percent Lane Miles Tested
Primary	497.191	95.17%
Secondary	11.065	2.12%
Toll	5.352	1.02%
Interstate	8.806	1.69%
Turnpike	0.000	0.00%
All Systems	522.414	100%

Total Lane Miles Tested from 1993 – 2002 by District (continued)

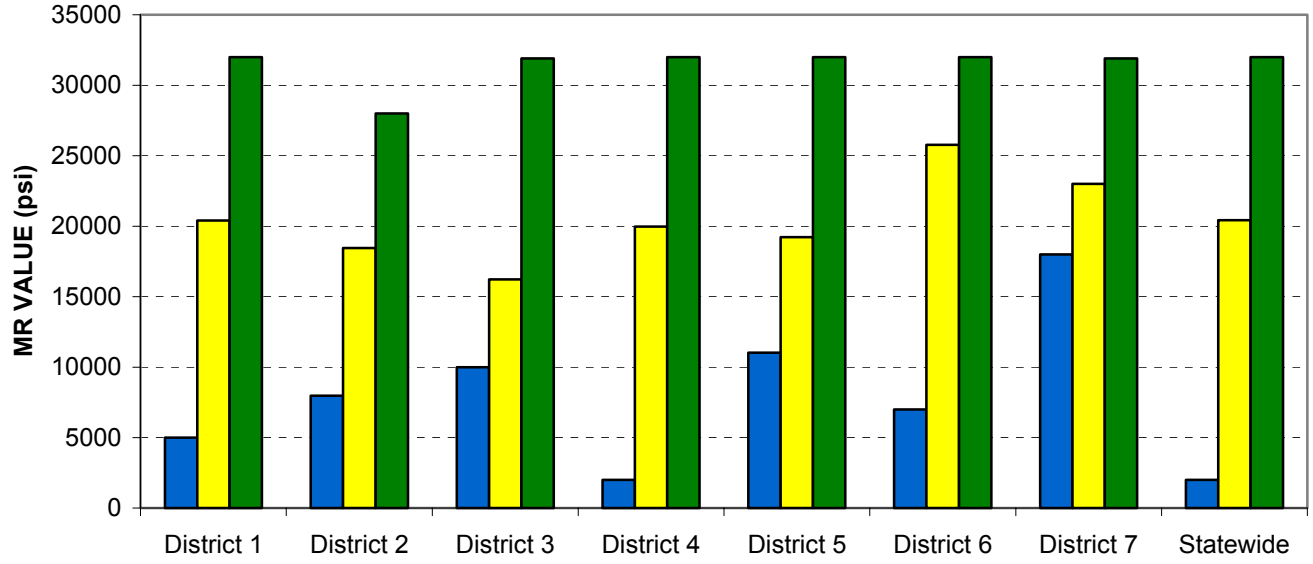
District 7



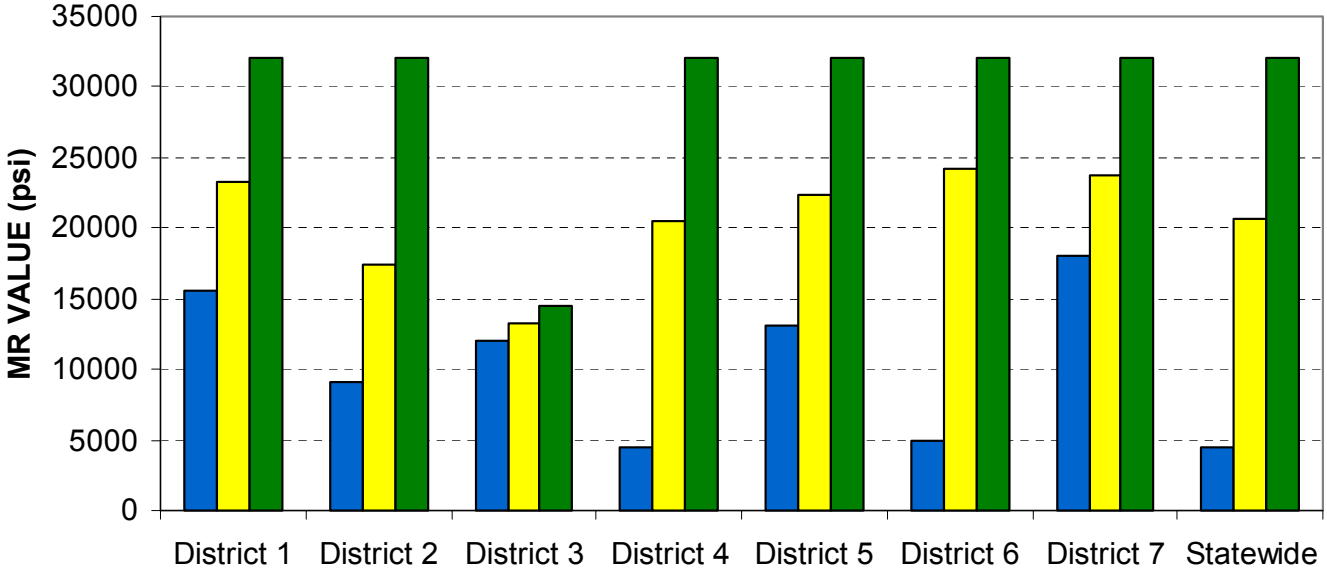
System	Lane Miles Tested	Percent Lane Miles Tested
Primary	518.941	83.04%
Secondary	0.000	0.00%
Toll	28.607	4.58%
Interstate	77.416	12.39%
Turnpike	0.000	0.00%
All Systems	624.964	100%

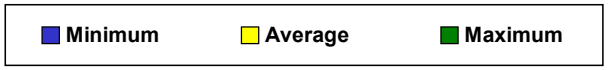
Project M_R Statistics by District

2002



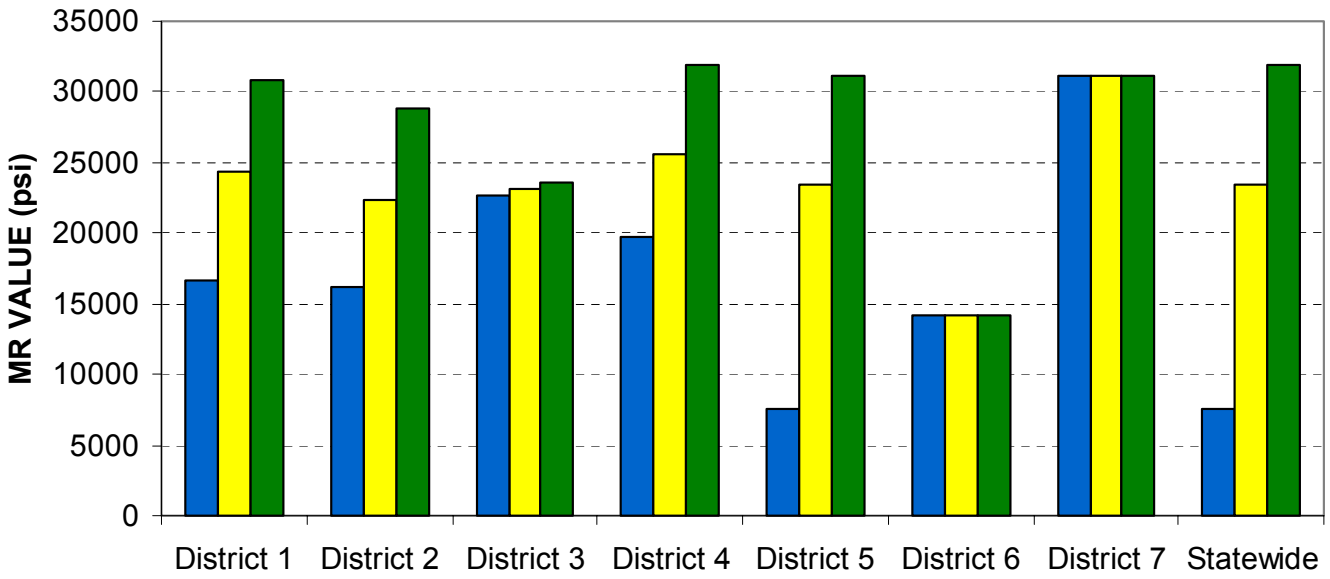
2001



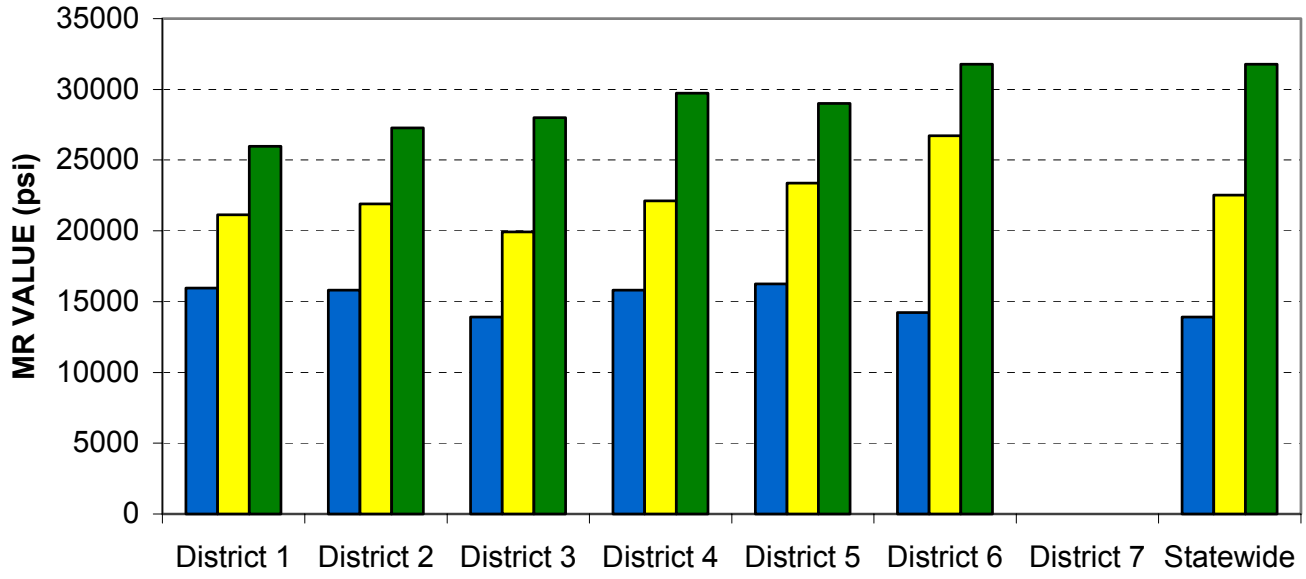


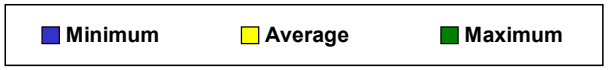
Project M_R Statistics by District (continued)

2000



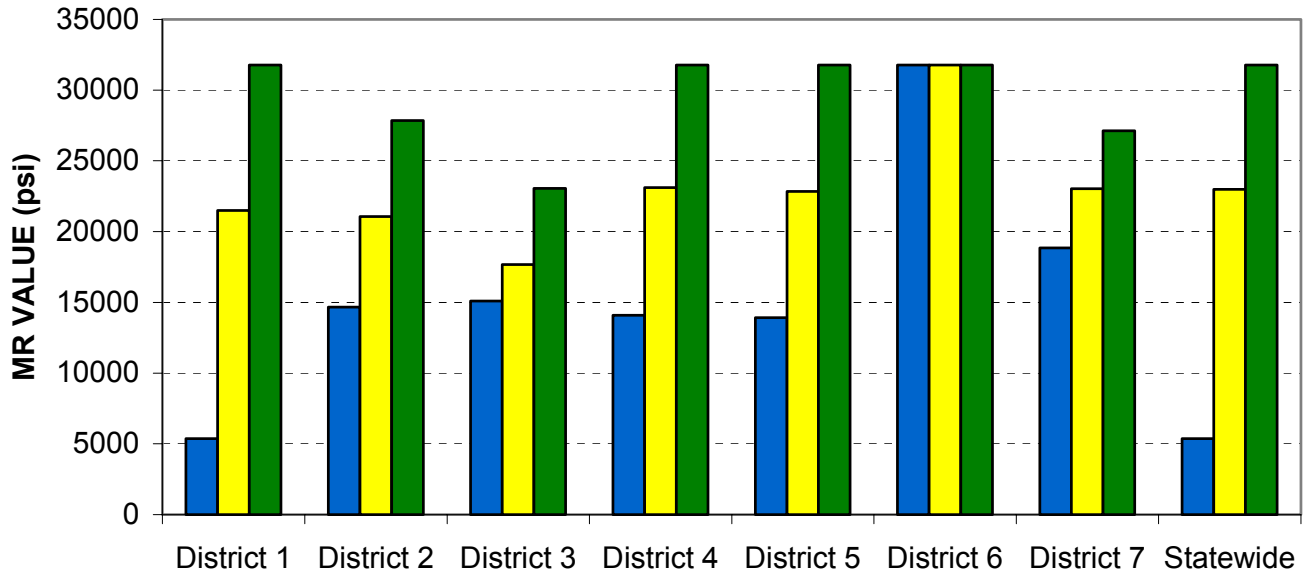
1999



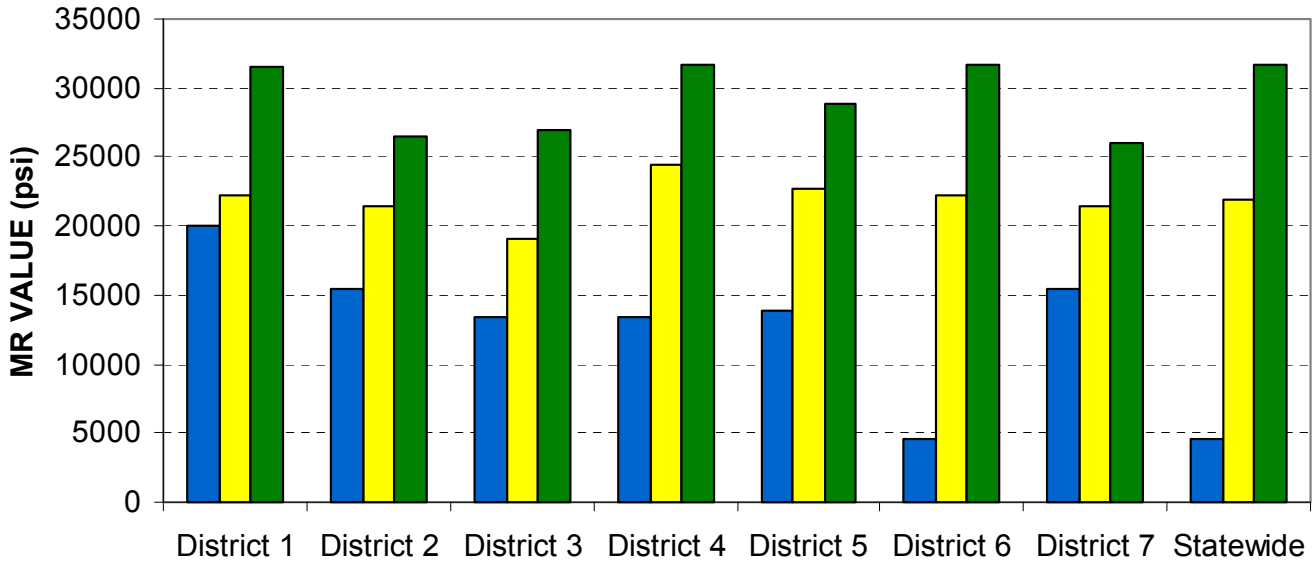


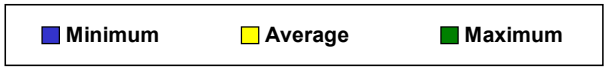
Project M_R Statistics by District (continued)

1998



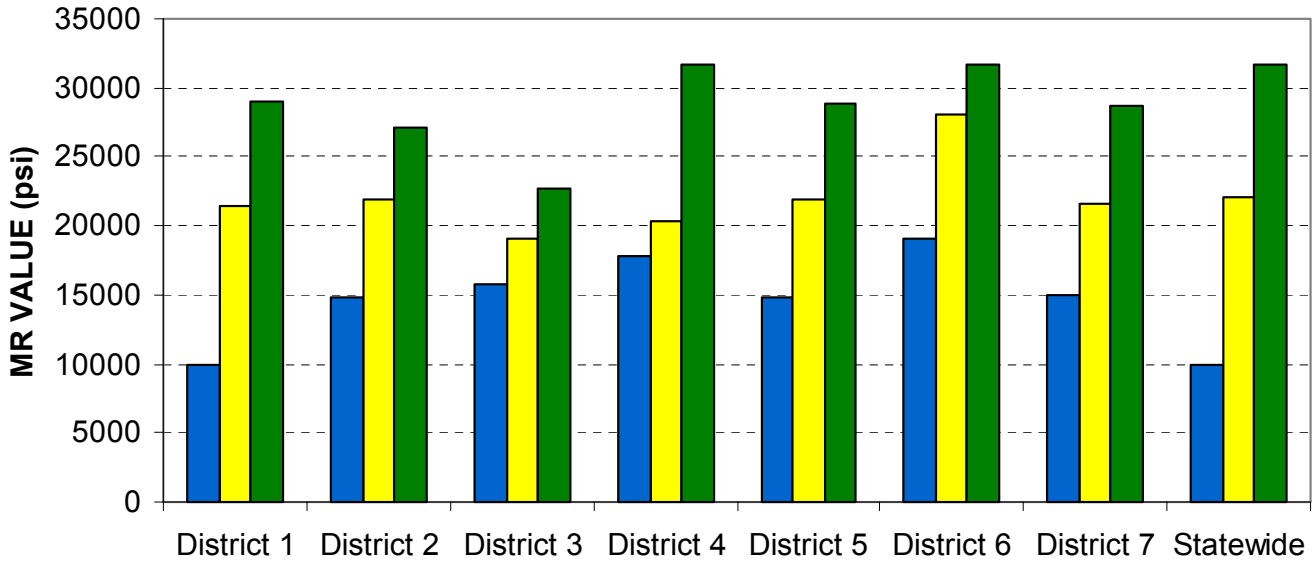
1997



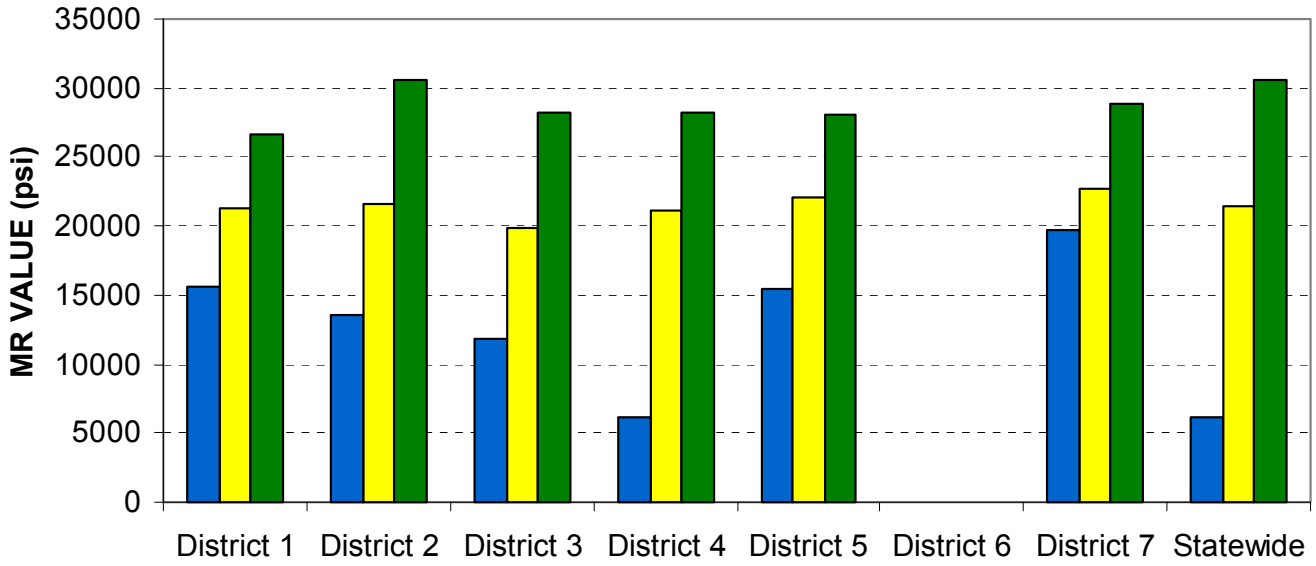


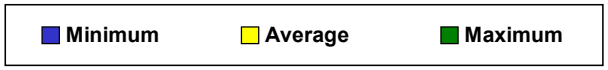
Project M_R Statistics by District (continued)

1996



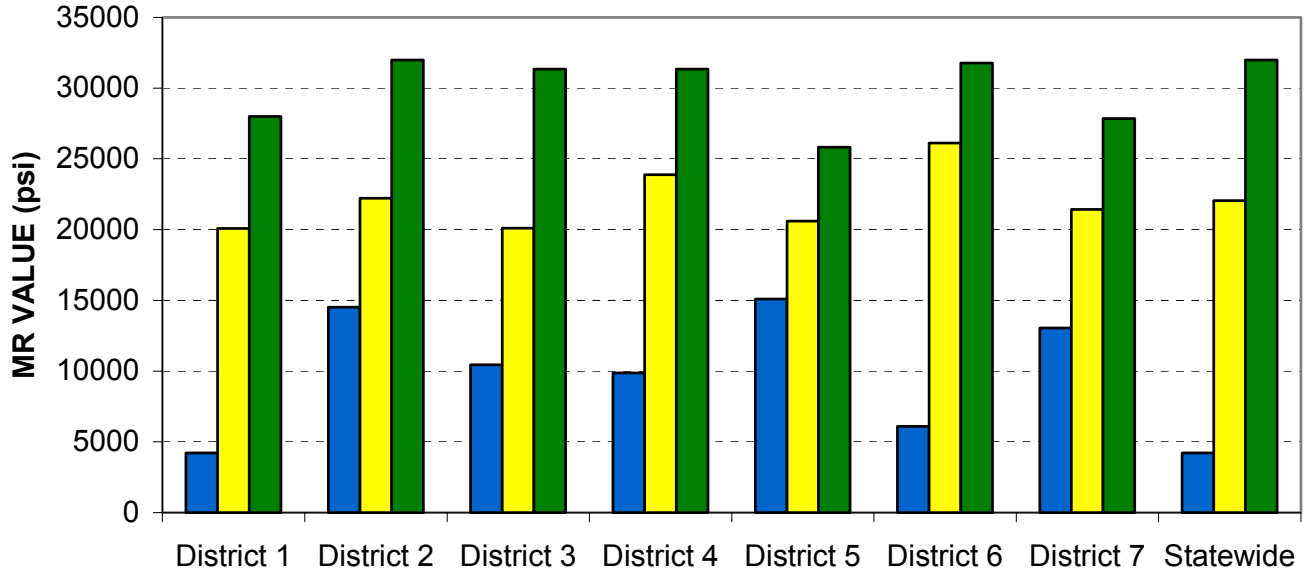
1995



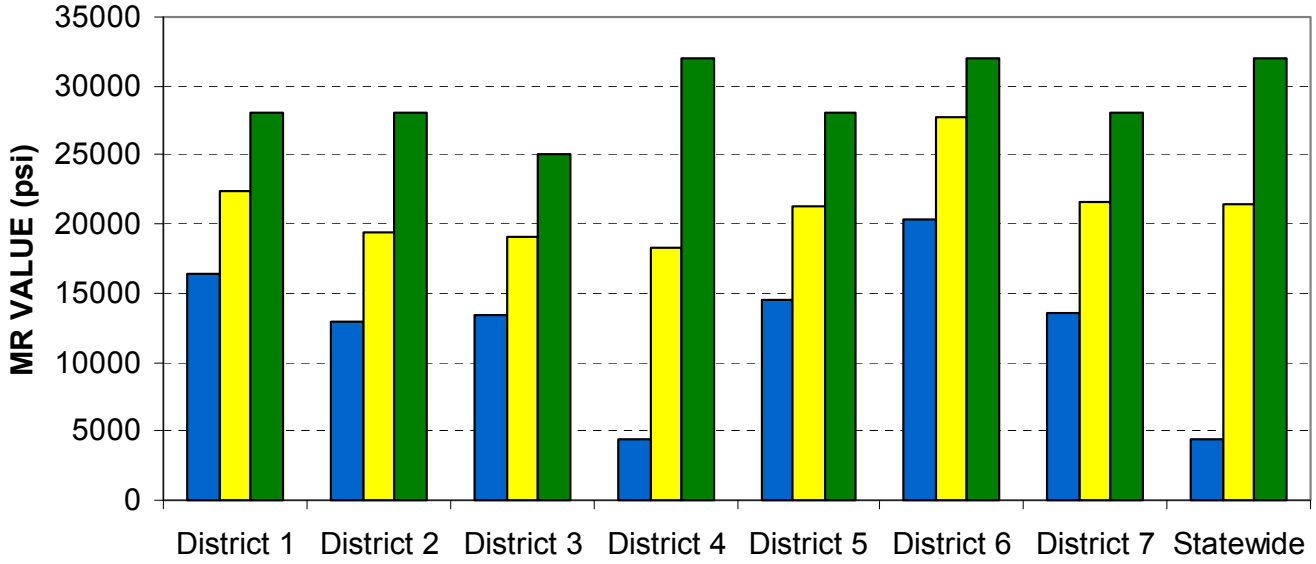


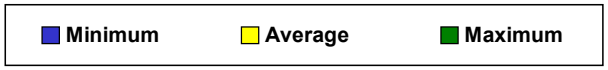
Project M_R Statistics by District (continued)

1994

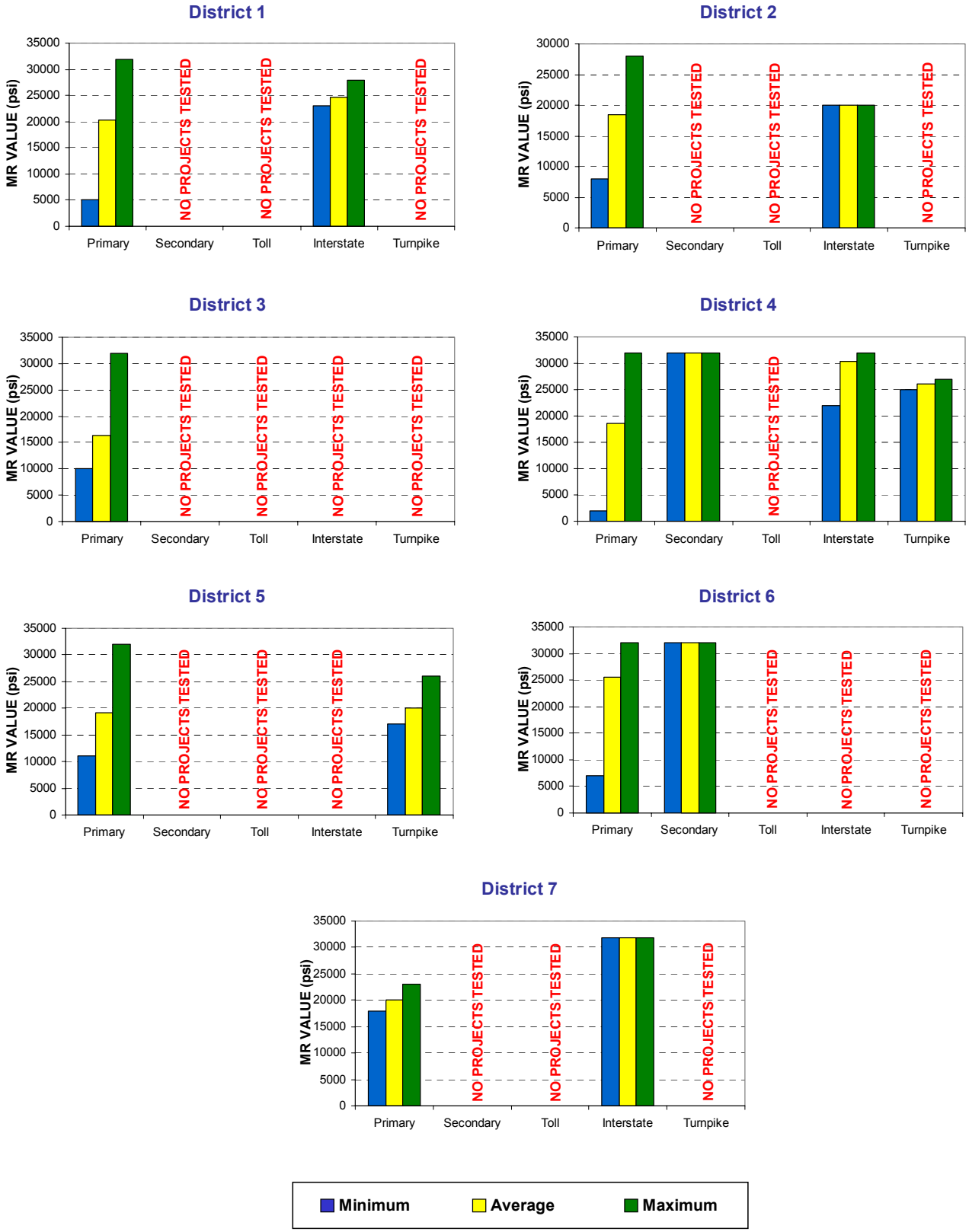


1993

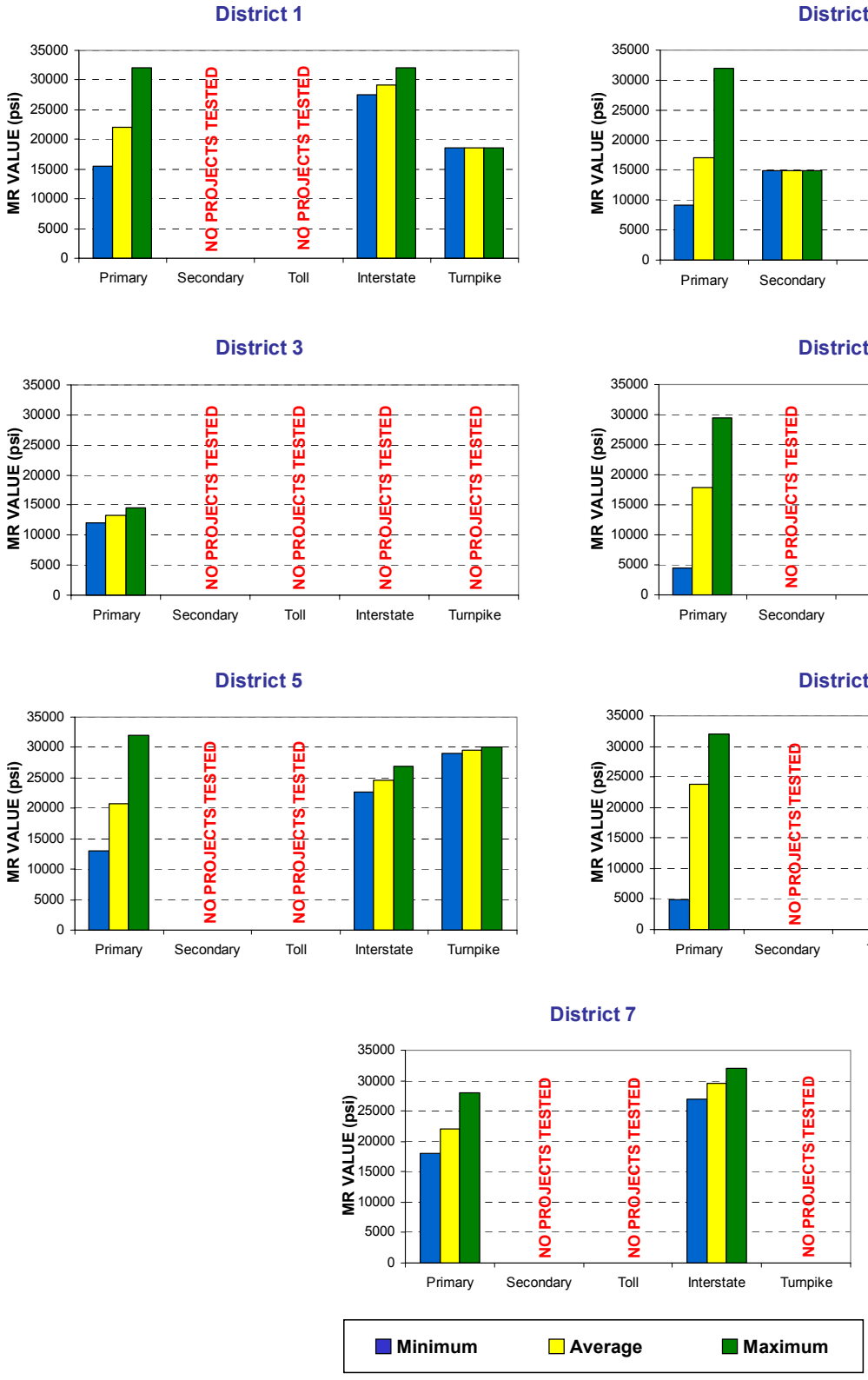




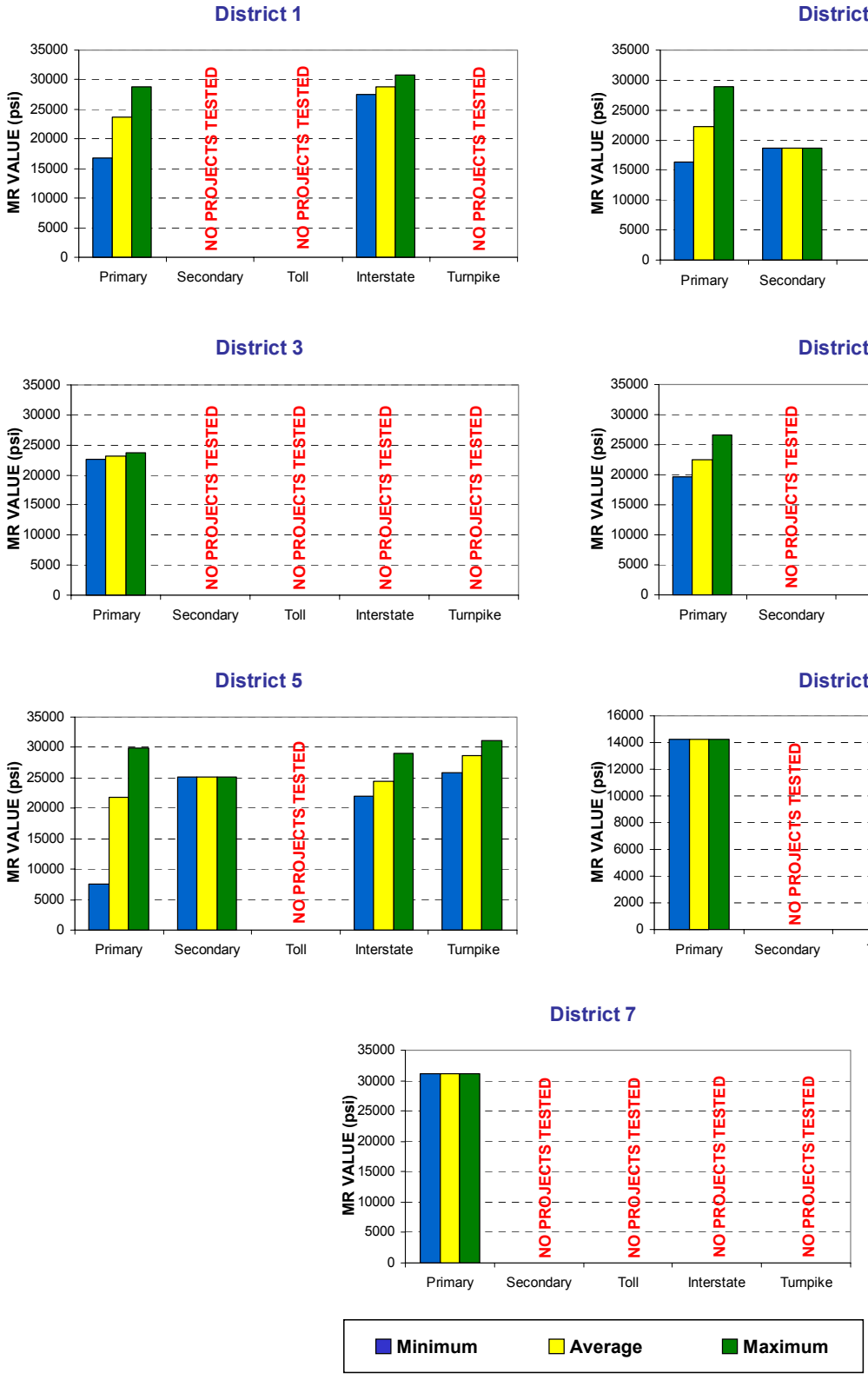
Project M_R Statistics by System Type & District 2002



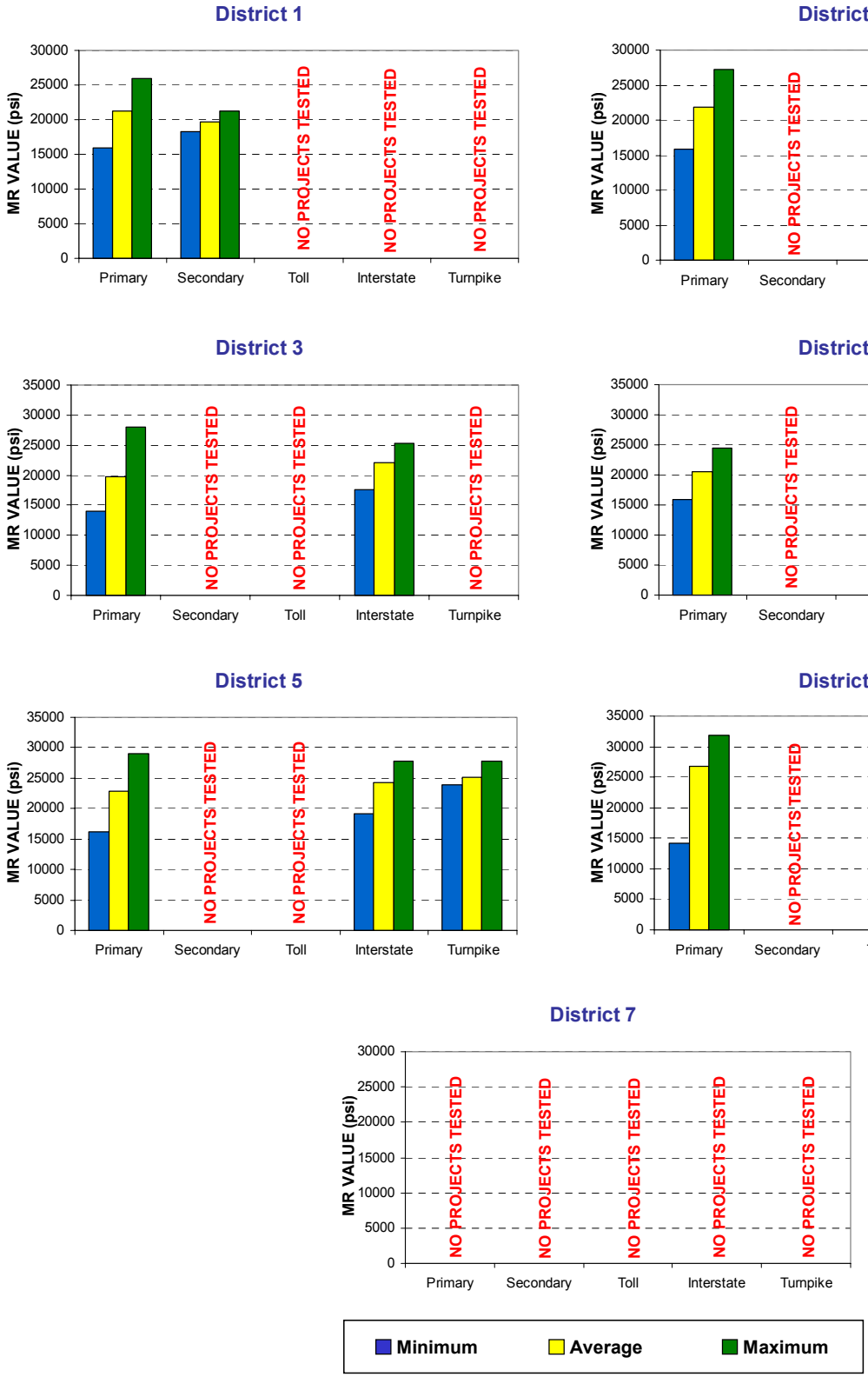
Project M_R Statistics by System Type & District (continued)
2001



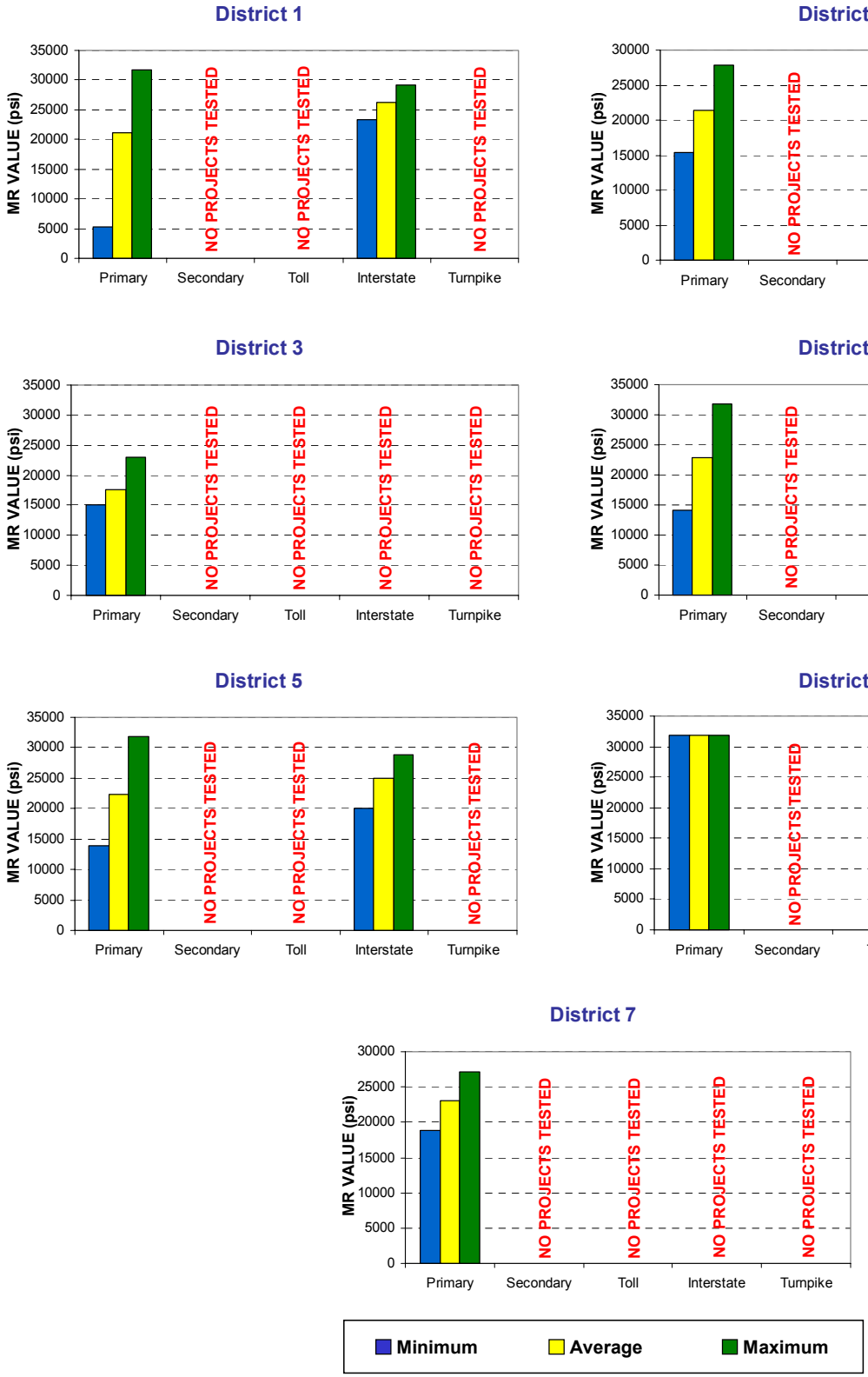
Project M_R Statistics by System Type & District (continued)
2000



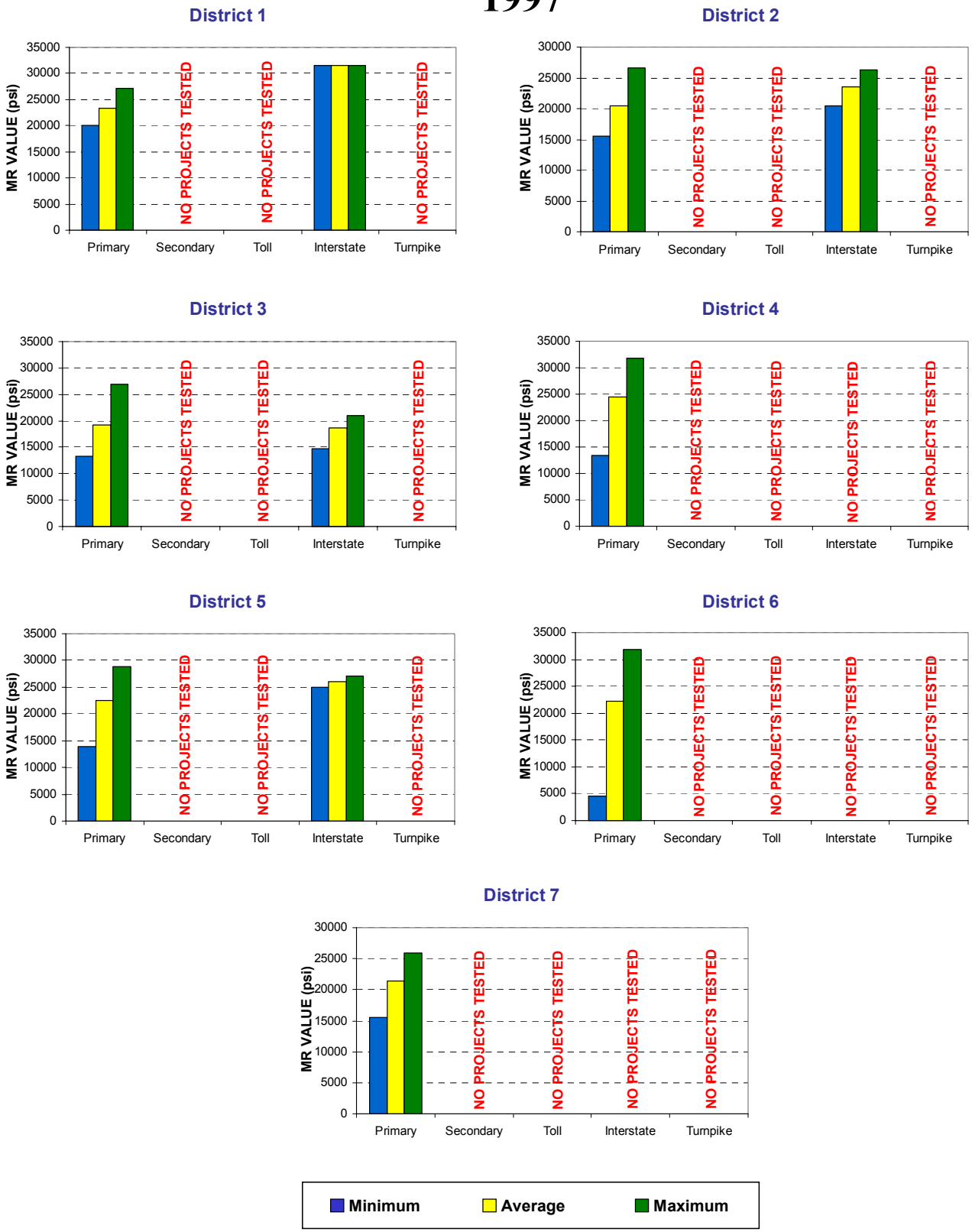
Project M_R Statistics by System Type & District (continued)
1999



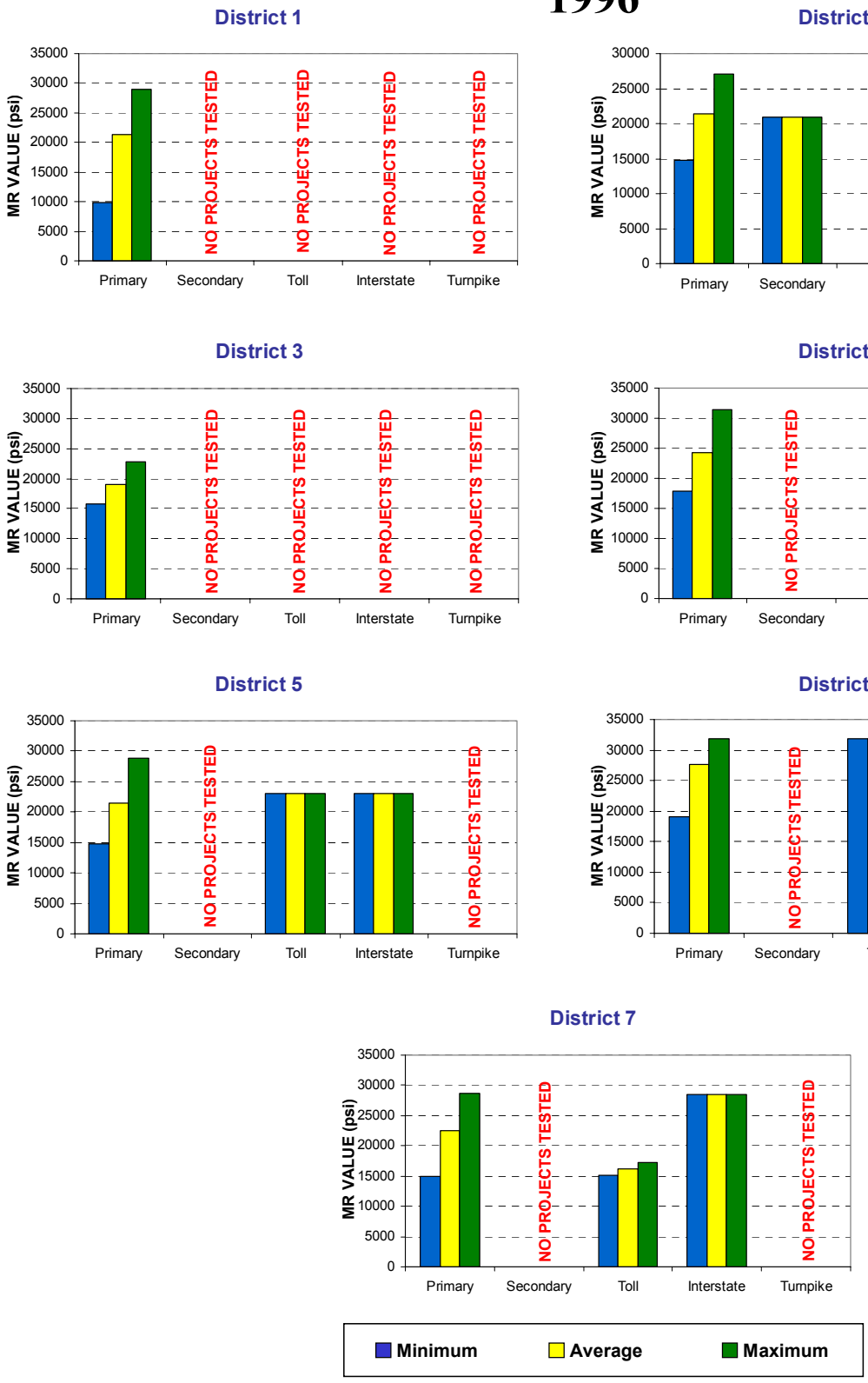
Project M_R Statistics by System Type & District (continued)
1998



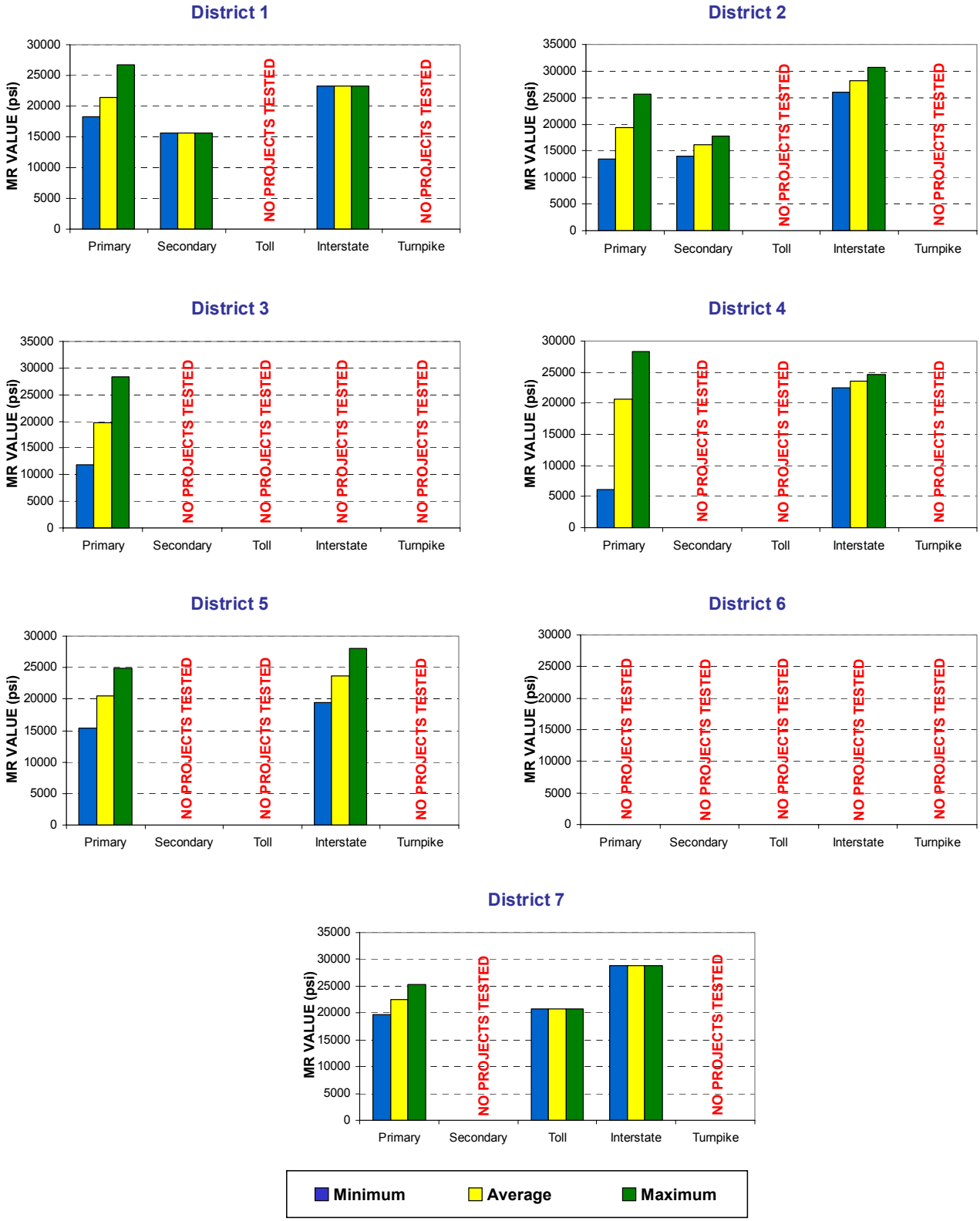
Project M_R Statistics by System Type & District (continued)
1997



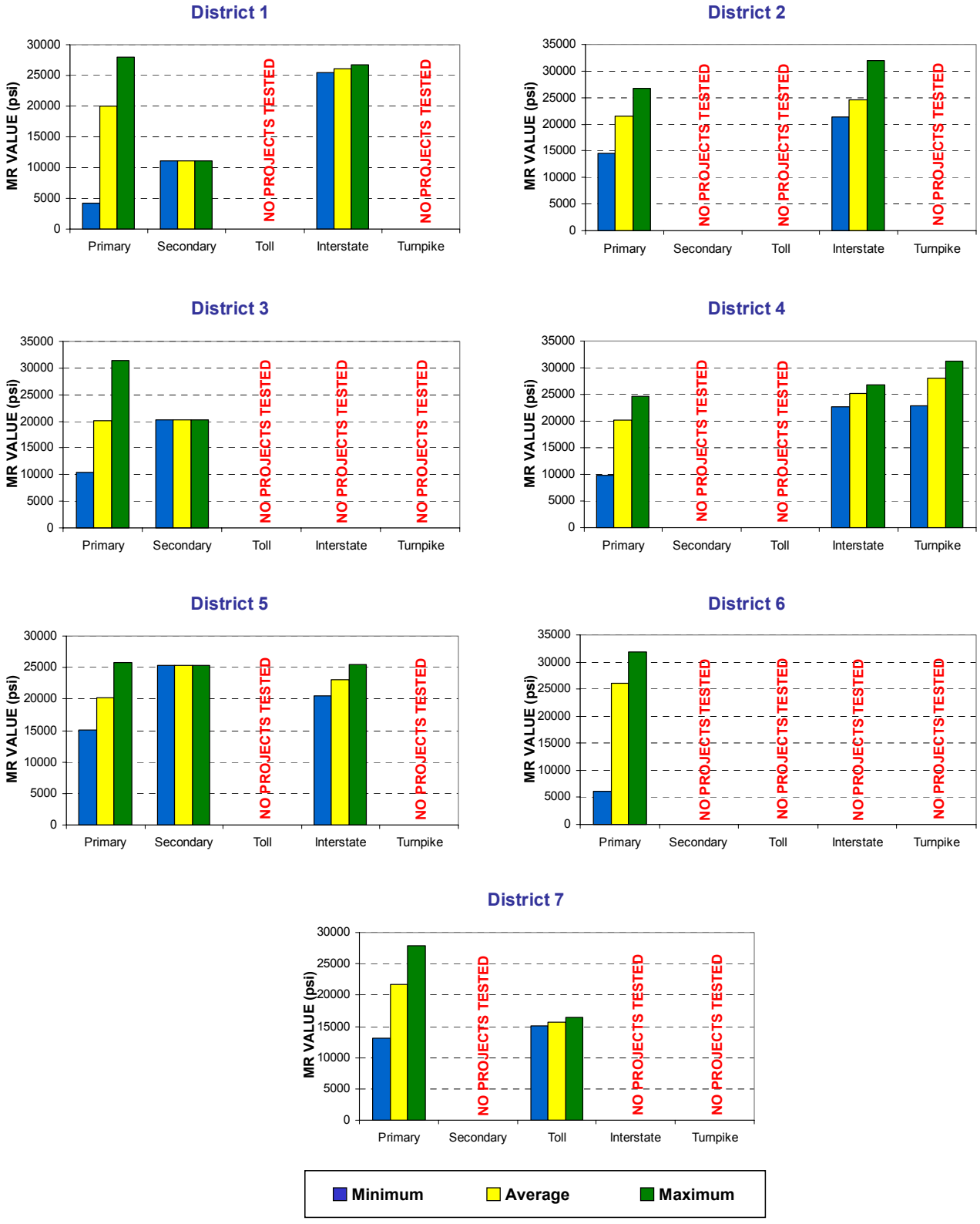
Project M_R Statistics by System Type & District (continued)
1996



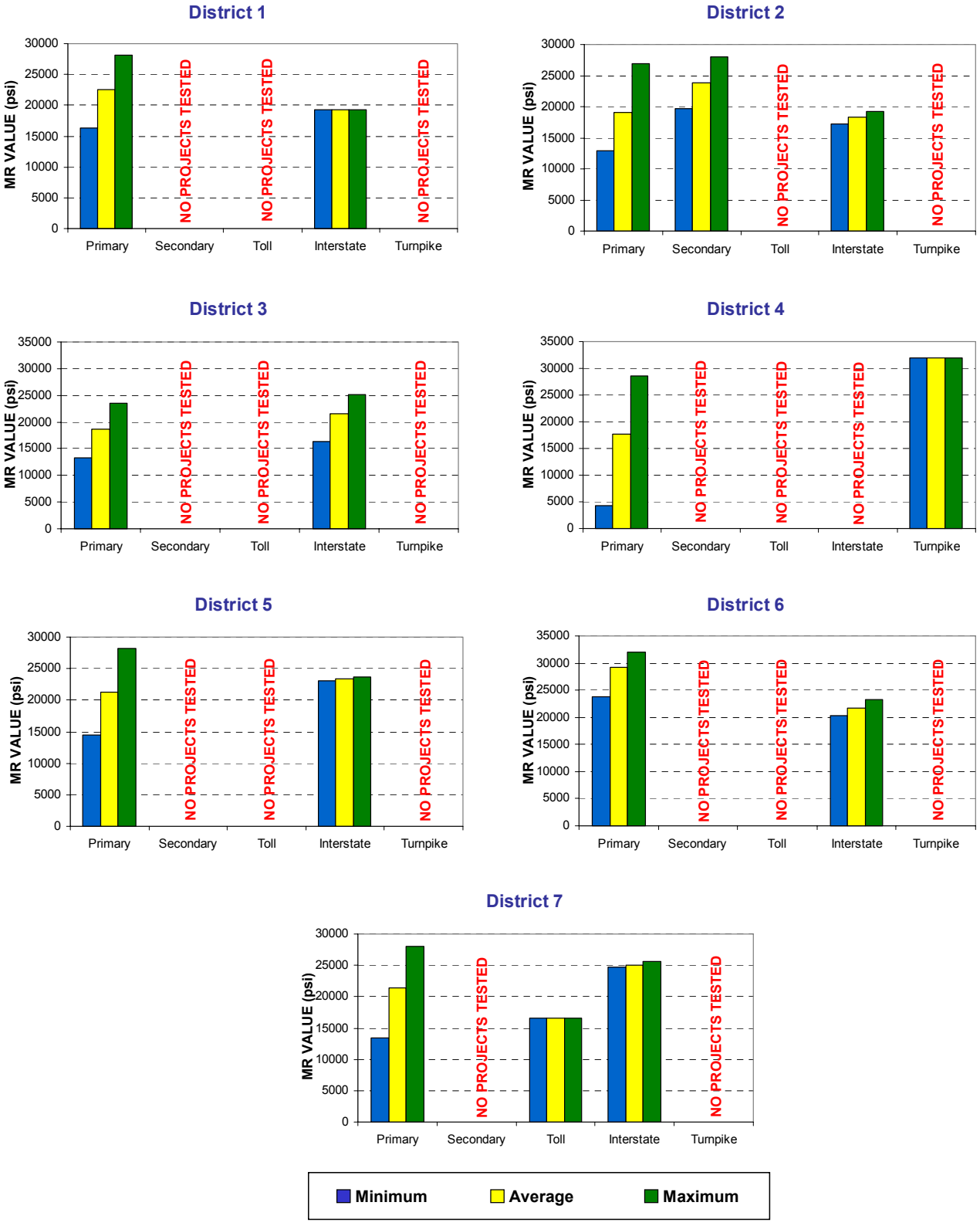
Project M_R Statistics by System Type & District (continued)
1995



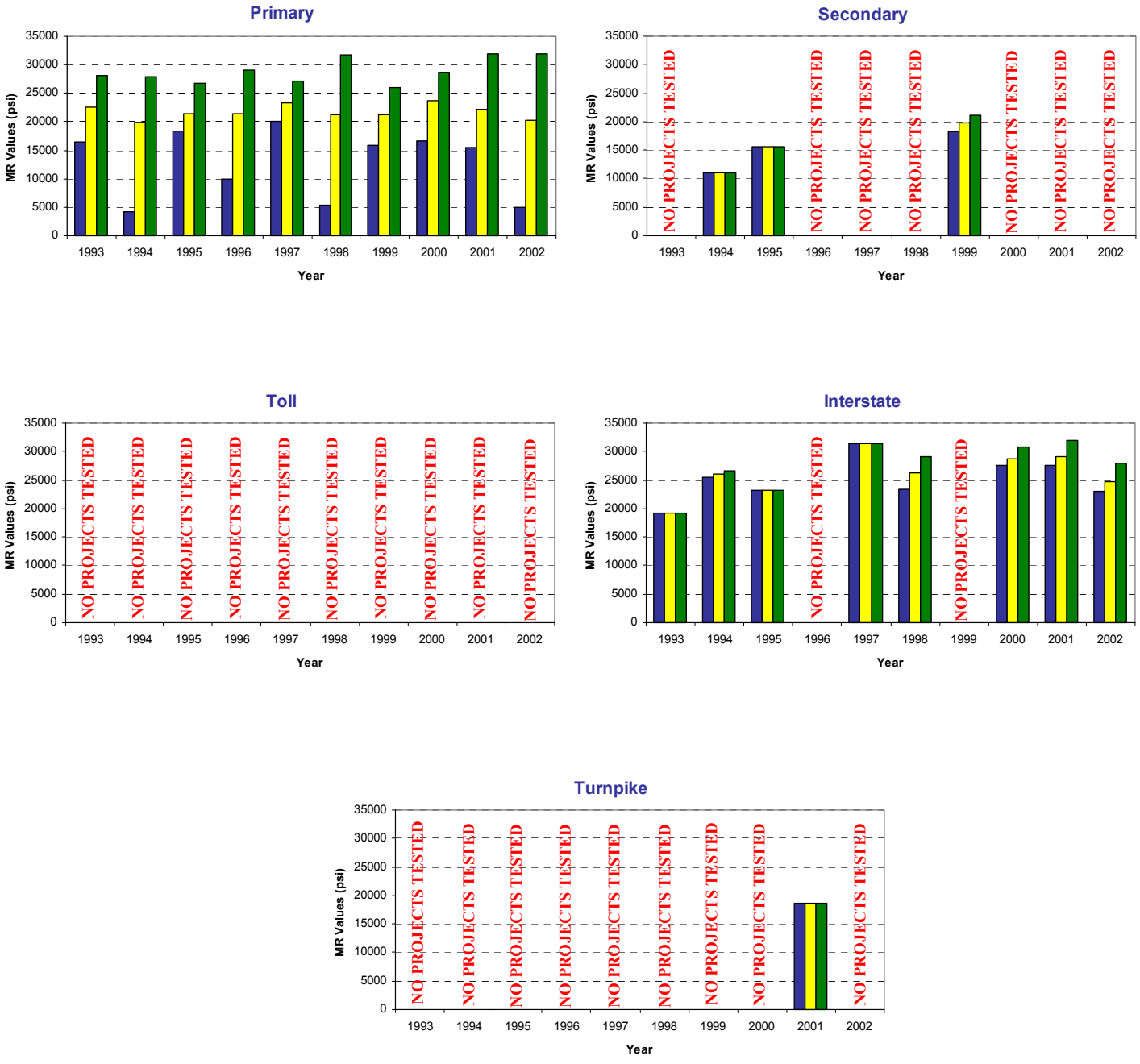
Project M_R Statistics by System Type & District (continued)
1994



Project M_R Statistics by System Type & District (continued)
1993

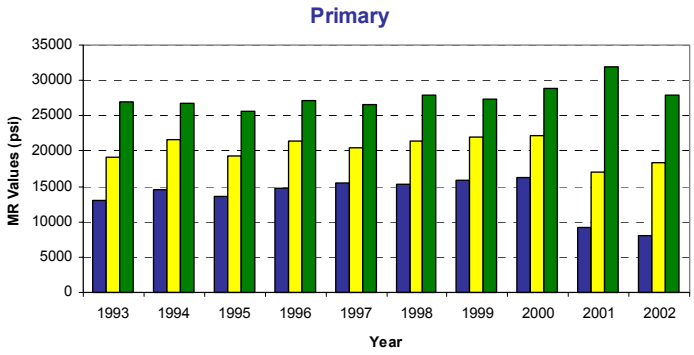


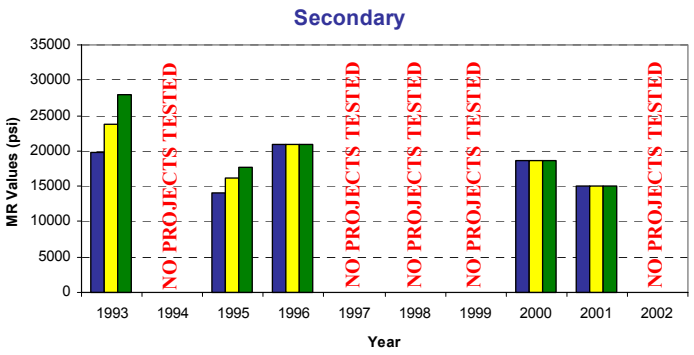
Resilient Modulus Trends by System Type
District 1

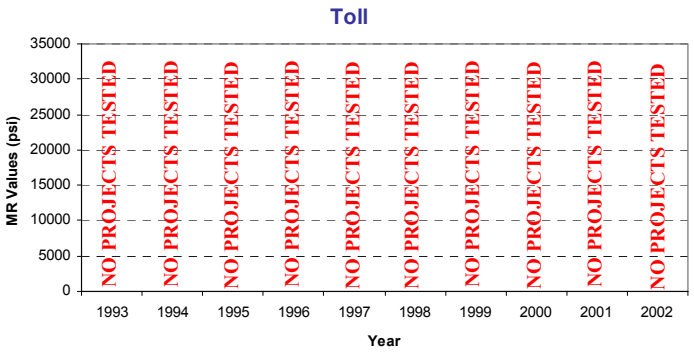


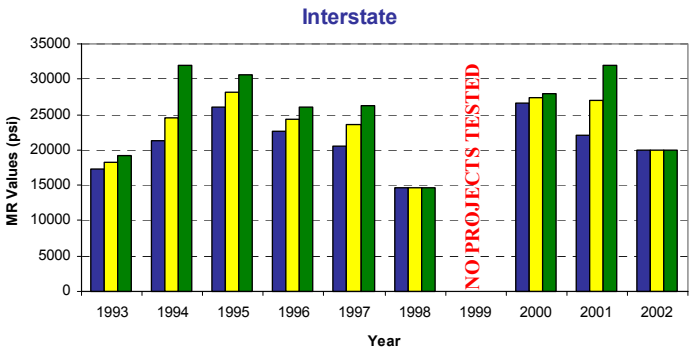
Resilient Modulus Trends by System Type (continued)

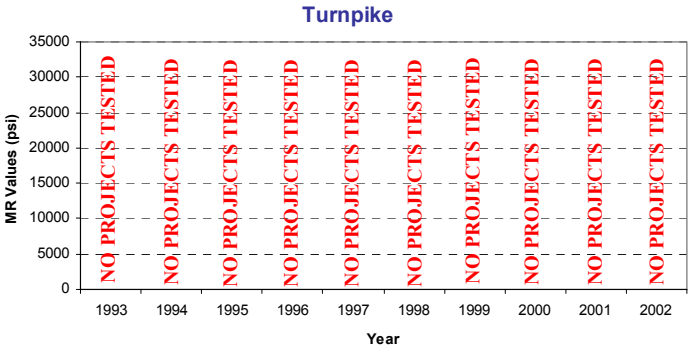
District 2

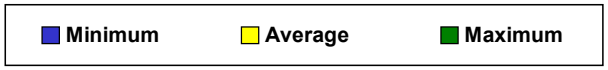






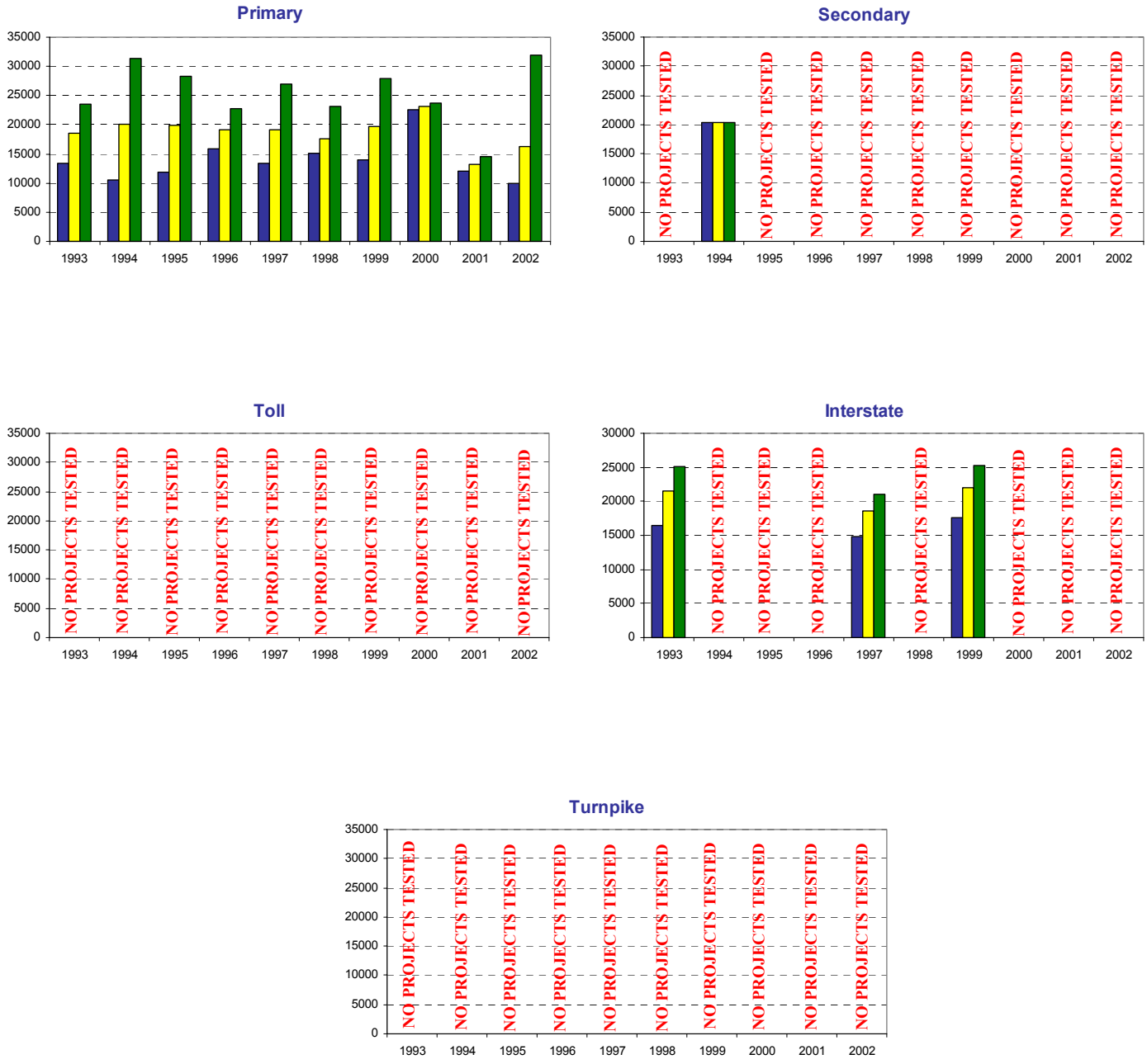






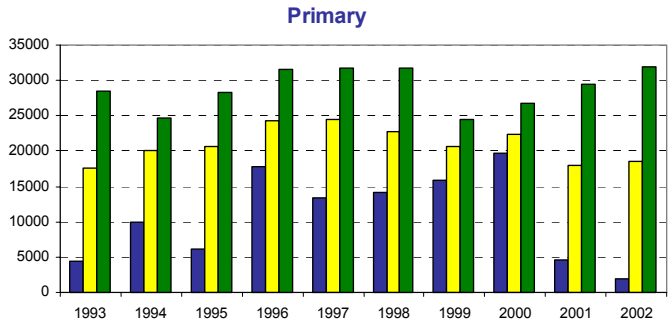
Resilient Modulus Trends by System Type (continued)

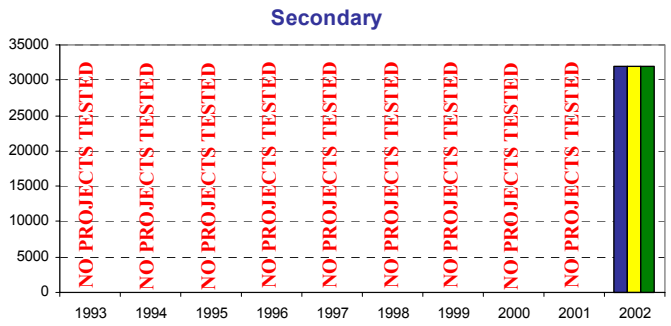
District 3

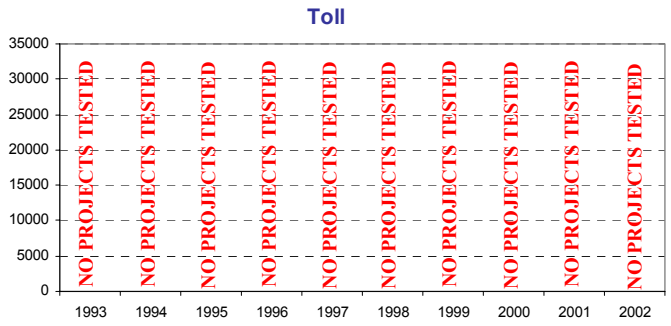


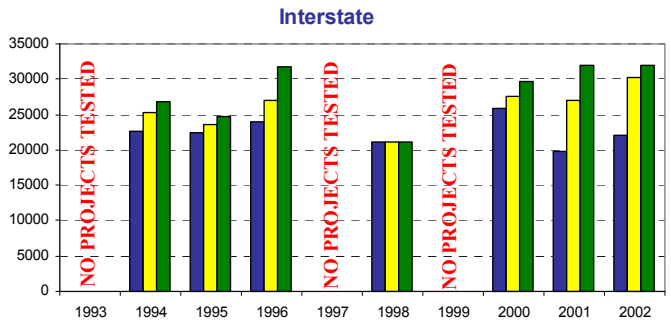
Resilient Modulus Trends by System Type (continued)

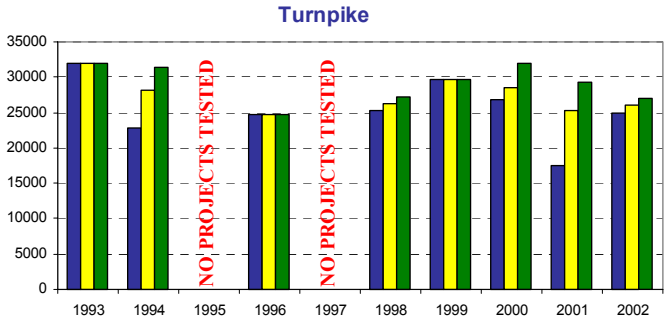
District 4

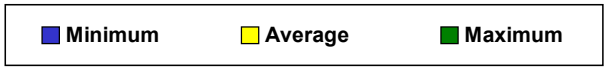






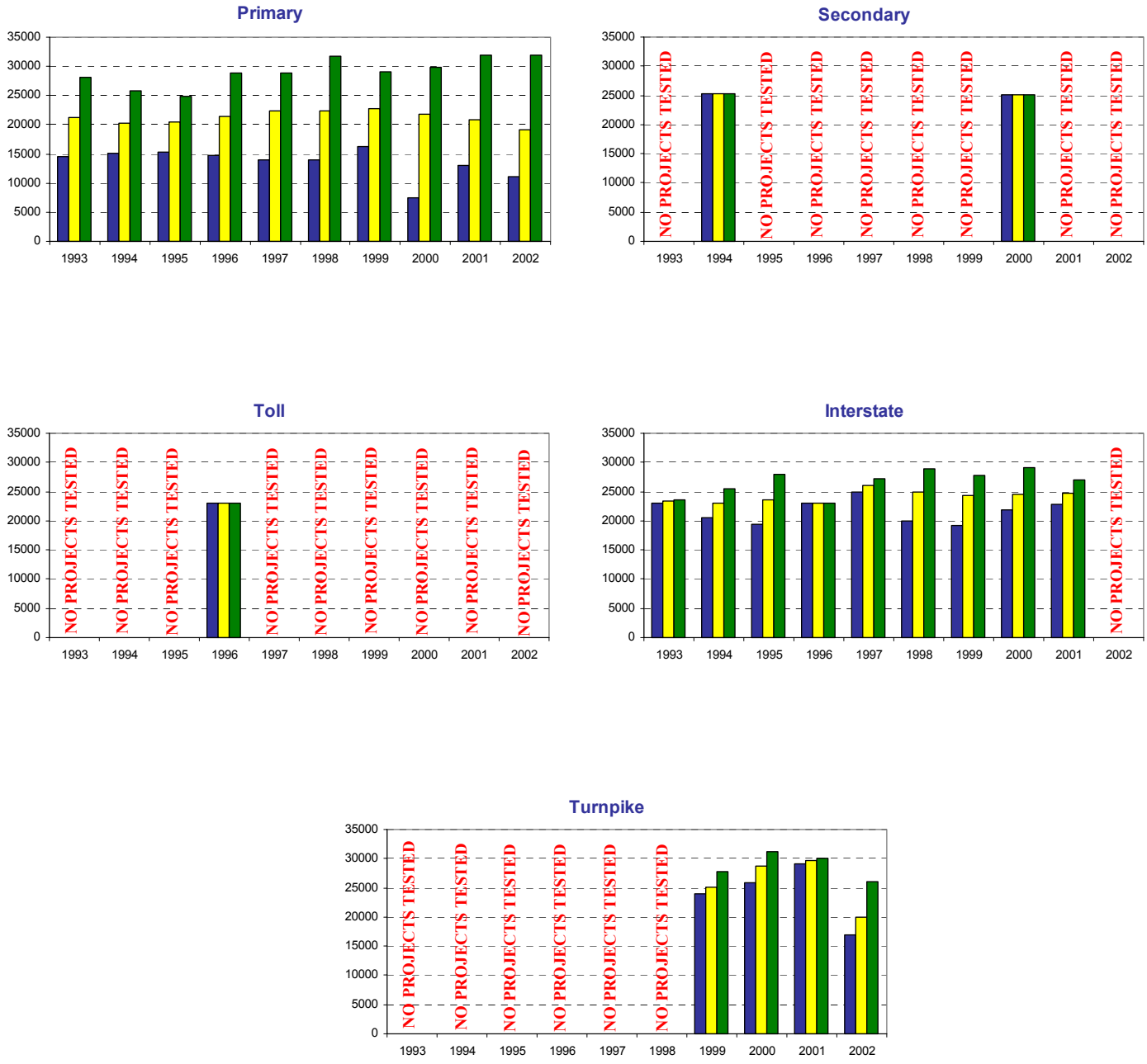






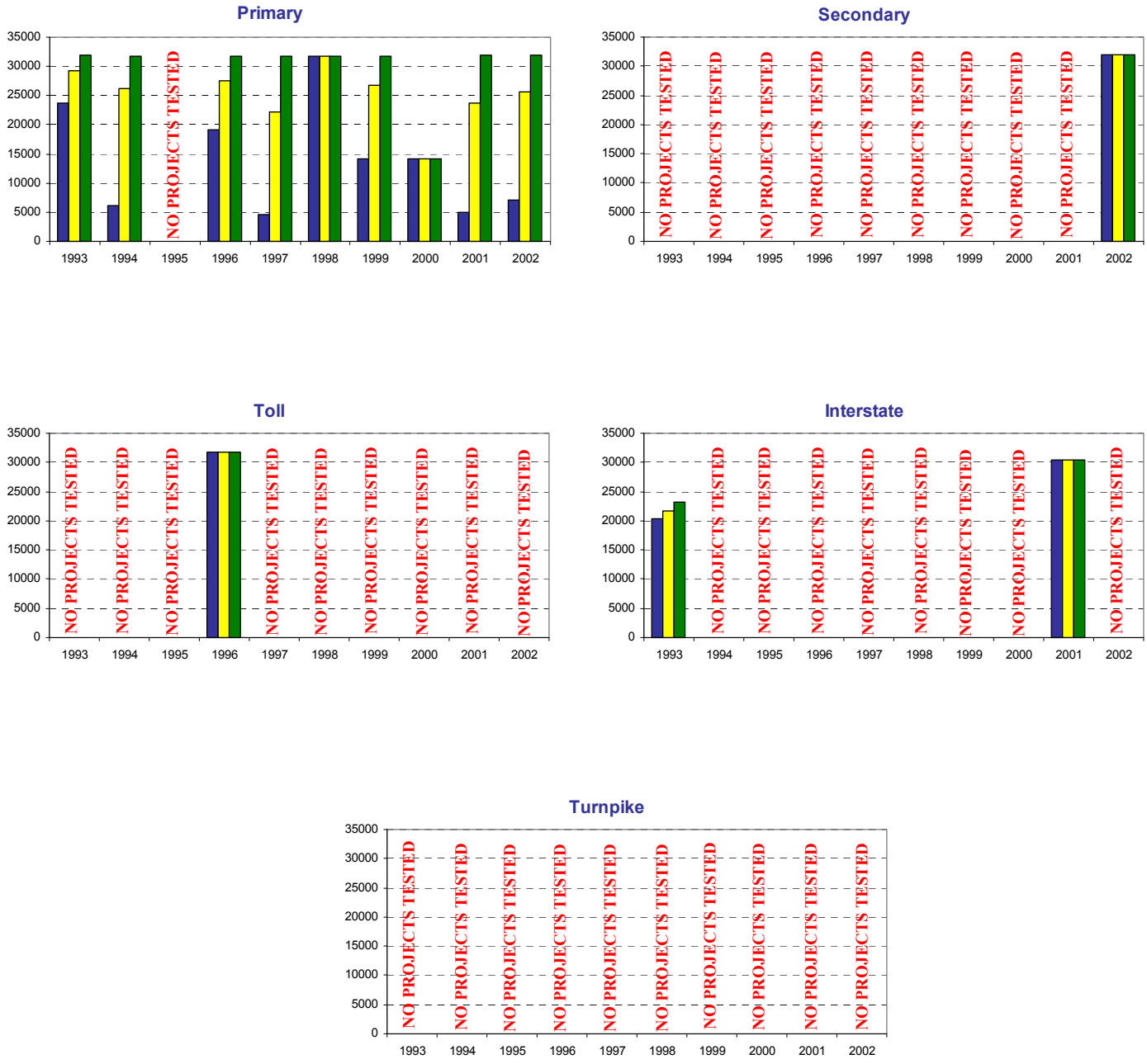
Resilient Modulus Trends by System Type (continued)

District 5



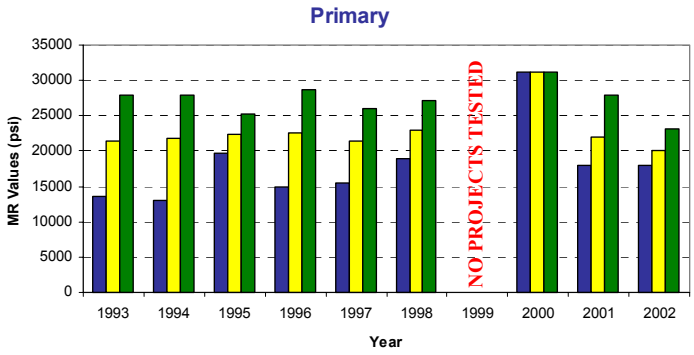
Resilient Modulus Trends by System Type (continued)

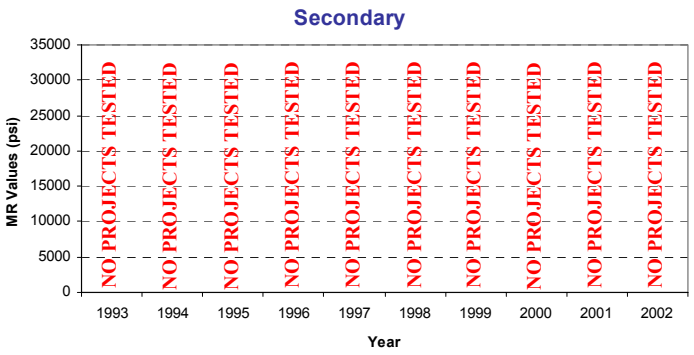
District 6

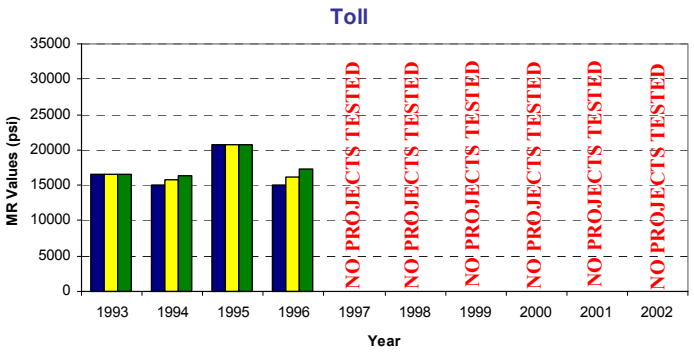


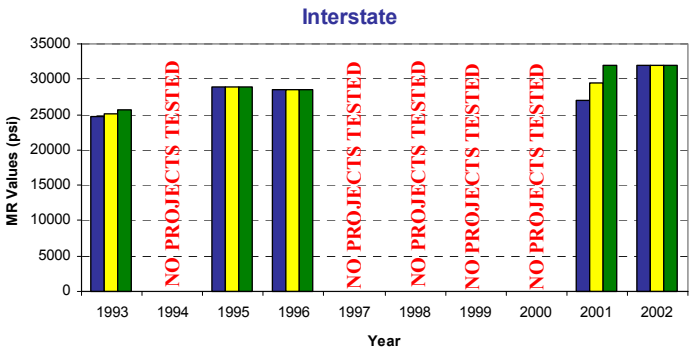
Resilient Modulus Trends by System Type (continued)

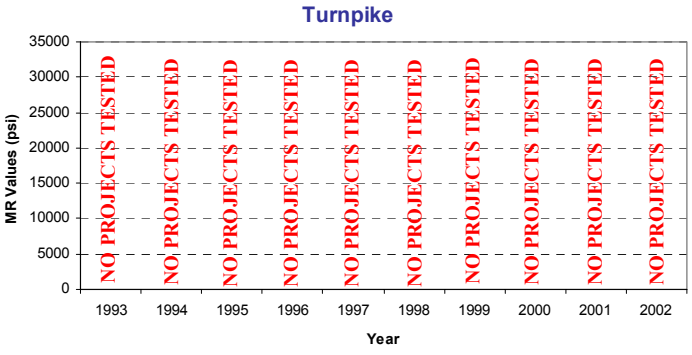
District 7

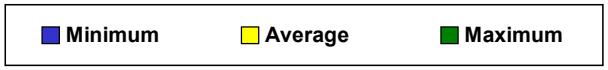






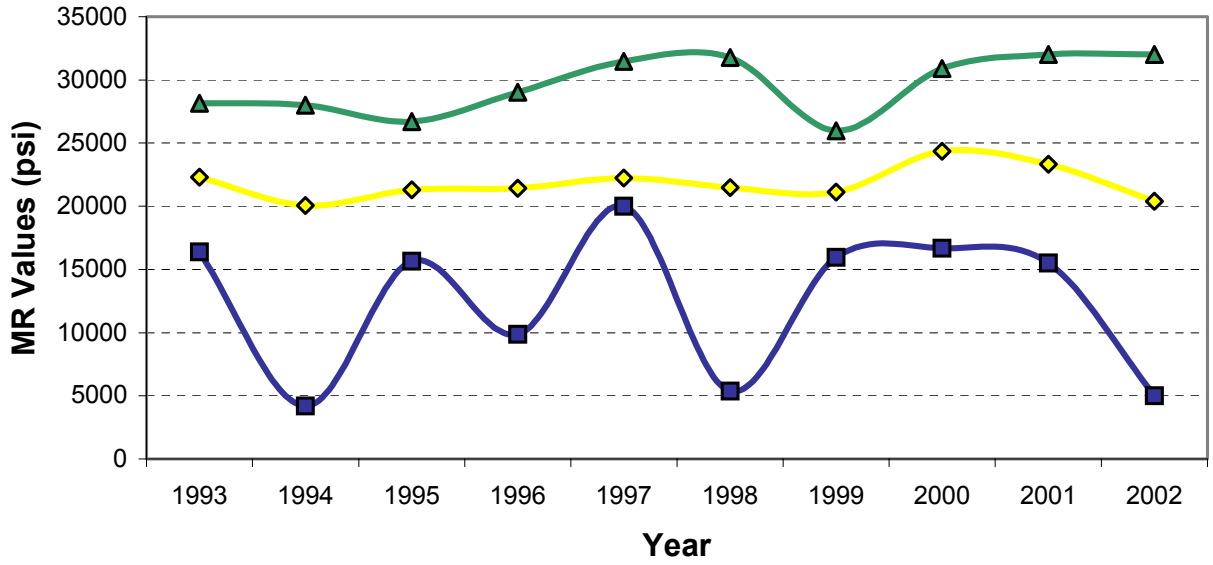




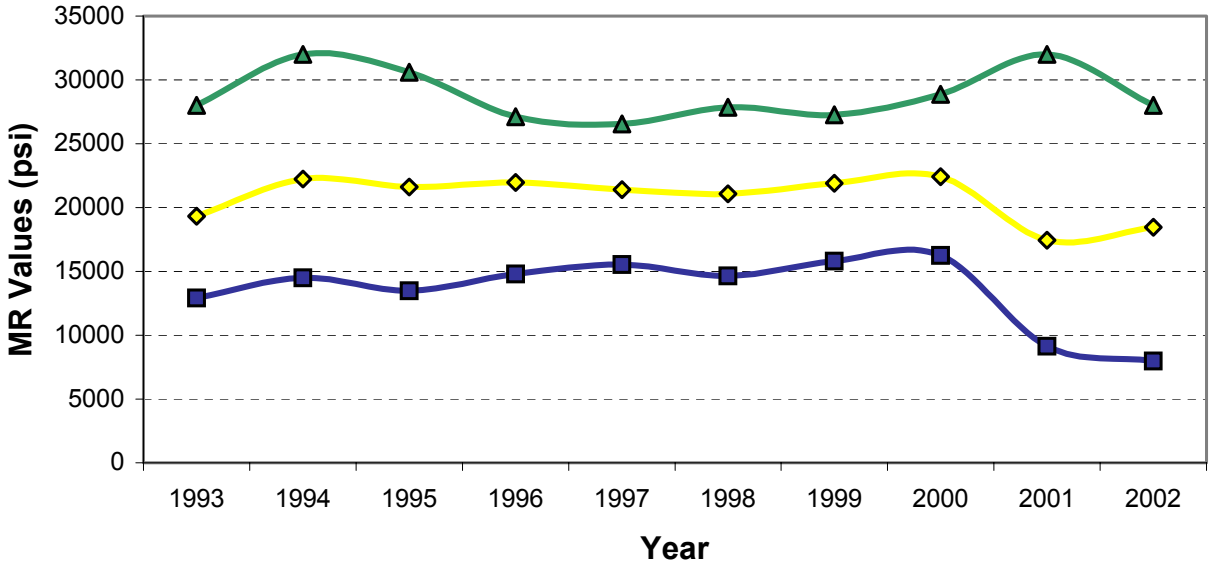


Overall Resilient Modulus Trends by District
(All Systems)

District 1



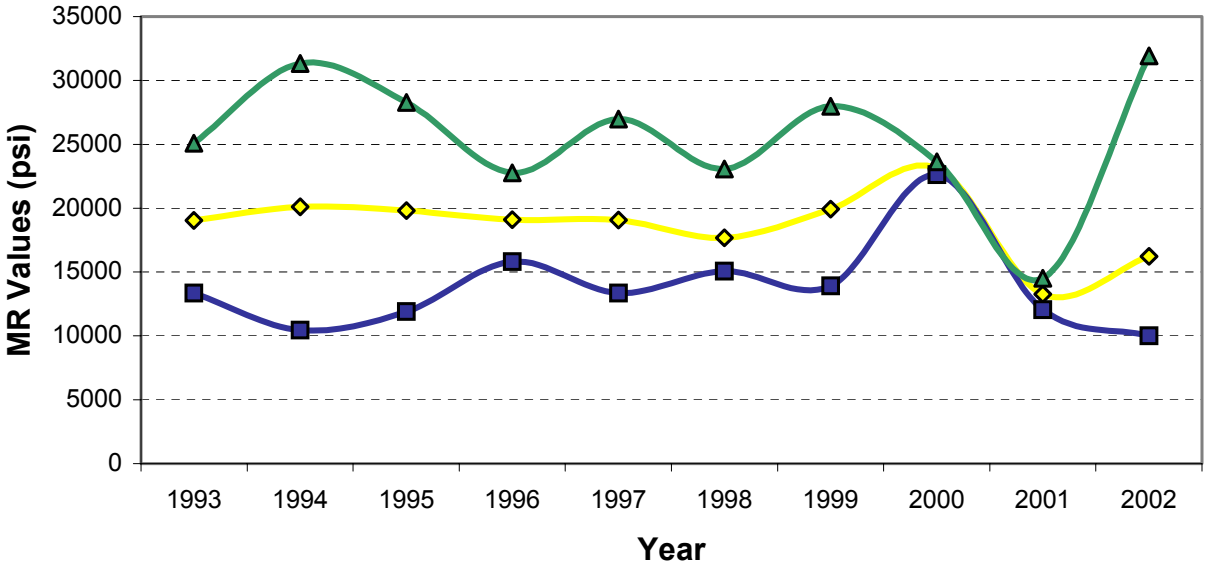
District 2



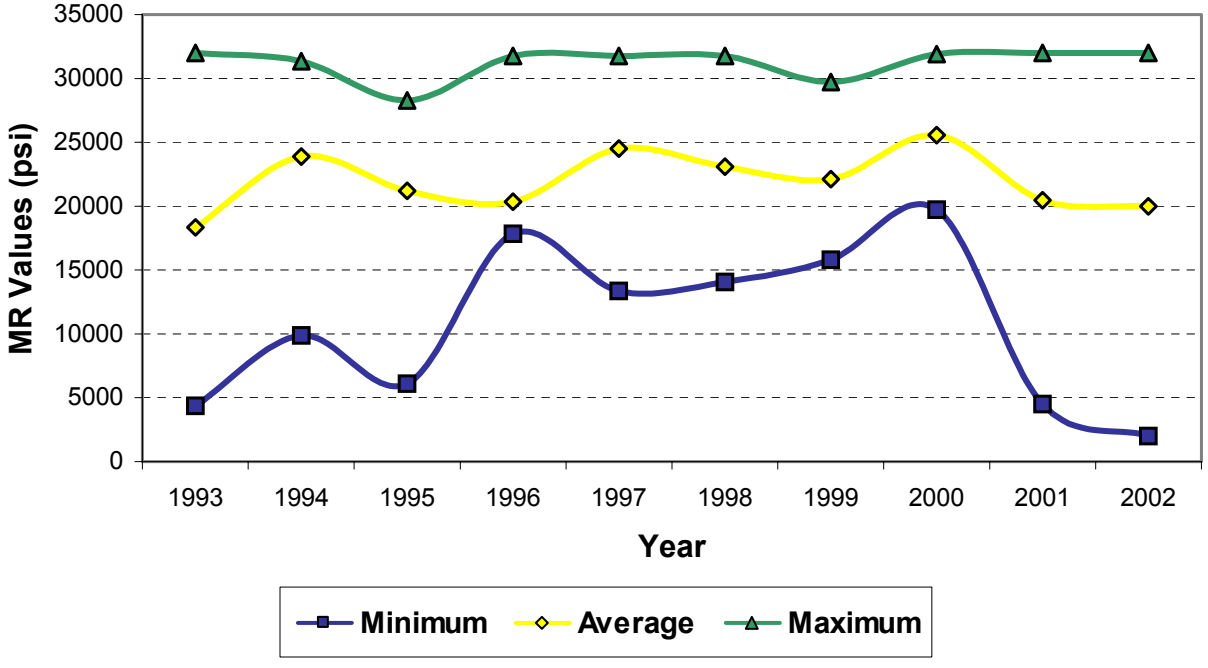
Overall Resilient Modulus Trends by District (continued)

(All Systems)

District 3

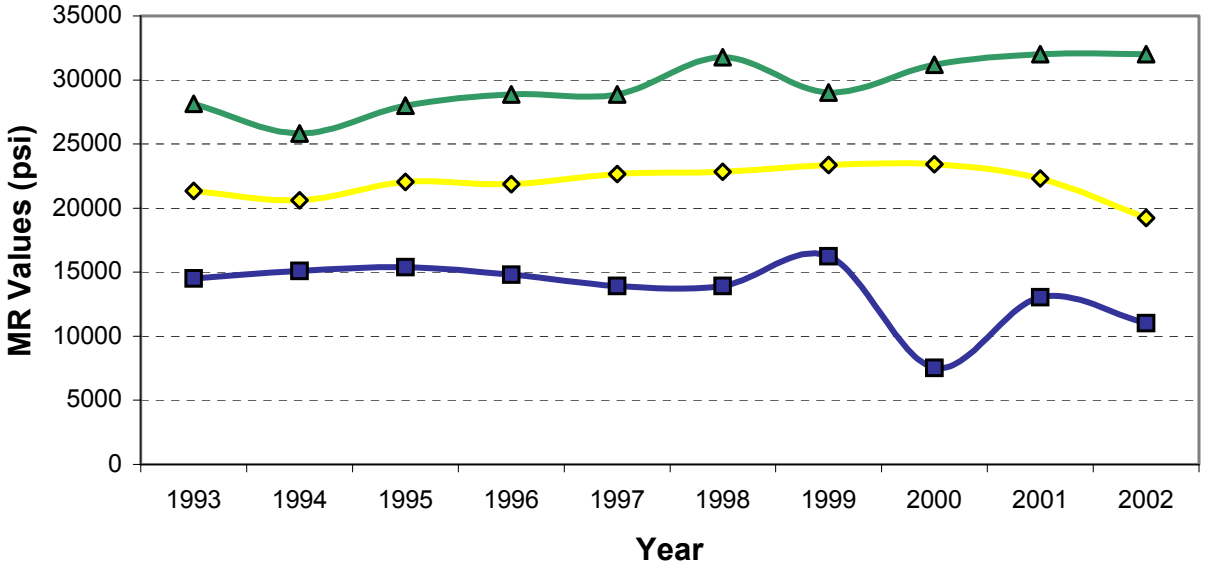


District 4

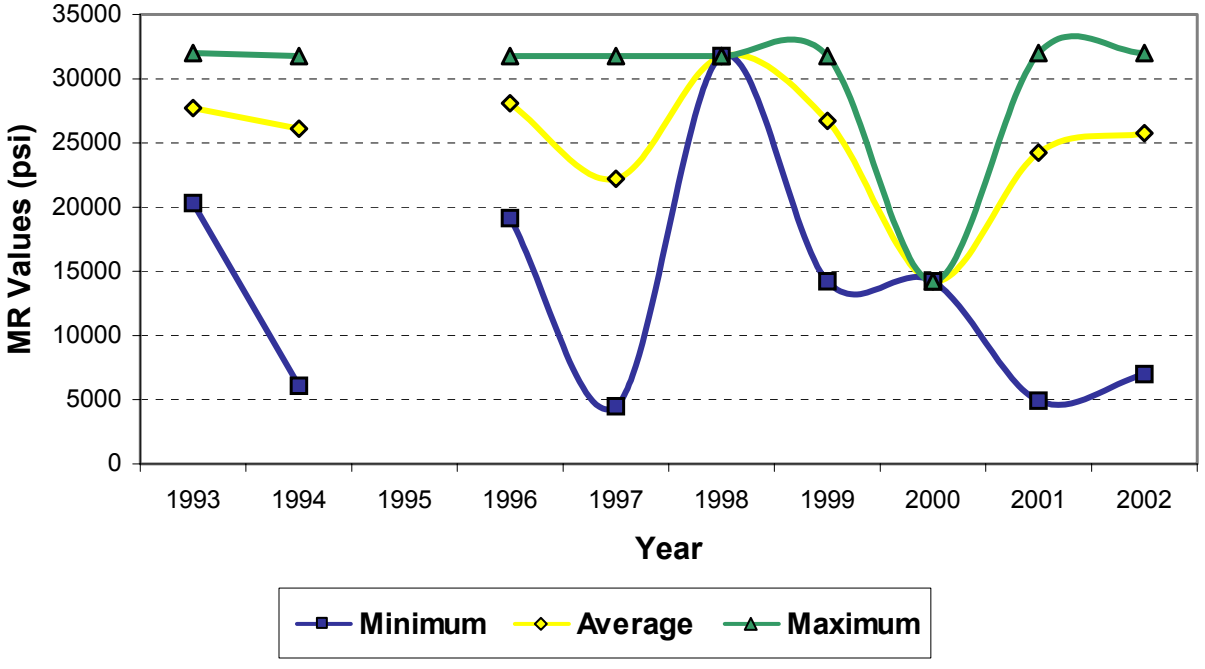


Overall Resilient Modulus Trends by District (continued)
(All Systems)

District 5

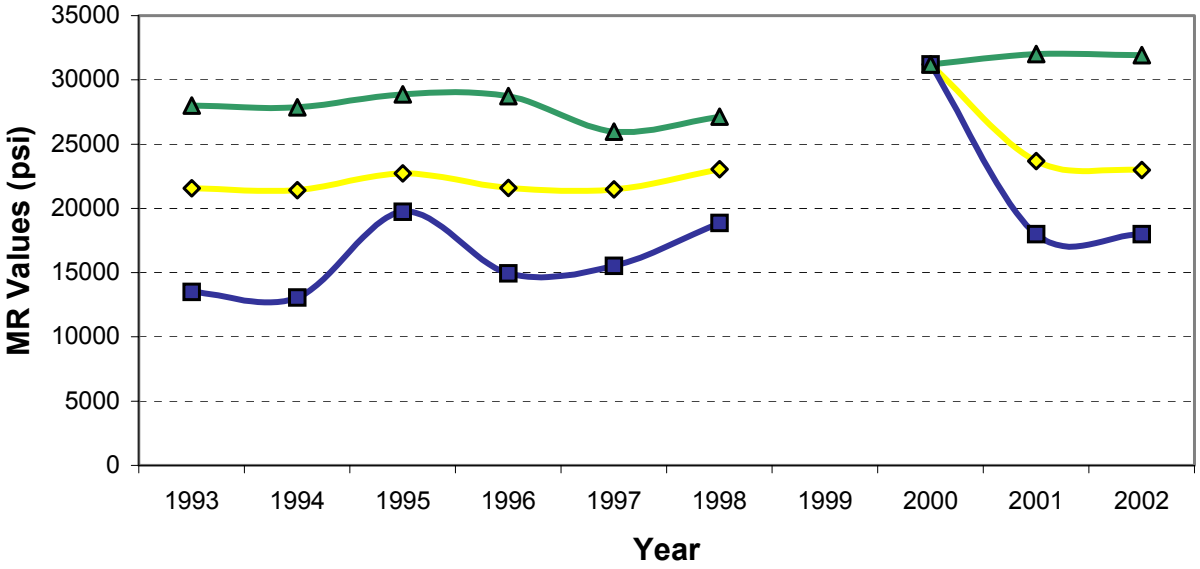


District 6

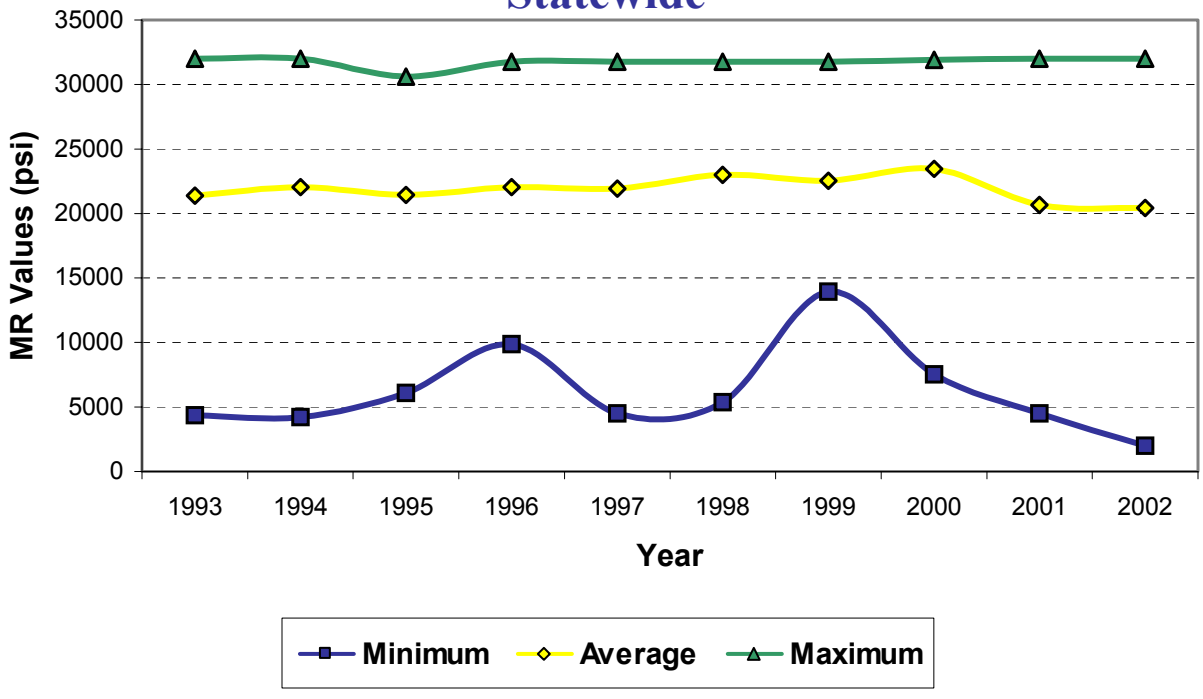


Overall Resilient Modulus Trends by District (continued)
(All Systems)

District 7



Statewide



2002 Project Listing by District

District 1

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
01010-	193832-1	45	0.000	5.406	08/12/02	NT / ST	CHARLOTTE	20000
01010-	4118641	45	5.406	7.777	08/12/02	NT / ST	CHARLOTTE	18000
01030-	1937502	31	0.000	12.100	08/13/02	NT	CHARLOTTE	14215
01030-	1937503	31	12.100	18.337	08/13/02	NT	CHARLOTTE	16971
01040-	1938291	35	0.707	1.668	03/18/02	WT	CHARLOTTE	25529
01075-	4118621	93	0.000	15.086	08/29/02	NT / ST	CHARLOTTE	28000
03001-	1954163	84	6.101	6.464	09/18/02	ET	COLLIER	19000
03010-	4052501	45	9.800	11.900	07/24/02	ET / WT	COLLIER	15956
03080-	4067451	29	0.000	2.738	09/18/02	NT	COLLIER	15000
03080-	1953992	29	36.740	37.834	09/18/02	NT / ST	COLLIER	20000
04010-	4042011	31	0.000	6.185	08/14/02	NT	DESOTO	21903
04010-	4042031	31	6.185	13.156	08/14/02	NT	DESOTO	20888
05010-	1939982	25	18.335	21.501	08/28/02	NT / ST	GLADES	15000
05020-	4040451	78	5.908	8.200	03/18/02	NT	GLADES	32057
05090-	1939572	29	2.621	12.437	03/18/02	NT	GLADES	22048
06020-	1940712	62	0.000	3.270	03/04/02	ET	HARDEE	10009
06030-	4067471	636	0.000	6.951	02/26/02	ET	HARDEE	10444
07020-	1941522	82	0.000	1.275	04/03/02	ET	HENDRY	13055
07060-	1941722	29	0.000	5.417	04/03/02	NT	HENDRY	20453
09060-	1944362	70	0.000	14.460	05/21/02	ET	HIGHLANDS	19002
09060-	1944372	70	14.460	16.600	08/28/02	ET	HIGHLANDS	28000
09060-	1944372	70	16.600	18.600	08/28/02	ET	HIGHLANDS	9000
09060-	1944372	70	18.600	21.630	08/28/02	ET	HIGHLANDS	5000
12020-	4118671	80	0.583	1.666	09/18/02	WT	LEE	8000
12020-	1955842	80	5.716	8.350	09/18/02	ET / WT	LEE	18000
13010-	406754-1	45	0.000	0.486	09/04/02	NT / ST	MANATEE	18000
13010-	1958132	45	2.125	2.962	04/09/02	NT / ST	MANATEE	22483
13030-	1959022	45	0.508	2.743	03/26/02	NT / ST	MANATEE	23064
13040-	4067551	684	3.974	7.025	07/23/02	ET / WT	MANATEE	24079
13050-	4067581	64	1.808	5.732	03/26/02	ET / WT	MANATEE	28576
13120-	195970-2	70A	0.857	1.597	09/04/02	NT	MANATEE	15000
13130-	4067561	45	1.765	2.600	03/26/02	NT / ST	MANATEE	28431
16030-	1970072	35	3.094	5.480	09/04/02	NT	POLK	22000
16030-	1970072	35	3.094	5.480	09/04/02	NT	POLK	17000
16030-	1972702	700	21.495	23.608	02/26/02	NT / ST	POLK	17987

NT = North Traffic Lane
ST = South Traffic Lane
ET = East Traffic Lane
WT = West Traffic Lane

NP = North Passing Lane
SP = South Passing Lane
EP = East Passing Lane
WP = West Passing Lane

2002 Project Listing by District

District 1

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
16030-	1971392	35	25.787	26.670	09/04/02	NT	POLK	17000
16030-	1971392	35	25.787	26.670	09/04/02	ST	POLK	28000
16030-	1973322	700	30.600	32.817	03/04/02	NT / ST	POLK	14941
16030-0101	1971393	555	0.000	0.885	09/04/02	ST	POLK	22000
16070-	1970692	33	14.180	14.639	03/05/02	ST	POLK	17987
16090-	4126401	17	0.000	4.207	09/03/02	NT	POLK	17000
16090-	4067591	17	4.207	6.258	09/03/02	NT	POLK	18000
16100-	1973552	517	0.000	0.912	03/05/02	NT / ST	POLK	17987
16118-	1976692	540	0.605	3.537	09/03/02	ET	POLK	26000
16130-	1973082	60	6.108	7.206	09/03/02	ET / WT	POLK	26000
16140-	1972982	544	3.189	3.678	09/04/02	ET / WT	POLK	19000
16180-	1977051	25	0.140	2.961	10/23/02	NT / ST	POLK	19000
16180-	1977061	25	6.206	8.946	10/23/02	NT / ST	POLK	26000
16180-	1977071	25	8.946	11.457	10/23/02	NT / ST	POLK	20000
16180-	1977091	25	18.954	21.466	10/24/02	NT	POLK	32000
16180-	1977091	25	18.954	21.466	10/24/02	ST	POLK	24000
16180-	1977101	25	21.466	23.675	10/24/02	ST	POLK	25000
16180-	2012041	25	23.028	24.713	10/24/02	NT	POLK	32000
16180-	2012041	25	23.028	24.713	10/24/02	ST	POLK	24000
16190-	1973342	674	0.000	2.128	02/11/02	WT	POLK	32057
16210-	1975072	700	0.896	2.648	03/05/02	NT / ST	POLK	16971
16250-	1972812	37	0.000	4.550	02/11/02	NT	POLK	17987
16293-	4067601	549	2.288	2.782	09/04/02	NT	POLK	17000
16293-	4067601	549	2.288	2.782	09/04/02	ST	POLK	22000
16320-	2012161	400	22.737	28.608	11/14/02	ET / WT	POLK	23000
16320-	2012161	400	22.737	28.608	11/14/02	ET / WT	POLK	23000
16320-	2012061	400	29.744	32.022	11/14/02	ET / WT	POLK	0
17010-	4067641	45	7.850	12.346	03/28/02	NT / ST	SARASOTA	25094
17020-	1977672	45	19.257	22.390	04/09/02	NT / ST	SARASOTA	17551
17080-	1978982	758	0.000	1.661	03/28/02	NT	SARASOTA	19002
91010-	1968562	78	3.166	4.781	02/12/02	ET	OKEECHOBEE	12039
91010-	1968561	78	3.166	4.781	02/12/02	ET	OKEECHOBEE	12039
91020-	1968981	15	0.000	1.481	02/11/02	NT / ST	OKEECHOBEE	19437
91020-	196803	15	1.481	2.478	02/25/02	NT / ST	OKEECHOBEE	26545
91020-	1968032	15	1.482	3.142	05/20/02	NT / ST	OKEECHOBEE	30026
91020-	196822	15	3.082	3.636	02/11/02	NT / ST	OKEECHOBEE	27995
91020-	1117127	15	3.082	3.636	02/11/02	NT / ST	OKEECHOBEE	27995
16180-	1977101	25	21.466	23.675	10/24/02	NT	POLK	32000

2002 Project Listing by District
District 2

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
26004-	2075552	226	0.000	2.201	04/18/02	NT / ST	ALACHUA	21468
26005-	2076112	222	3.638	5.546	05/30/02	ET / WT	ALACHUA	27995
26010-	2078495	25	3.570	11.639	05/30/02	NT / ST	ALACHUA	16971
26020-	2077852	329	0.000	1.250	04/12/02	NT / ST	ALACHUA	20017
26050-	2078013	331	0.022	3.385	10/08/02	NT / ST	ALACHUA	20000
26060-	2077562	200	0.000	1.220	05/28/02	NT / ST	ALACHUA	21033
28020-	2079562	100	11.661	22.169	06/18/02	NT	BRADFORD	24949
28090-	2079472	21	0.000	3.560	05/30/02	NT	BRADFORD	12039
31010-	2097872	26	0.486	7.532	05/07/02	ET	GILCHRIST	15956
33010-	2100772	20	0.000	4.845	04/30/02	ST	LAFAYETTE	15521
35050-	2105052	55	12.621	19.356	06/20/02	NT	MADISON	16971
37040-	2108064	129	22.689	23.469	06/18/02	NT	SUWANNEE	24949
71050-	2082002	16	10.208	23.684	07/01/02	ET	CLAY	19002
71070-	2081112	21	0.000	3.954	06/03/02	ET / WT	CLAY	23064
71110-	2082264	21	0.000	0.833	06/04/02	NT	CLAY	14070
72001-	2132512	9A	0.841	5.208	10/27/02	NT / ST	DUVAL	20000
72006-	2085752	163	0.000	2.194	06/04/02	NT	DUVAL	17987
72010-	2092655	10	18.709	19.555	06/04/02	ET / WT	DUVAL	7978
72050-	2094387	5	13.299	15.736	06/04/02	NT / ST	DUVAL	19002
72160-	2096972	13	0.105	3.115	06/04/02	NT / ST	DUVAL	15956
72220-	2096922	134	3.006	7.709	06/04/02	ET / WT	DUVAL	20017
76010-	2099492	15	29.293	30.366	01/15/02	NT / ST	PUTNAM	16536
76050-	2100041	20	20.308	23.780	01/15/02	WT	PUTNAM	14941
78001-	2104082	A1A	0.346	2.437	06/12/02	NT	ST. JOHNS	22048
78030-	2104132	A1A	2.038	18.886	06/12/02	NT	ST. JOHNS	15956
78040-	2102653	A1A	13.776	15.266	06/10/02	NT / ST	ST. JOHNS	22048
78070-	2102234	13	4.385	13.995	06/10/02	NT	ST. JOHNS	12039

2002 Project Listing by District

District 3

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
46002-	4134281	327	1.001	1.589	11/07/02	NT	BAY	14000
46010-	411384	30	0.000	5.573	04/23/02	ET / WT	BAY	14070
46020-	411401	304	0.000	2.548	04/23/02	ET / WT	BAY	17987
46020-	4134291	30	12.000	13.660	11/07/02	ET / WT	BAY	16000
46020-0003	4134321	30A	4.649	5.778	11/07/02	ET / WT	BAY	12000
46040-	4134301	75	0.000	1.130	11/05/02	NT / ST	BAY	10000
46040-	4134331	75	4.050	10.510	11/05/02	NT / ST	BAY	11000
46040-	4134311	75	10.510	16.335	11/05/02	NT / ST	BAY	12000
46040-	4134341	75	25.247	34.861	11/06/02	NT / ST	BAY	11000
46140-	4134381	390	2.021	7.022	11/17/02	ET	BAY	11000
47020-	411392	71	0.000	11.240	04/24/02	NT	CALHOUN	17987
48020-	4063221	10A	7.644	10.527	04/03/02	ET / WT	ESCAMBIA	13925
48020-	4113871	10A	12.157	13.041	04/03/02	ET / WT	ESCAMBIA	10444
48020-	4116911	10A	13.513	16.120	04/03/02	ET / WT	ESCAMBIA	12039
48050-	4039281	292	17.452	19.452	04/02/02	NT / ST	ESCAMBIA	14941
48205-	4113951	173	0.526	2.586	04/03/02	NT / ST	ESCAMBIA	22048
50010-	4116951	10	2.158	4.224	04/16/02	ET / WT	GADSDEN	19437
50040-	4113961	63	0.214	6.454	04/16/02	NT / ST	GADSDEN	31912
50140-	4113881	267	0.147	0.849	04/16/02	NT	GADSDEN	25965
52050-	4114021	2	16.000	20.927	04/15/02	ET	HOLMES	14941
53030-	4134431	75	9.826	12.965	11/19/02	NT	JACKSON	21000
53030-	4134431	75	9.826	12.965	11/19/02	ST	JACKSON	16000
53030-	4113891	75	12.965	15.850	04/23/02	NT / ST	JACKSON	30026
53070-	4114021	2	8.152	12.946	04/23/02	ET	JACKSON	23064
55060-	4116971	10	0.160	3.215	04/17/02	ET / WT	LEON	22483
55080-	4090251	20	3.380	12.699	04/17/02	NT / ST	LEON	20453
56040-	4116991	65	25.554	28.732	04/24/02	ST	LIBERTY	13055
57030-	4118581	30	11.323	11.447	07/24/02	ET / WT	OKALOOSA	19002
57050-	4090211	85	4.412	15.945	04/23/02	NT / ST	OKALOOSA	14070
57050-	4113991	85	15.945	17.486	04/23/02	NT / ST	OKALOOSA	18567
57060-	2202101	85	2.295	5.400	04/17/02	ST	OKALOOSA	12475
57060-	4113911	85	5.400	6.993	04/17/02	ST	OKALOOSA	10009
57110-	4117021	393	0.000	1.837	07/24/02	NT / ST	OKALOOSA	17987
57110-	4114031	189	0.589	2.850	07/24/02	NT / ST	OKALOOSA	16101
58010-	4063281	10	9.370	11.650	07/23/02	ET	SANTA ROSA	13055
58010-	4063281	10	9.370	11.650	07/23/02	WT	SANTA ROSA	17987
58050-	4117051	87	0.041	2.071	07/23/02	NT / ST	SANTA ROSA	12039
60030-	4114001	20	16.652	17.658	04/17/02	ET	WALTON	12475
60070-	4114041	83	0.040	7.898	04/17/02	NT	WALTON	10009

2002 Project Listing by District

District 4

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
86003-	2279541	844	0.240	0.902	09/18/02	ET / WT	BROWARD	28000
86010-	4035851	5	0.000	0.768	02/12/02	NT / ST	BROWARD	20017
86014-	4109561	870	4.228	6.248	07/10/02	ET / WT	BROWARD	15956
86016-	4114381	848	2.700	6.726	10/23/02	ET / WT	BROWARD	21000
86018-	4114391	824	0.000	2.285	07/09/02	ET / WT	BROWARD	19002
86020-	4114401	5	1.889	4.161	12/09/02	NT / ST	BROWARD	17000
86020-	2280921	5	5.828	6.831	02/12/02	NT / ST	BROWARD	20017
86020-	2280931	5	6.831	8.050	02/12/02	NT / ST	BROWARD	20017
86020-	4035751	5	11.820	13.360	10/23/02	NT / ST	BROWARD	19000
86020-	4035752	5	13.360	14.590	10/23/02	NT / ST	BROWARD	18000
86028-	2280731	5	7.424	9.491	10/23/02	ET / WT	BROWARD	17000
86030-	4114321	A1A	4.100	4.325	07/09/02	NT	BROWARD	4000
86030-	4114321	A1A	4.364	4.758	07/09/02	NT	BROWARD	23000
86030-	4114321	A1A	4.793	5.254	07/09/02	NT	BROWARD	2000
86030-	4114321	A1A	5.289	5.533	07/09/02	NT	BROWARD	14000
86030-	2281581	A1A	5.728	7.478	07/09/02	NT / ST	BROWARD	17987
86065-	2280751	845	4.351	6.519	07/11/02	NT / ST	BROWARD	17987
86070-	2317321	9	6.585	8.382	10/23/02	NT / ST	BROWARD	32000
86070-	2317351	9	14.800	16.880	10/24/02	NT / ST	BROWARD	32000
86070-	2317361	9	16.916	21.540	10/23/02	NT / ST	BROWARD	32000
86070-	2317371	9	21.581	25.285	10/23/02	NT / ST	BROWARD	22000
86075-	4113211	93	0.000	6.000	11/06/02	NT / ST	BROWARD	32000
86095-	231727	862	6.900	9.056	07/08/02	ET / WT	BROWARD	31912
86100-	2281881	7	10.450	13.160	12/09/02	NT / ST	BROWARD	23000
86100-	4111054	7	13.160	14.760	02/12/02	NT / ST	BROWARD	20453
86100-	2281891	7	13.160	14.760	02/12/02	NT / ST	BROWARD	20453
86130-	2298271	814	5.500	6.000	03/19/02	ET / WT	BROWARD	22048
86170-	2282461	811	0.000	0.975	07/09/02	NT / ST	BROWARD	14070
86210-	2281801	736	3.100	4.033	03/19/02	ET / WT	BROWARD	20017
86470-	4060941	91	6.000	11.000	11/07/02	NT / ST	BROWARD	27000
86470-	4060971	91	11.000	19.000	11/07/02	NT / ST	BROWARD	25000
88000-	2308721	16TH	0.000	0.750	06/26/02	ET / WT	INDIAN	16971
88010-	2285832	5	0.000	0.650	06/26/02	NT / ST	INDIAN	14941
88010-	2285834	5	0.650	3.500	06/26/02	NT / ST	INDIAN	11024
88010-	403598	5	3.920	5.846	05/22/02	NT / ST	INDIAN	17987
88010-	228623	5	7.277	14.800	05/22/02	NT / ST	INDIAN	20017
89010-	2288591	5	18.000	19.450	03/27/02	NT / ST	MARTIN	14505
89010-	4035921	5	21.900	22.914	03/27/02	NT / ST	MARTIN	20017
89030-	4035911	707	21.920	23.698	03/27/02	ET	MARTIN	13490
89040-	2288531	A1A	1.765	2.537	03/27/02	NT / ST	MARTIN	14070

2002 Project Listing by District
District 4

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
89060-	2288521	76	29.763	31.390	03/27/02	NT / ST	MARTIN	17551
89090-	4114351	714	5.222	10.760	12/10/02	ET / WT	MARTIN	22000
89092-	2288621	714	0.000	3.250	10/09/02	ET / WT	MARTIN	18000
93004-	229781	808	6.693	7.615	07/01/02	ET / WT	PALM	17987
93012-	4114311	708	2.000	3.667	11/06/02	ET / WT	PALM	20000
93016-	2297821	882	8.539	9.483	06/27/02	ET / WT	PALM	14070
93026-	229812	845	0.000	3.000	05/06/02	NT / ST	PALM	26980
93060-	4036031	A1A	8.187	9.000	10/22/02	NT	PALM	18000
93060-	4036031	A1A	9.000	9.838	10/22/02	NT	PALM	30000
93060-	2297481	A1A	9.273	10.270	10/21/02	NT	PALM	32000
93060-	4036061	A1A	10.270	12.000	10/22/02	NT	PALM	32000
93060-	4036061	A1A	12.000	15.698	10/22/02	NT	PALM	17000
93060-	403610	A1A	15.698	17.000	10/22/02	NT	PALM	26000
93060-	403610	A1A	17.000	18.000	10/22/02	NT	PALM	9000
93060-	403610	A1A	18.000	20.543	10/22/02	NT	PALM	18000
93060-	2297491	A1A	25.000	27.044	06/27/02	NT	PALM	26980
93090-	4126001	811	10.766	11.426	06/27/02	NT / ST	PALM	17987
93110-	4114421	80	0.000	8.963	01/24/02	ET / WT	PALM	6527
93120-	NA	80	21.467	21.928	09/19/02	ET	PALM	28000
93180-	2297501	802	2.152	5.677	11/06/02	ET / WT	PALM	20000
93280-	4118799	704	8.200	8.400	01/23/02	ET / WT	PALM	23934
93280-	4048361	704	9.920	10.199	01/23/02	ET / WT	PALM	8558
93310-	4036191	710	11.800	16.930	01/15/02	ET / WT	PALM	26980
93310-	2298151	710	16.930	20.588	01/15/02	ET / WT	PALM	28576
93310-	2298971	710	20.588	22.294	01/14/02	WT	PALM	20453
93310-	2298961	710	22.294	23.655	01/14/02	WT	PALM	17987
94010-	4035941	5	14.596	20.399	03/05/02	NT / ST	ST. LUCIE	13635
94010-	2303681	5	20.399	21.336	06/26/02	NT / ST	ST. LUCIE	15000
94050-	2302961	A1A	6.105	13.663	03/26/02	NT	ST. LUCIE	14941

2002 Project Listing by District

District 5

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
11010-0047	2383942	500	0.000	0.747	08/05/02	ET / WT	LAKE	18000
11040-	2383942	25	4.000	4.827	08/05/02	NT / ST	LAKE	14000
11050-	4119811	19	11.256	12.716	08/05/02	ST	LAKE	12000
11070-	238429	50	15.689	18.679	03/12/02	ET / WT	LAKE	30026
11200-	5112904	25	0.000	3.728	08/29/02	NT / ST	LAKE	32000
11200-	4119131	25	23.818	31.840	07/01/02	NT / ST	LAKE	23064
18110-	4119821	471	0.000	5.115	07/11/02	NT	SUMTER	22048
36001-	4119831	25	0.000	8.419	06/25/02	NT / ST	MARION	26980
36008-	4116141	492	0.000	3.757	06/26/02	ET / WT	MARION	23934
36080-	4116601	40	10.157	15.149	02/06/02	WT	MARION	14505
36080-	4116611	40	15.149	23.828	02/06/02	WT	MARION	14505
36080-	4116621	40	23.828	32.206	02/06/02	WT	MARION	14505
36100-	410378	200	11.872	14.859	01/31/02	ET / WT	MARION	23499
70007-	4116641	528	0.115	9.956	02/04/02	ET / WT	BREVARD	18857
70007-	4116641	528	0.115	9.956	02/04/02	ET / WT	BREVARD	18857
70020-	2375761	5	16.269	20.622	02/04/02	NT / ST	BREVARD	17987
70020-	2375761	5	16.269	20.622	02/04/02	NT / ST	BREVARD	17987
70020-	2375921	5	20.622	25.115	02/04/02	NT / ST	BREVARD	20017
70030-	4116671	5	0.000	1.775	06/27/02	NT / ST	BREVARD	17000
70120-	4116721	518	0.000	3.087	01/30/02	ET / WT	BREVARD	19872
70120-	4119961	518	3.087	4.452	01/30/02	ET / WT	BREVARD	15956
75030-	4117271	526	0.000	2.118	06/27/02	ET / WT	ORANGE	13925
75035-	4117281	535	0.630	2.314	02/21/02	NT / ST	ORANGE	14070
75050-	238429	50	0.000	1.400	02/21/02	ET / WT	ORANGE	16971
75050-	2384295	50	0.000	1.400	02/21/02	ET / WT	ORANGE	16971
75050-	4109831	50	3.080	6.217	02/21/02	ET / WT	ORANGE	23064
75050-	239535	50	6.217	9.338	02/21/02	ET / WT	ORANGE	19002
75060-	4117301	50	3.832	5.208	03/12/02	ET / WT	ORANGE	19002
75470-	4115301	91	19.179	24.373	10/28/02	NT	ORANGE	26000
75471-	4060901	528	0.000	8.000	11/04/02	ET / WT	ORANGE	25000
77040-	2402291	46	0.000	3.805	01/22/02	ET / WT	SEMINOLE	11024
77120-	4071601	434	8.912	11.282	01/15/02	ET / WT	SEMINOLE	16536
79030-	4117771	5	0.000	5.868	06/27/02	NT / ST	VOLUSIA	17987
79060-	4117781	600	0.000	2.763	04/02/02	ET / WT	VOLUSIA	22048
79220-	4117821	430	0.000	2.169	11/20/02	ET / WT	VOLUSIA	16000
92070-	4117831	60	0.000	3.547	04/03/02	ET	OSCEOLA	23064
92470-	4115321	91	0.000	7.983	10/03/02	NT / ST	OSCEOLA	17000
92470-	4115321	91	16.672	17.876	10/28/02	NT / ST	OSCEOLA	17000

2002 Project Listing by District

District 6

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
87001-	4124681	94	0.000	2.129	07/09/02	ET / WT	DADE	32202
87017-	4103511	913	0.000	0.373	07/09/02	ST	DADE	32202
87019-	4124701	817	0.000	2.907	07/17/02	NT / ST	DADE	26110
87019-	4124711	817	4.023	4.785	07/17/02	NT / ST	DADE	19002
87020-	4106251	5	3.784	7.120	07/08/02	NT / ST	DADE	32202
87026-	4124721	860	5.529	6.569	07/17/02	ET / WT	DADE	27995
87027-	4075601	969	0.479	1.183	07/09/02	NT / ST	DADE	32202
87030-	4124741	5	24.904	25.380	07/17/02	NT / ST	DADE	23064
87038-	4083031	932	8.240	9.700	05/23/02	ET / WT	DADE	26545
87044-	4075841	976	8.100	8.466	05/22/02	ET / WT	DADE	32057
87053-0001	4106441	968	2.351	3.009	07/17/02	ET	DADE	12910
87054-	4124751	972	3.008	4.672	07/09/02	ET / WT	DADE	32202
87055-	4124761	986	0.925	1.904	07/09/02	ET / WT	DADE	22048
87060-	4106451	A1A	6.916	7.250	05/22/02	NT / ST	DADE	25965
87062-	4075901	959	4.072	5.064	07/17/02	NT / ST	DADE	29011
87066-	4075911	922	0.000	1.897	05/22/02	ET / WT	DADE	22483
87072-	4124791	985	6.170	6.663	07/17/02	NT / ST	DADE	32057
87080-	4106461	934	0.000	0.689	07/17/02	ET / WT	DADE	17987
87080-0900	4106471	934	38.580	40.027	07/17/02	ET / WT	DADE	21033
87120-0001	4124811	90	0.000	2.933	07/09/02	WT	DADE	32202
87133-	412937	825	0.000	2.544	09/24/02	NT / ST	DADE	32000
87150-	4106431	997	3.576	4.330	05/22/02	NT	DADE	32057
87150-0001	2496141	997	0.000	22.298	05/22/02	NT	DADE	32057
87160-	4106401	9336	7.058	8.089	07/08/02	WT	DADE	32202
90000-	410847	CR905	0.000	11.065	07/18/02	NT	MONROE	32057
90001-	4108481	C905A	0.000	2.500	09/24/02	NT	MONROE	18000
90001-	4108481	C905A	2.500	5.100	09/24/02	NT	MONROE	7000
90020-	412482	5	14.899	15.164	07/17/02	NT	MONROE	24079
90020-	410354	5	20.475	20.912	07/17/02	NT	MONROE	16971
90020-	410355	5	22.118	22.647	07/17/02	NT	MONROE	16971

2002 Project Listing by District

District 7

Section Number	Work Project Number	State Road	BMP	EMP	Date Tested	Lanes Tested	County	M_R (psi)
10040-	2558531	45	0.000	3.165	03/19/02	NT	HILLSBOROUGH	19002
10075-	2586671	93A	30.219	39.835	06/25/02	NT / ST	HILLSBOROUGH	31912
15009-	2571381	586	0.000	1.034	09/17/02	ET / WT	PINELLAS	18000
15230-	7117164	693	0.000	2.100	03/19/02	NT / ST	PINELLAS	23064

REFERENCES

1. Nazef, A., and B. Choubane. *Survey of Current Practices of Using Falling Weight Deflectometers.* Research Report FL/DOT/SMO/01-452, Florida Department of Transportation, Gainesville, September 2001.
2. Bentsen, R. A., S. Nazarian, and J. A. Harrison. Reliability Testing of Seven Nondestructive Pavement Testing Devices. In Nondestructive Testing of Pavement and Backcalculation Moduli, ASTM STP 1026, A. J. Bush, III and G. Y. Baladi, Eds., American Society for Testing and Materials, Philadelphia, 1989.
3. *AASHTO Guide for the Design of Pavement Structures*. American Association of State Highway and Transportation Officials, Washington, D.C., March 1993.
4. Ullidtz, P. *Pavement Analysis*. Elsevier Science Publishers, New York, 1987.
5. Boussinesq, J. Application des Potentiels à l'Etude de l'Equilibre et du Mouvement des Solides Elastiques. Gauthiers-Villars, Paris 1885.

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Overall Value of This Report	O	O	O	O	O

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