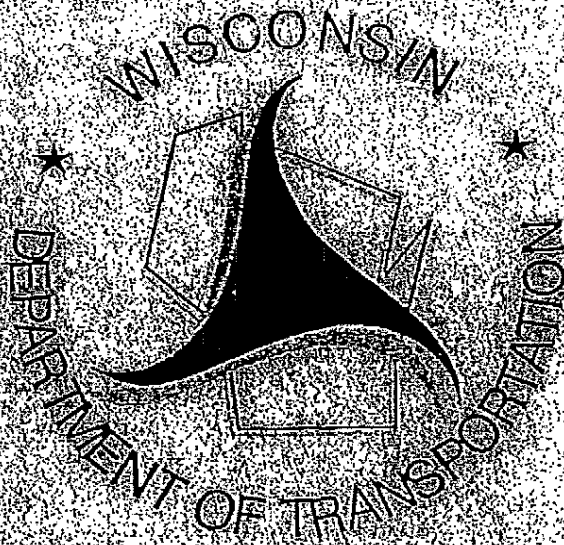


✓
1-5-07
from
Emily Johnson

MILWAUKEE COUNTY STADIUM VARIABLE MESSAGE SIGN STUDY

IMPACTS OF AN ADVERTISING VARIABLE MESSAGE SIGN ON FREEWAY TRAFFIC



Prepared for the
Wisconsin Department of Transportation

By
WISDOT District 2
Freeway Operations Unit

December, 1994

Results:

The crash rate is a statistic that accurately describes the safety and performance of a facility by considering both the traffic volumes of the study segment and the accident frequency. An increase in side-swipe or rear-end crashes could indicate that the sign had an effect on traffic moving through the two study segments. It is possible that many crashes occurred because motorists looked at the new sign off in the distance and, as a result, momentarily drifted into an adjacent lane. The study segment roadways are somewhat S-shaped (eastbound more than westbound).

The results of the crash analysis are tabulated below. The analysis uses the following equations to indicate percentage increase or decrease:

1984 effect: $(R_{1984} - R_{before}) / R_{before} * 100$

3-year after effect: $(R_{after} - R_{before}) / R_{before} * 100$

The 1984 single year average percentage increase or decrease illustrates the initial effects of the sign and the 3-year after percentage increase or decrease shows the long term effects of the sign.

EASTBOUND SEGMENT

Total Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	3.12	
1984 single year average	4.46	+43%
3 year after average	4.25	+36%

Side-Swipe Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	0.75	
1984 single year average	1.35	+80%
3 year after average	0.81	+8%

Rear-End Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	1.81	
1984 single year average	2.1	+60%
3 year after average	2.27	+21%

WESTBOUND SEGMENT

Total Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	2.91	
1984 single year average	2.56	-12%
3 year after average	3.53	+21%

Side-Swipe Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	0.52	
1984 single year average	1.16	+123%
3 year after average	0.7	+35%

Rear-End Analysis

	RATE	% INCREASE/DECREASE
3 year prior average	1.39	
1984 single year average	0.99	-29%
3 year after average	1.87	+35%

Conclusions:

It is obvious that the variable message sign has had an effect on traffic, most notably in the increase of the side-swipe crash rate. The eastbound segment was impacted dramatically in both the short and long-term. The reason for this is that the sign is orientated such that it is more readable to eastbound traffic than westbound traffic.

Comparing the annual study crash rates to the annual Wisconsin urban interstate crash rates illustrates the effect of the sign, especially in the eastbound direction. If the sign had no effect on traffic, most likely the segment crash rates would have followed a trend similar to the urban interstate, but at a higher overall rate.

Crash rates may be lower in the westbound due to the merging area created by westbound I-94 traffic originating from northbound and southbound USH 41. Observation reveals that merging traffic 'meters' or causes traffic to slow down as it enters the area. As a result, traffic in the majority of the westbound study segment tends to be less congested once it passes through the more constrained operational area to the east. The eastbound segment appears to be an area of more uniformly distributed congestion.

The Milwaukee County Stadium variable message sign changes images on an average of 12 frames per minute. Signs operating at a faster display rate with similar horizontal and vertical grading in the area are possible to have an equal or greater impact on traffic. It may be beneficial to introduce traffic responsive variable message signs into the area. Signs could function at rates proportional to traffic flow and density in the viewing area. Money, time and lives could be saved.

Milwaukee County Stadium Variable Message Sign Study

Need for Study:

The Department has been looking for a process to analyze the immediate and long-term effects of variable message signs advertising along roadways. The term advertising refers to signs that display non-traffic related information. With the introduction of highly sophisticated signs, which can distract motorists, the Department seeks statistics showing how less advanced signs have impacted traffic in the past. These statistics will be the basis for justification into further study. Regulating the use of complex messages, which may demand motorists' attention and as a result, decrease the level of service and increase the number of crashes in that area, could possibly be a recommendation.

Facility Studied:

The study area consists of I-94 eastbound and westbound adjacent to Milwaukee County Stadium namely: from just east of Hawley Road to just west of the Stadium Interchange (Figure 1). This range was determined through field analysis. The area consists of all places where the variable message sign can be viewed by a motorist and/or passengers at various traveling speeds ranging from 30 to 55 miles per hour.

Time Period Studied:

The Milwaukee County Stadium message sign began operation on April 13, 1984. In order to obtain valid results, the time period studied was January 1, 1981 to December 31, 1987; three years prior to operation and three years after.

Process of Investigation:

Annual crashes were inventoried and classified by type for the study area using spot maps maintained by the WISDOT Freeway Operations Unit. The crashes were then broken into percentage (%) by crash type. Average daily traffic (ADT) counts from the automatic traffic recorder (ATR) # 40.0002, located immediately west of Mitchell Boulevard, maintained by the WISDOT Planning Unit, were obtained and converted into average yearly traffic (AYT). Annual crash rates for each segment were calculated by type using the following equation:

$$\text{crash rate} = \frac{\text{accident frequency}}{(\text{length of test segment} * \text{AYT} * 10^6)}$$

units = # of crashes per million vehicle miles

Refer to Tables 1-4 for data collected and calculated. Figures 3 and 4 are illustrations representing the relationship between crash rates and years studied for each segment. Figure 4 shows a graphical comparison of crash rates within the study area versus the state-wide urban interstate crash rate.

STADIUM VARIABLE MESSAGE SIGN STUDY

NUMBER OF CRASHES BY TYPE

EASTBOUND SEGMENT

Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER	TOTAL
1981	16	11	10	4	41
1982	16	5	5	5	31
1983	13	10	5	7	35
1984	25	16	8	4	53
1985	21	8	7	5	41
1986	30	13	4	8	55
1987	33	9	12	7	61
TOTAL # OF CRASHES BEFORE 1984					107
TOTAL # OF CRASHES AFTER 1984					157

WESTBOUND SEGMENT

Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER	TOTAL
1981	13	7	11	3	34
1982	17	3	8	1	29
1983	18	8	7	4	37
1984	12	14	4	1	31
1985	18	9	9	9	45
1986	30	9	7	2	48
1987	22	8	6	3	39
TOTAL # OF CRASHES BEFORE 1984					100
TOTAL # OF CRASHES AFTER 1984					182

STADIUM VARIABLE MESSAGE SIGN STUDY

PERCENTAGE(%) OF CRASHES BY TYPE

EASTBOUND SEGMENT

Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER
1981	39.0	26.8	24.4	9.8
1982	51.6	16.1	16.1	16.1
1983	37.1	28.6	14.3	20.0
1984	47.2	30.2	15.1	7.5
1985	51.2	19.5	17.1	12.2
1986	54.4	23.6	7.3	14.5
1987	54.1	14.8	19.7	11.5

WESTBOUND SEGMENT

Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER
1981	38.2	20.6	32.4	8.8
1982	58.6	10.3	27.6	3.4
1983	48.6	21.6	18.9	10.8
1984	38.7	45.2	12.9	3.2
1985	40.0	20.0	20.0	20.0
1986	62.5	18.8	14.6	4.2
1987	56.4	20.5	15.4	7.7

TABLE 3

STADIUM VARIABLE MESSAGE SIGN STUDY

AVERAGE DAILY TRAFFIC(ADT) FROM ATR # 40-0002

LOCATION: Immediately west of Mitchell Boulevard

NOTE: ADT consists of 7 day average.

	<u>EASTBOUND</u>	<u>WESTBOUND</u>
1981	51,716	51,566
1982	51,494	51,776
1983	53,524	53,720
1984	54,293	55,326
1985	53,653	55,312
1986	55,943	57,984
1987	58,410	57,285

AVERAGE YEARLY TRAFFIC(AYT)

	<u>EASTBOUND</u>	<u>WESTBOUND</u>
1981	18,876,340	18,821,590
1982	18,795,310	18,898,240
1983	19,536,260	19,607,800
1984	19,816,945	20,193,990
1985	19,583,345	20,188,880
1986	20,419,195	21,164,160
1987	21,319,650	20,909,025

STADIUM VARIABLE MESSAGE SIGN STUDY

CRASH RATE

Note: units are accidents/million vehicle miles

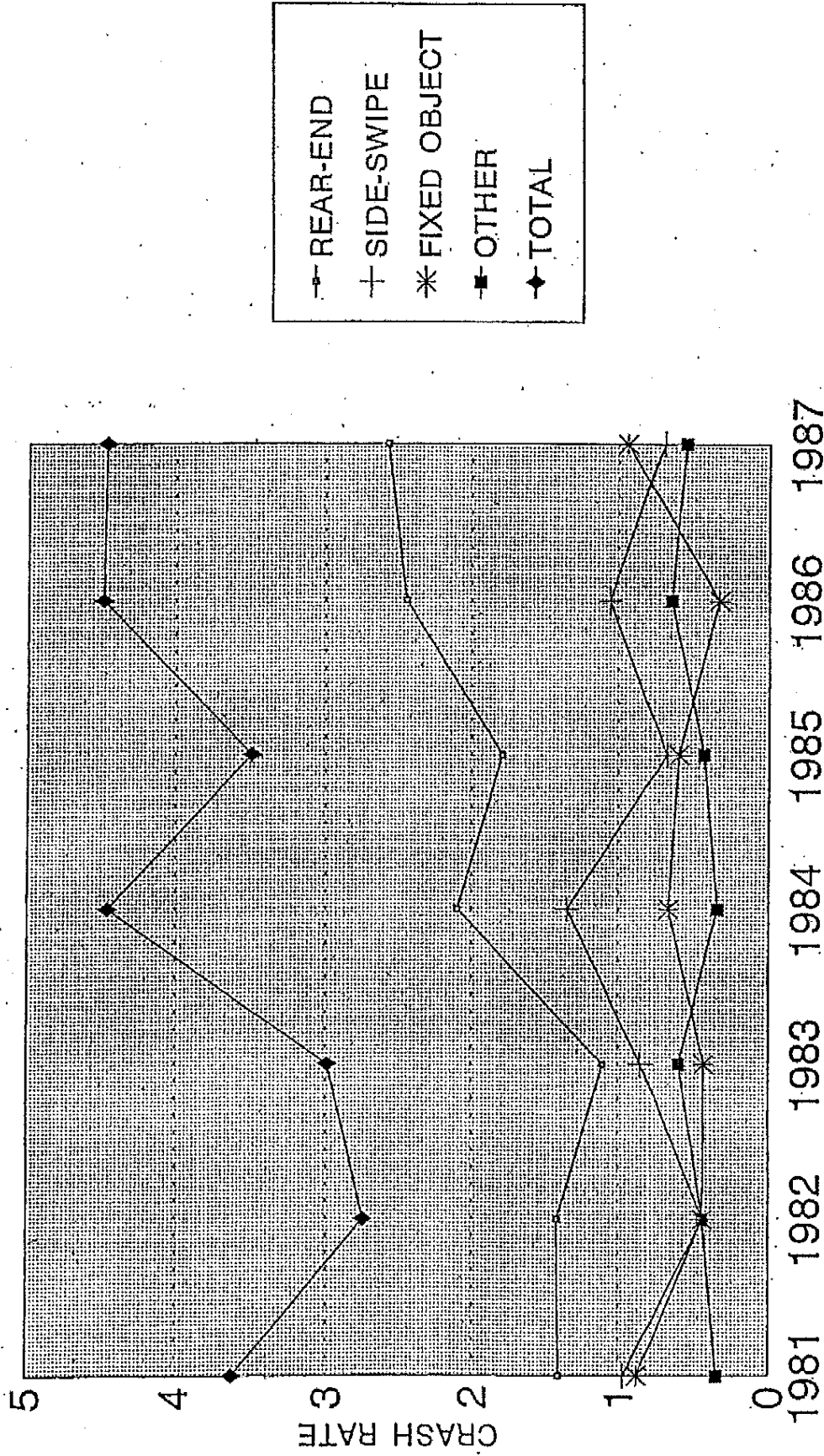
EASTBOUND SEGMENT					
Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER	TOTAL
1981	1.41	0.97	0.88	0.35	3.62
1982	1.42	0.44	0.44	0.44	2.75
1983	1.11	0.85	0.43	0.60	2.99
1984					
	2.10	1.35	0.67	0.34	4.46
1985					
	1.79	0.68	0.60	0.43	3.49
1986					
	2.45	1.06	0.33	0.65	4.49
1987					
	2.58	0.70	0.94	0.55	4.77
PRE-1994 AVERAGE CRASH RATE					3.12
POST-1984 AVERAGE CRASH RATE					4.25

WESTBOUND SEGMENT					
Year	REAR-END	SIDE-SWIPE	FIXED OBJECT	OTHER	TOTAL
1981	1.15	0.62	0.27	0.27	3.01
1982	1.50	0.26	0.09	0.09	2.56
1983	1.53	0.58	0.34	0.34	3.15
1984					
	0.99	1.16	0.08	0.08	2.56
1985					
	1.49	0.74	0.74	0.74	3.71
1986					
	2.36	0.71	0.16	0.16	3.78
1987					
	1.75	0.64	0.24	0.24	3.11
PRE-1994 AVERAGE CRASH RATE					2.97
POST-1984 AVERAGE CRASH RATE					3.53

STADIUM VARIABLE MESSAGE SIGN STUDY

CRASH RATE BY TYPE (EASTBOUND SEGMENT)

Note: the unit of crash rate is # of crashes per million vehicle miles.

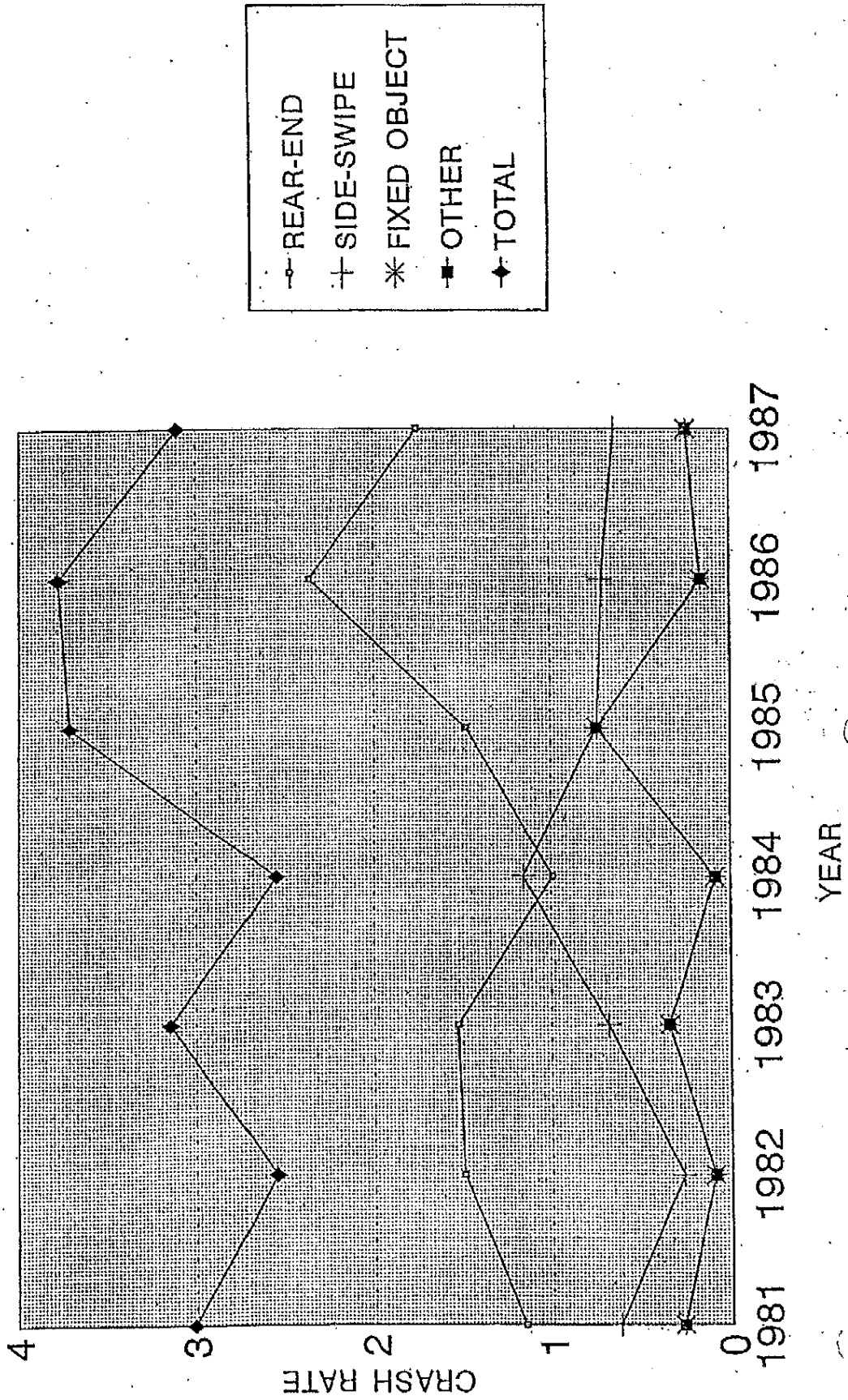


YEAR

19

STADIUM VARIABLE MESSAGE SIGN STUDY CRASH RATE BY TYPE (WESTBOUND SEGMENT)

Note: the unit of crash rate is # of crashes per million vehicle miles.





Wisconsin Department of Transportation

MEMORANDUM

DATE: December 19, 1994
TO: John Corbin, Freeway Operations Engineer
FROM: Todd Szymkowski, Freeway Operations
SUBJECT: Milwaukee County Stadium variable message sign study

As requested, I have prepared a study showing the traffic impacts that the variable message sign located at County Stadium has created since installation. It started operation on the Brewer's opening game in 1984. Therefore, 1984 has been designated the test year. For accurate results, information pertaining to the study was collected three-years prior and three years after the beginning of operation.

In 1984, side-swipe crashes increased 123% in the westbound study segment of I-94. In the three year after analysis, crashes increased 36% in the eastbound study segment. The first signifies the immediate effects and the latter highlights the long-term effect of the sign.

If you have any questions or wish to meet or discuss, please contact John Corbin (414)-227-2150 or me at (414)-227-2153.

Copies: Bob Packee
Ron Sonntag
Ed Friede
Steve Young
Dick Lange
Stu Mathias
Kristi Sebastian
Mark Morrison
Jay Obenberger

ST. LOUIS AREA

DATE RICKS
MIS DOT
JEFF. CITY MISSOURI

STARTING UP PATROL

ST. LOUIS & KOGA

EDWARDS & KELCEY

RON

IDEAL CONTACT W/ GCM

PHIL TEK

INFO

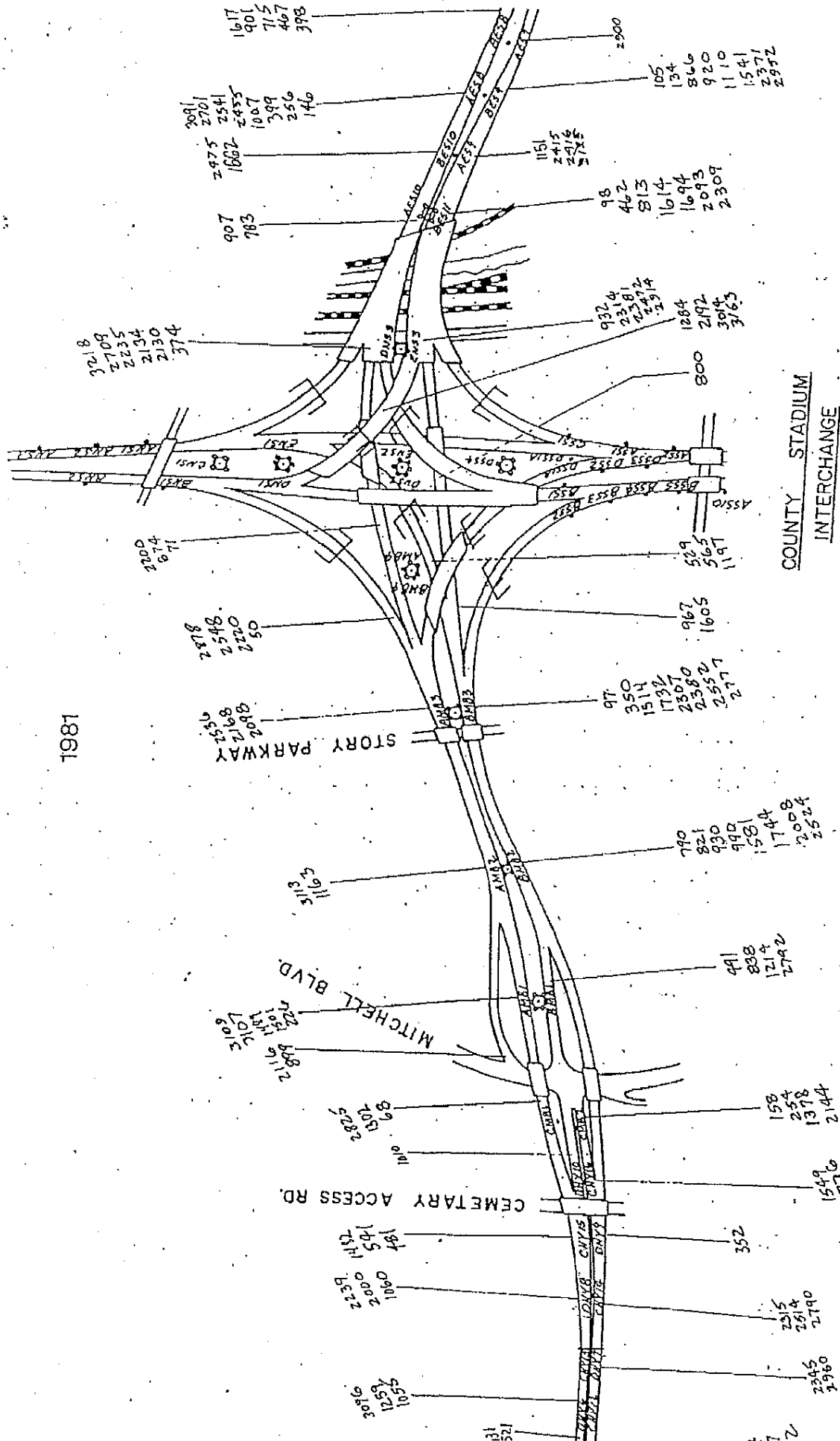
B-1-555-1212

(314) -

1-(314)-555-1722

751-7100

1981



COUNTY STADIUM INTERCHANGE

1981

EB	314	SS	2524	FO
	927	RE	97	SS
	1112	O	350	FO
	2345	FO	1514	SS
	2960	RE	1732	FO
	2315	RE	2307	RE
	2514	RE	2380	SS
	2790	FO	2552	RE
	352	FO	2777	O
	1549	SS	967	RE
	1776	O	1605	O
	2323	RE	3294	FO
	158	RE	665	FO
	254	SS	1197	FO
	1378	FO	1197	
	2144	RE		
	491	RE		
	838	SS		
	1214(9)	RE		
	2792	RE		
	796	SS		
	821	RE		
	930	RE		
	990	RE		
	1581	SS		
	1744	SS		
	2008	SS		

CA
DIR

REAR END = RE = 16
 SIDESWIRE = SS = 11
 FIXED OBJECT = FO = 10
 OTHER = O = 4
 UNKNOWN = U = 0
 TOTAL = 41

1981

WB 2200 FO

2000 SS

674 FO

1060 FO

71 FO

8096 RE

2878 SS

1259 RE

2548 FO

1055 RE

2220 FO

1331 SS

60 FO

1521 FO

2530 SS

~~1097~~

2168 SS

2098 SS

3113 FO

1163 RE

3109 RE

3107 RE

1489 RE

1501 FO

720 RE

2116 O

899 RE

2825 RE

REAR END = RE = ~~13~~ 13

1302 FO

SIDESWIPE = SS = 7

68 RE

FIXED OBJECT = FO = 11

1010 RE

OTHER = O = 3

1482 O

UNKNOWN = U = 0

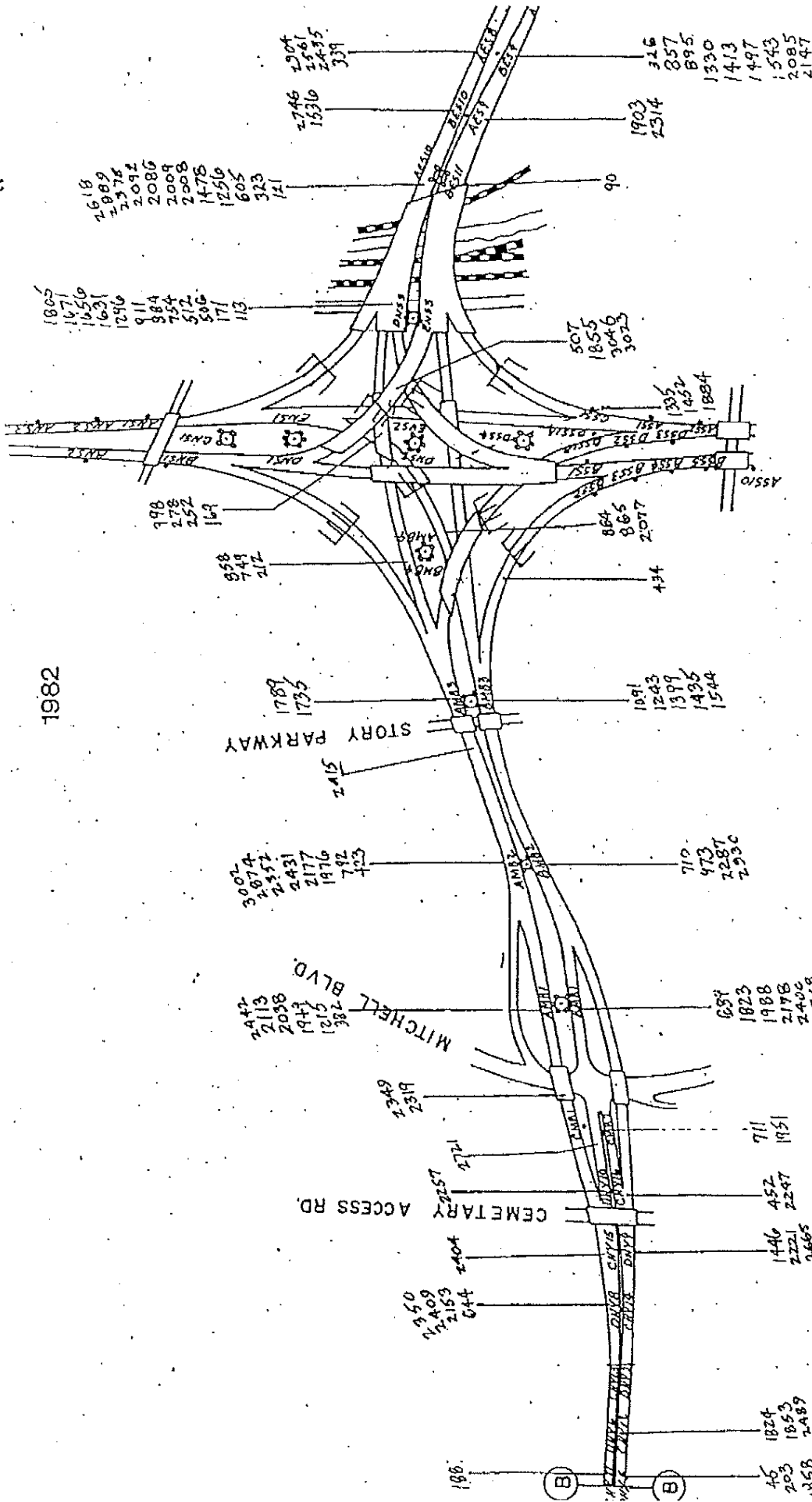
541 RE

TOTAL = 34

481 SS

2239 FO

1982



COUNTY STADIUM
INTERCHANGE

1605
1471
1650
1631
12916
911
2086
2004
754
512
1478
12516
605
323
121

2618
1889
2378
2092
2086
2004
754
512
1478
12516
605
323
121

2746
204
2561
2435
329

1903
2314

90

507
1855
3046
3073

1335
1452
1884

884
865
2077

434

1891
1243
1399
1436
1544

710
473
2287
2330

684
1823
1988
2178
2406
2768
2944

711
1951

1446
452
2221
2247
2665

1404
1404

146
1824
203
1853
1358
2489

186

46
203
1358

1982

~~1982~~ EB

1399 FO

45 SS

1435 RE

203 SS

1544 O

1858 RE

184 FO

1824 RE

~~1864~~

1853 SS

CHECK
LOC. ~~1865~~

2409 O

2077 FO

1446 FO

2221 RE

2665 RE

152 RE

RE = ~~16~~ 16

2247 RE

SS = ~~6~~ 6

711 O

FO = ~~5~~ 5

1957 ~~RE~~ RE

O = ~~5~~ 5

689 O

U = 10

1823 O

TOTAL = 31

1988 ~~SS~~ SS

2178 RE

2400 RE

2768 FO

2944 RE

710 RE

973 SS

2287 RE

2980 RE

1091 RE

1243 RE

1982

WB 858 RE 2153 FO

749 FO 644 FO

212 FO 188 FO

1789 RE

1735 RE

2115 RE

3002 RE RE = 17

2874 FO SS = 23

2352 RE FO = 78

2431 RE O = 71

2177 RE U = 0

1976 RE TOTAL 29

792 FO

423 O

~~2942~~

2113 SS

2038 RE

1941 SS

1215 RE

382 SS

2349 RE

1319 FO

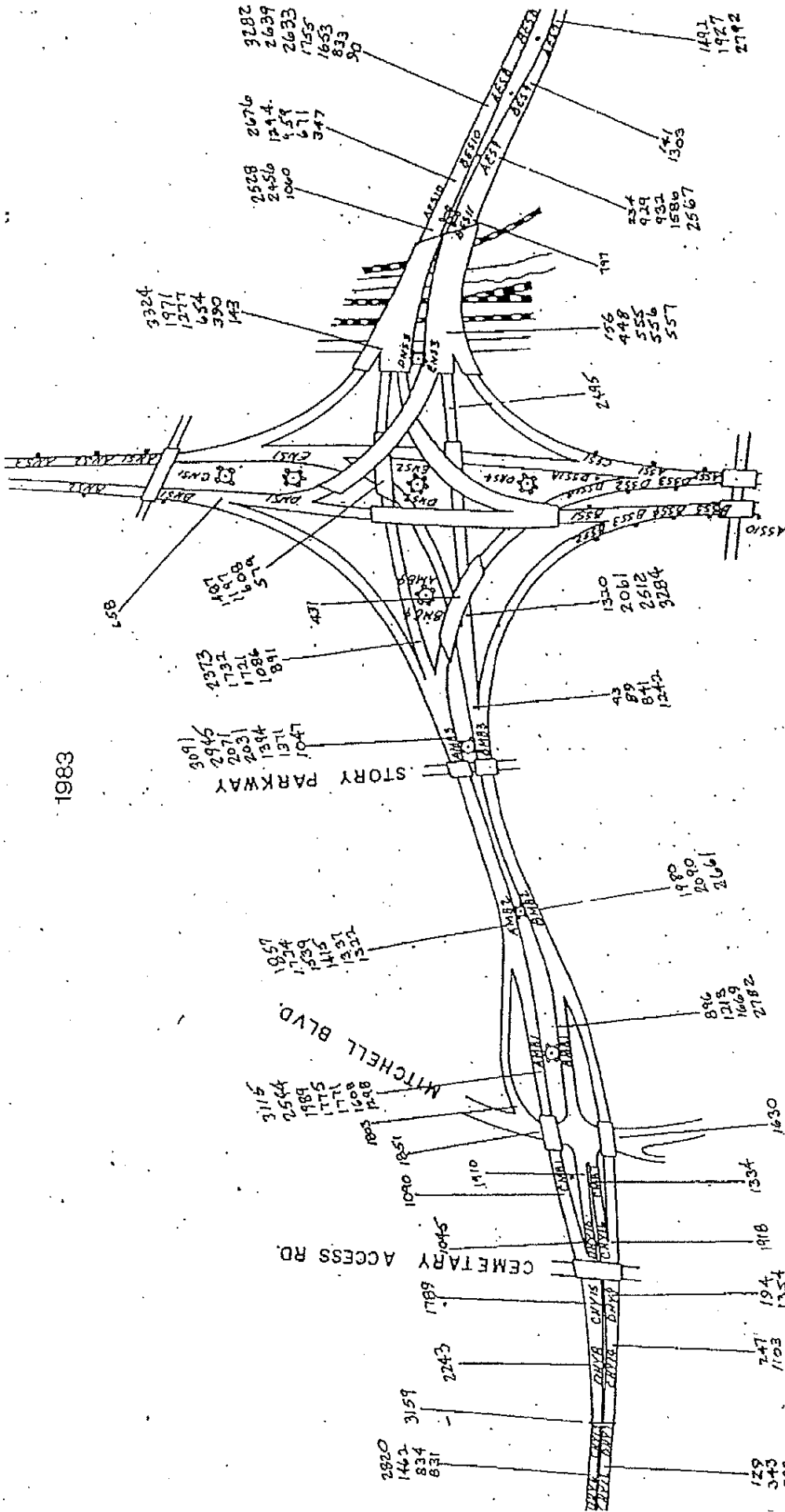
2721 RE

2257 RE

2404 RE

2350 RE

1983



COUNTY STADIUM
INTERCHANGE

ACCESS RD.
CEMETARY

MITCHELL BLVD.

STORY PARKWAY

2820
1462
834
158
831

3159

2243

681

1000

1410

1000

1410

1410

1410

1410

1410

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1410

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1410

1410

1410

1410

1410

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129
343
812
2143
2251
3191

247
1103
1113
2216

194
1354
1524
2724

1918

1334

1630

1410

1410

1410

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1410

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1491
1927
2792

234
929
932
1586
2567

234
929
932
1586
2567

191

2497

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191

191

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

3282
2639
2633
525
1755
1653
833
06

2528
2456
1000

2676
1244
459
671
347

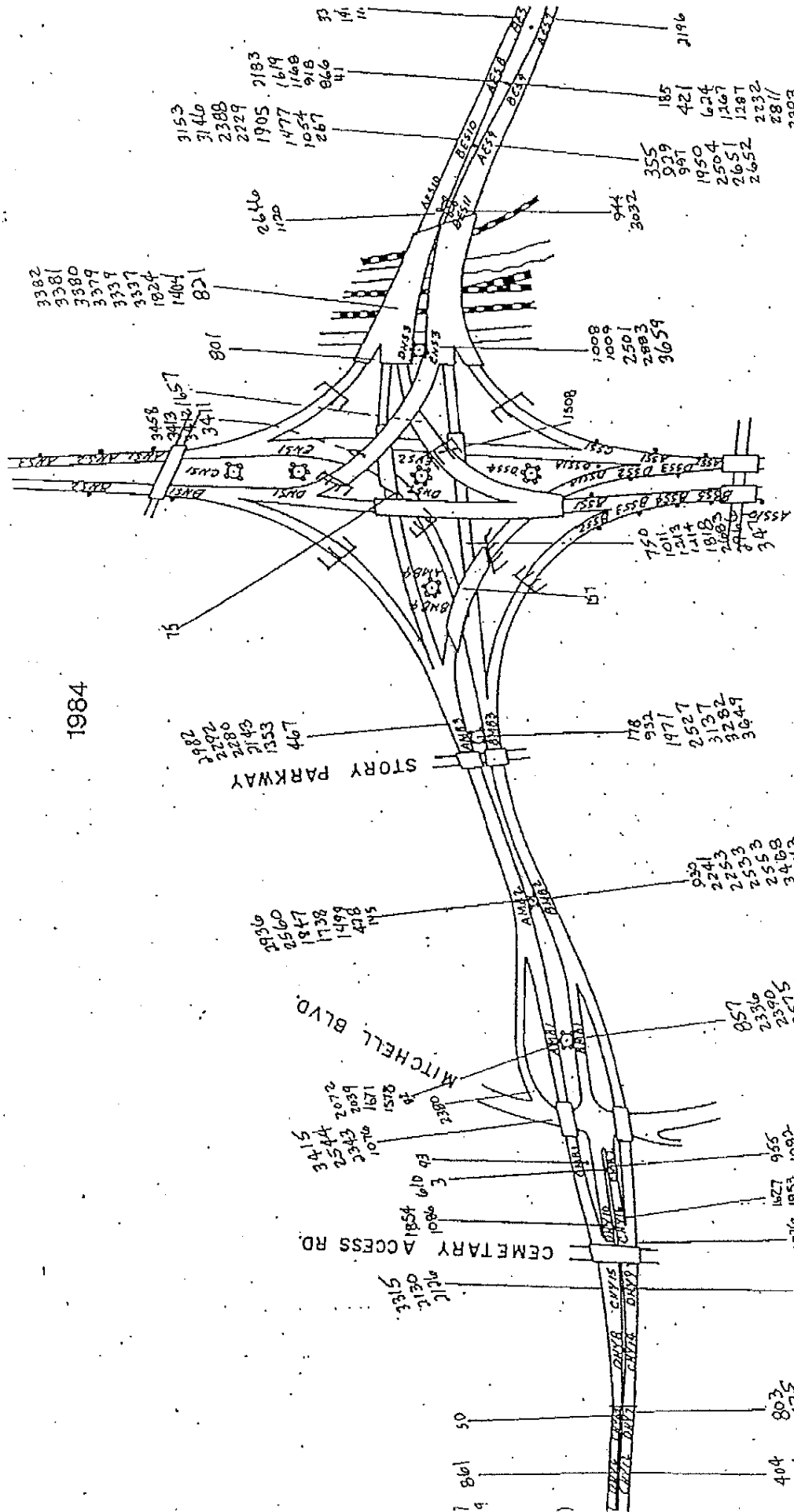
1983

<u>EB</u>	1333 FO	89 RE
	1858 RE	841 FO
	129 RE	1242 RE SS
	343 FO	1320 RE
	892 SS	2061 SS
	2143 RE	2512 SS
	2241 O	3284 O
	3291 FO	1090 O
	247 FO	
	1103 SS	RE = 12 13
	1113 RE	SS = 18 10
	2216 SS	FO = 5
	194 O	O = 14 7
	1354 SS	TOTAL = 34
	1524 RE	
	2724 O	
	1918 O	
	1334 SS	
	1630 O	
	896 RE	
	1213 RE	
	1069 RE	
	2782 RE	
	1980 RE	
	2090 RE	
	2661 SS	
	9(4)3 SS	

1983

1983 WB	431	FO	1851	FO
	2373	RE	1410	RE
	1732	RE	ER 1090	0
	7721	RE	1045	SS
	1086	RE	1784	SS
	891	RE	2243	0
	5091	FO	3159	FO
	2945	RE	2820	0
	2071	SS	1462	RE
	2031	RE	834	RE
	1394	RE	831	RE
	1371	RE		
	1647	FO		
	1857	RE	RE = 18	
	1724	SS	SS = 48	
	1589	RE	FO = 7	
	1415	RE	0 = 4	
	1337	SS	TOTAL = 347	
	1322	RE		
	3115	0		
	2544	0		
	1989	SS		
	1775	FO		
	1771	RE		
	1608	SS		
	1298	SS		
	1863	FO		

1984



COUNTY STADIUM
INTERCHANGE

3382
3381
3380
3379
3339
3337
3324
1824
1404
821

3153
3146
2388
2224
1905 2183
1477 1619
1054 918
267 866
41

2646
1120

355
939
991
1950
2504
2651
2652
2232
2811
3993

1008
1009
2501
2883
3659

1982
2292
2280
2145
1353
467

STORY PARKWAY

178
932
1971
2527
3137
3282
3649

930
2241
2253
2533
2553
2558
3643
3644

6596
2560
1947
1738
1498
438
145

MITCHELL BLVD

857
2336
2390
3215

3444
2543
2072
1571
1578
2380

CEMETERY ACCESS RD

965
1092
1772
2192
2254
2320

CEMETERY ACCESS RD

1271
1281

1861
50

404
8035
804
2475
1186
3016
1403

1984

RE = 25

SS = 16

FO = 8

O = 4

U = 0

TOTAL = 53

EB 1626 RE	2336 RE
1585 SS	2390 RE
2053 RE	3575 FO
2233 FO	930 O
2262 SS	2241 SS
3158 O	2253 RE
3669 SS	2533 RE
404 RE	2553 O
804 SS	3468 FO
1186 FO	3643 SS
1403 O	3644 RE
803 FO	178 SS
2475 FO	932 FO
3018 RE	1971 RE
1271 RE	2527 FO
1281 SS	3137 RE
6026 RE	3282 RE
1620 RE	3649 SS
1853 RE	750 O SS
955 SS	2011 RE
1082 RE	1213 RE
1772 RE	1214 SS
2192 RE	1818 SS
2264 RE	2683 RE
2329 SS	2966 RE
2520 RE	3470 SS
857 SS	

1984

WB	157 SS	2315 SS
	2982 SS	2130 SS
	2292 FO	2126 RE
	2280 RE	50 SS
	2143 RE	861 SS
	1353 RE	1977 SS
	467 SS	799 RE
	2936 RE	RE = 12
	2560 RE	SS = 14
	1847 RE	FO = 4
	1738 FO	O = 1
	1499 SS	U = 0
	478 RE	TOTAL = 31
	145 SS	
	2072 SS	
	2039 RE	
	1671 O	
	1578 SS	
	92 RE	
	2119	
	2544	
	2117	
	1076 SS	
	2380 FO	
	93 RE	
	3 FO	
	1086 SS	

1985

EB	2859 RE	841 0
	3907 RE	942 FO
	810 0 0	1066 FO
	3056 0	1354 FO
	732 SS	1442 RE
	822 0	1752 RE
	1316 RE	1912 RE
	2202 RE	2258 SS
	2854 FO	3153 RE
	2942 FO	2181 RE
	3432 RE	2431 RE
	3942 FO	2799 SS
	816 RE	2653 SS
	1720 RE	1080 RE
	2885 RE	
	1103 0	RE = 21 21
	1449 RE	SS = 8 8
	2932 FO	FO = 7
	3018 SS	0 = 5 5
	358 SS TOTAL	401
	368 RE	
	1238 RE	
	1280 RE	
	1845 SS	
	2349 RE	
	3630 SS	
	3557 RE	

1985

WB 3573 FO

1324 RE

3125 RE

1126 ~~SS~~

3161 SS

152 ~~SS~~

3155 RE

2766 O

3146 RE

~~1080~~

3136 SS

3370 RE

1656 O

1332 RE

1205 FO

7321 RE

794 RE

1536 ~~RE~~

431 O

282 ~~SS~~

267 SS

245 FO

3816 FO

2 O

2655 RE

3087 RE

2645 RE

2488 SS

2264 ~~SS~~

2215 RE

1597 RE

1976 O

1426 RE

1939 O

1304 FO

731 O

674 FO

657 RE

4078 ~~SS~~

3786 RE

RE = ~~18~~ 18

3399 RE

SS = ~~9~~ 9

3376 FO

FO = 9

3019 FO

O = ~~9~~ 9

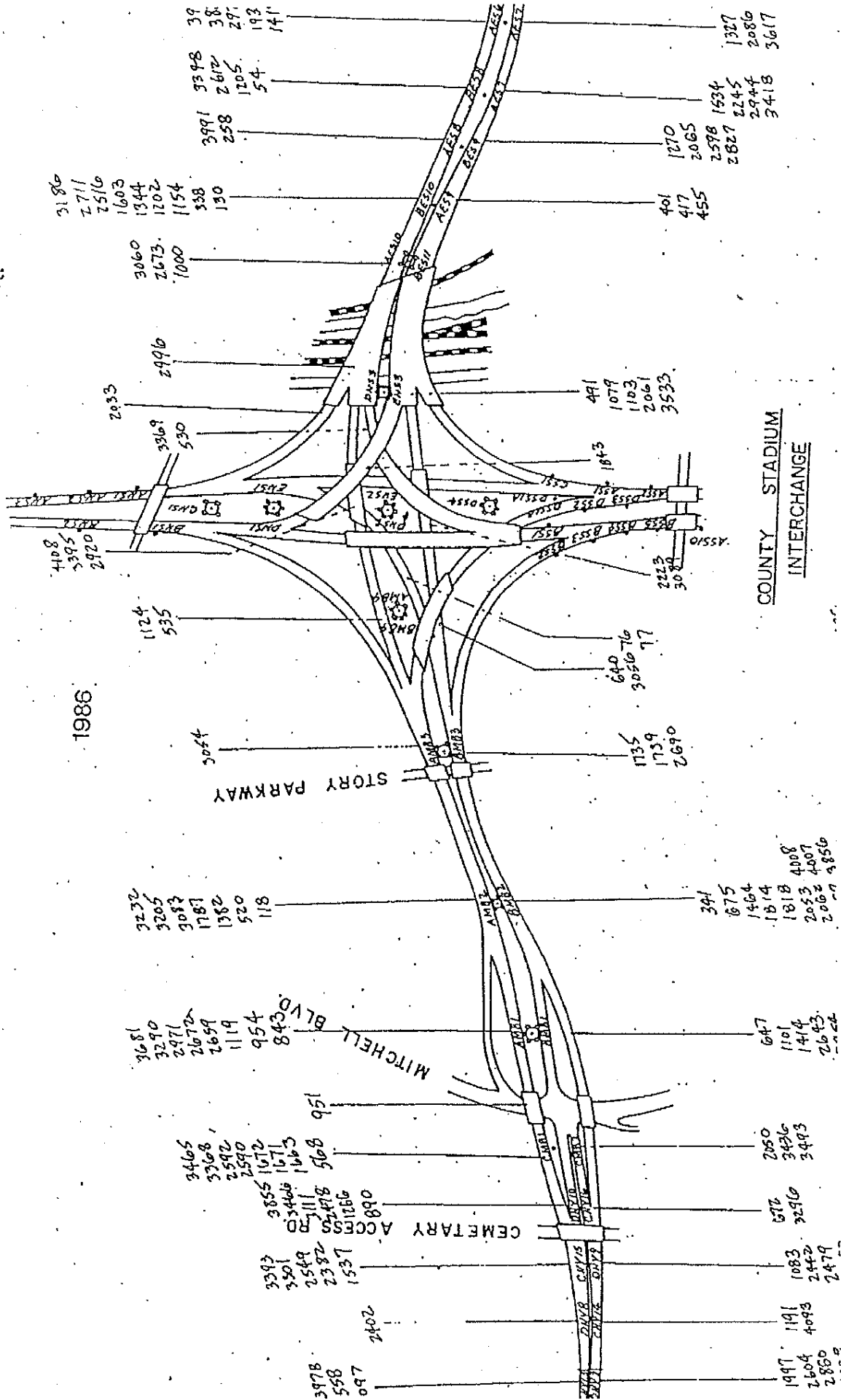
1708 O

TOTAL = 45

1461 FO

1385 O

1986



COUNTY STADIUM
INTERCHANGE

1986

RE = 30
SS = 13
FO = 4
O = 8
TOTAL = 55

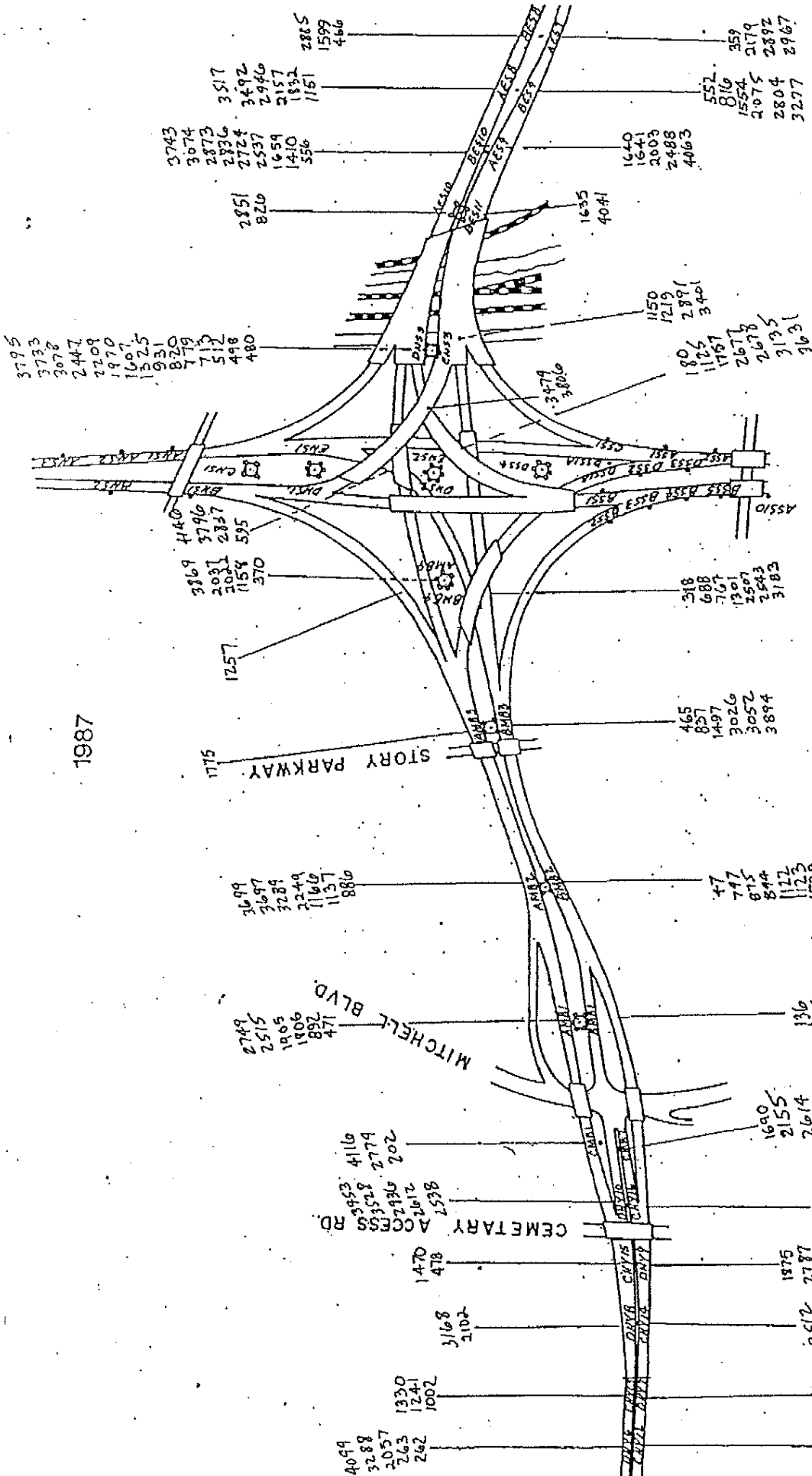
EB → 1046 RE	3139 RE
7819 RE RE	3494 RE
3144 O	3918 RE
3288 RE	3956 RE
7073 SS	391 RE
2146 SS	675 SS
1997 SS	1464 RE
2604 O	1814 SS
2860 SS	1818 RE
8228 RE	2053 RE
3767 RE	2062 SS
1191 SS	2157 RE
4093 SS	2264 RE
1083 SS	2354 FO
2AAZ O	2369 SS
2479 RE	4008 RE
2680 O	4007 O
672 FO	3856 SS
3296 RE	3A19 RE
2050 RE	3278 RE
3436 RE	2640 RE
3793 RE	1735 O
647 FO	1739 O
1101 O	2690 FO
1414 RE	640 RE
2643 RE	3056 RE
2954 SS	76 RE

SS = 9
 FO = 7
 O = 2
 U =
 TOTAL = 48

1986

CUB	1124 SS	3855 SS
	535 FO	3466 RE
	3054 FO	8111 RE
	3232 RE	2478 RE
	3205 RE	1266 RE
	3083 RE	890 O
	1287 SS	3393 O
	1382 RE	3301 RE
	520 RE	2549 RE
	118 FO	2382 RE
	3681 RE	1537 SS
	3240 RE	2402 RE
	2971 RE	3978 FO
	2672 RE	1558 RE
	2659 RE	1097 SS
	1119 SS	3622 FO
	954 RE	2135 SS
	843 RE	1391 RE
	854	558 FO
	3465 RE	2444 RE
	3368 RE	1315 SS
	2592 RE	212 FO
	2590 RE	
	1672 RE	
	1671 RE	
	1663 RE	
	568 SS	

1987



COUNTY STADIUM
INTERCHANGE

1987

EB 1148 O	2777 RE	318 FO
1709 FO	2823 RE	688 FO
2825 RE	3276 RE	767 SS
107 FO	3633 SS	1301 FO
1572 RE	3898 RE	2507 FO
1981 RE	3911 RE	2543 RE
2572 FO	4052 RE	3183 O
1875 RE	473 FO	
2787 RE	797 SS	
586 FO	875 FO	RE = 33
1099 RE	894 RE	SS = 9
1578 RE	1122 RE	FO = 12
2176 SS	1123 RE	O = 7
3926 FO	1529 RE	U = 7
1680 O	1803 RE	TOTAL = 61
2155 RE	2213 RE	
2614 RE	2224 RE	
2811 SS	2304 RE	
3772 SS	2530 RE	
136 RE	3811 RE	
144 RE	3867 SS	
215 FO	465 O	
229 SS	837 FO	
1038 SS	1497 O	
1175 O	3026 RE	
1910 RE	3052 RE	
2483 RE	3894 RE	

1.987

WB	3869 FO	2538 RE
	2037 O	1470 RE
	2072 O	478 RE
	1158 SS	3168 RE
	370 FO	2102 RE
	1257 O	1330 RE
	1775 RE	1241 RE
	3699 SS	1002 O
	3697 SS	4099 SS
	3289 RE	3288 RE
	2249 SS	2057 RE
	1166 RE	263 SS
	1137 FO	262 FO
	886 RE	
	2749 RE	RE = 21
	2515 RE	SS = 8
	1905 RE	FO = 6
	1806 FO	O = 3
	892 RE	V = 0
	471 RE	TOTAL = 39
	416 FO	
	2779 RE	
	202 RE	
	3953 SS	
	3528 SS	
	2986 RE	
	2612 RE	

