Report 7

Regional Park and Ride Assessment: Highway-Related Facilities Supplement 1: Evaluation of Areas #76-84

DIRECTION 2020

A Region on the Rise

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

REGIONAL PARK AND RIDE ASSESSMENT:
HIGHWAY-RELATED FACILITIES

SUPPLEMENT 1: Evaluation of Areas #76-84

DIRECTION 2020 Report #7

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

TITLE	Date Published: June 1993
REGIONAL PARK AND RIDE ASSESSMENT: HIGHWAY-RELATED FACILITIES *SUPPLEMENT 1*	*Publication No. 93019*

Geographic Area Covered:

The DVRPC nine-county region, including Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.

Key Words:

Market area evaluation, demand analysis, trip factors, rideshare options, locational factors, needed improvements, risk factors, local and regional park and ride lots, focal intersection, travel time, travel distance, transit service, local land use, proximity of vacant land, state and local plans

ABSTRACT

This report continues the work of the previous report, "Regional Park and Ride Assessment: Highway-Related Facilities." Nine new proposed park and ride areas are subjected to a market area evaluation and general demand analysis. A recommendation for further action is given for each of these areas.

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INTRODUCTION

This supplement to the fiscal year 1992 Delaware Valley Regional Planning Commission report, "Regional Park and Ride Assessment: Highway-Related Facilities," was conducted as a means to expand the list of proposed park and ride areas provided in that report from 75 to 84. Nine new areas were identified for evaluation either at the request of member counties or because they have been submitted as projects for Pennsylvania's Safety and Mobility Initiative (SAMI-2) funding program.

The methodology used to assess these park and ride areas was the same as that used in the fiscal year 1992 report.

- A market area was identified for each proposed park and ride area.
- Each area was analyzed based on the market area characteristics including trip factors, rideshare options, and locational factors.
- A demand analysis was conducted which estimated potential lot usage by patrons traveling from each market area to 10 major employment destinations within the DVRPC region. This potential demand provided an indicator as to whether or not a more focused demand analysis is warranted.
- A recommendation was developed for each park and ride area which states whether or not the area should be pursued as a park and ride site and what the next action should be.

The criteria for each factor, as set in the fiscal year 1992 report is included in Appendix C.

The areas selected for this supplement are:

County	Area No.	Focal Intersection	Municipality
Chester	78	US 202 & PA 401	East Whiteland
	79	US 202 & US 30	West Whiteland
	80	US 202 & PA 3	West Goshen
	81	US 422 & PA 100	North Coventry
	82	US 30 & US 322	Caln
Montgomery	76	US 422 & Sanatoga Rd.	Limerick
	77	US 422 & PA 29	Upper Providence
	83	Spring Mill Park	Whitemarsh
	84	US 422 & PA 363	Lower Providence

The locations of these areas are shown in Figure I. The results of both the market area analysis and the demand analysis were compiled into the tables found in Appendix A. Tables which show the potential demand from each market area to each of the 10 employment areas are located in Appendix B.

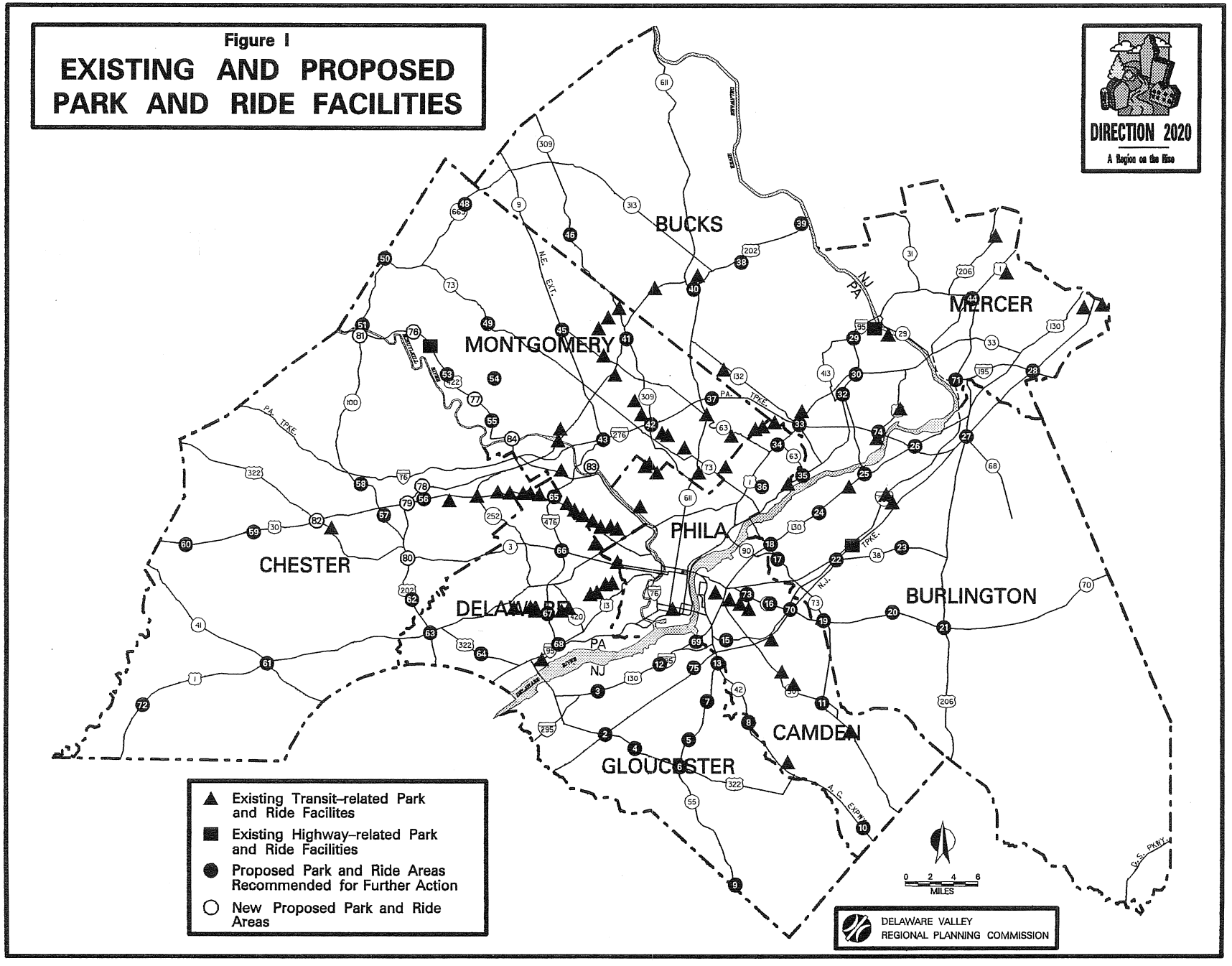
Figure 1
EXISTING AND PROPOSED PARK AND RIDE FACILITIES
DIRECTION 2020
A Region on the Rise
BUCKS
MONTGOMERY
MERCER
PHILA
CHESTER
DELAWARE
BURLINGTON
CAMDEN
GLOUCESTER
PA
NJ
Existing Transit-related Park and Ride Facilites
Existing Highway-related Park and Ride Facilities
Proposed Park and Ride Areas Recommended for Further Action
New Proposed Park and Ride Areas
0 2 4 6
MILES
DELAWARE VALLEY REGIONAL PLANNING COMMISSION

FINDINGS

All of the new proposed park and ride areas could serve car pools and van pools. Eight areas (#77, 79, 80, 81, 82, 76, 83, & 84) are located within walking distance of a transit line or a rail station. Two of these locations (#77 & 84), could not serve the transit passengers even though they are in close proximity. The scheduling for Route 125a bus is oriented to area #77 as a destination rather than an origin; the lack of full interchange at US 422 & PA 363 makes access to area #84 by Route 125a impractical. At the remaining locations, the development of new parking could attract new riders to existing transit services or create a market for new or modified transit services.

Table I shows the estimated potential demand for each of the 84 areas examined in fiscal years 1992 and 1993. The table has been sorted by total potential demand. As may be expected, those park and ride areas that are located in the more densely populated areas of the region are at the top of the list. This list shows not only where a park and ride area ranks in relation to the rest of the region, but also in relation to others within the same county. These numbers are only an indication that the area can generate sufficient use for trips destined to the employment areas used in the analysis. A focused demand analysis which looks at a wider range of destinations appropriate to each origin would probably yield a higher estimate.

Eight of the nine proposed park and ride areas are recommended for further study. Only one area (#84) is not. Area #84 is not recommended for further study because of the lack of a full interchange between US 422 & PA 363. This limited local access to the arterial it is intended to serve, US 422, hinders rideshare individuals and transit services which need to exit and re-enter the highway in order to pick up passengers.

Of the remaining eight proposed park and ride areas, three (#76, 77 & 83) are recommended for focused demand analysis and preliminary engineering. Site selection has already been completed by the county planning staff for all these areas. Three areas (#78, 79 & 81) were recommended for focused demand analysis and site selection. One area (#80) was recommended for site selection only. Area #80 is highly developed, which may limit its potential for park and ride development and dictate the number of spaces that may be provided.

The eight lots recommended for further study in this report could generate 1,353 spaces in addition to the 13,431 spaces recommended in fiscal year 1992. Using a typical non-transit parking lot layout, the gross amount of impervious surface per parking space, including driveways, is 350 square feet. Based on a unit cost of $3.30 per square foot plus 15 percent for contingencies, the estimated cost of constructing these new spaces would be $1,800,000. Adding 25 percent of the construction cost to this total to cover engineering, planning and marketing brings the total to $2,250,000. Acquiring right-of-way, extraordinary grading or drainage, wetlands mitigation, and adding bus lanes or shelters to any of these sites would raise the estimated cost.

The next stage of development for these park and ride areas consists of working with county and state agencies to refine and prioritize the list of areas to be evaluated in each county and begin the site selection process and preliminary engineering.

TABLE I

Potential Demand for Proposed Park and Ride Areas

Area No.	Focal Intersection	Total	Area No.	Focal Intersection	Total
36	PHNEAIR	1145	41	MO202/309	112
34	PH1/63	662	20	BR541/70	112
67	DE476/BAL	617	25	BR541/130	109
66	DE476/3	590	56	CH30/352	105
35	BU63/95	544	**78**	CH202/401	105
68	DE476/95	481	06	GL322/55	102
83	SPRNGMLL	433	**79**	CH202/30	99
33	BU1/276	429	73	CA70/644	95
08	GL42/168	402	23	BR541/38	94
82	CH30/322	378	**80**	CH202/3	94
65	DE476/30	374	63	DE1/202	87
32	BU413/95	371	52	MO422/LEWIS	86
13	GL42/55	349	**76**	MO422/SAN	86
16	CA644/70	334	71	ME195/295	83
31	BU276/95	318	57	CH30/100	77
70	CA295/70	309	15	CA168/295	74
75	GL45/534	307	49	MO73/29	70
07	GL47/55	306	54	MO29/GMTWN	70
42	MO309/276	289	14	CA42/NJTPK	66
62	CH202/986	281	27	BR206/NJTPK	66
74	BU13/276	279	03	GL551sp/295	60
19	BR70/73	275	26	BR130/NJTPK	60
43	MO476/276/9	232	60	CH30/10	50
84	MO422/363	228	51	MO663/RDG	48
17	BR537/73	227	40	BU202/611	45
29	BU332/95	224	58	CH100/76	45
59	CH30/340	218	**81**	CH422/100	43
69	CA47/130	212	04	GL322/45	38
11	CA73/561	204	10	CA73/ACX	34
24	BR636/130	189	46	BU152/309	32
18	BR130/73 or	186	21	BR206/70	29
53	MO422/TWPLN	178	38	BU202/263	27
22	BR38/295	177	02	GL322/NJTPK	25
12	GL667/295	174	61	CH1/41	23
28	ME195/NJTPK	164	50	MO100/73	19
05	GL553/55	163	01	GL130/295	17
64	DE322/452	155	09	GL40/55	13
30	BU413/1	154	48	MO29/663	10
55	MO422/EGYPT	118	44	ME1/295	10
45	MO63/9	115	47	BU663/9	9
77	MO422/29	115	72	CH1/272	7
37	MO611/276	114	39	BU32/202	7
			Total		**15,463**

Focal Intersection Code: GL = County; 111/222 = intersecting highways or streets **nn** = new proposed park and ride areas

APPENDIX A

Market Area Evaluation Tables

County: **Chester**

Area No., Municipality	Focal Intersection	Trip Factors	Rideshare Options	Current Transit Routes	Average Transit Frequency	Projected Demand	Local Land Use	Prox. Vacant Land	Status on State/ Local Plans	Recommendations
78. East Whiteland	US 202 & PA 401	1	c,v			105	Ind, Res, Vac	<1	S5	Recommended for site selection and focused demand analysis.
79. West Whiteland	US 202 & US 30	1	c,v,b	S(92)	P - 1/hr OP - 1/hr	99	Ind, Com, Res, Vac	<1	S3	Recommended for site selection and focused demand analysis. Consideration should be given to development plans for a 500 space rail station at Glenloch.
80. West Goshen	US 202 & PA 3	1	c,v,b	S(104) S(117)	P - 5/hr OP - 5/hr	94	Res, Com, Otr	>1	S3	Recommended for site selection analysis. Demand estimate indicates a need, but adequate space may be difficult to find. A joint-use arrangement may need to be found.
81. North Coventry	US 422 & PA 100	1	c,v,b	PUT	P - 0/hr OP - 2/hr	43	Res, Com, Vac	<1	S5	Recommended for site selection and focused demand analysis. Potential demand may be higher when external destinations are included. Coventry Mall should be investigated as an initial site.

Trip Factors
1 - excessive distance
2 - restricted parking
3 - tolls

Rideshare Options
c - carpool
v - vanpool
b - bus
r - rail

Current Transit Routes
S - SEPTA
N - NJ TRANSIT
K - Krapf's Transit
B - Carl R. Beiber
M - Martz Trailways
CP - Capitol Trailways
P - Pottstown Urban Transit
SU - Susquehanna Trailways
( ) - denotes SEPTA and NJ TRANSIT route numbers

Transit Frequency
P - peak
OP - off-peak

Projected Demand
Taken from table in demand analysis section of the report.

Local Land Use
Res -residential
Ind - industrial
Com -commercial
Vac - vacant
Otr - other

Proximity of Vacant Land
>1 - over 1 mile distant
<1 - less than 1 mile distant

StatusState/Local Plan
S - SEPTA
N - NJ TRANSIT
NJ - NJDOT
PA - PennDOT
D - DVRPC
C - County
1 - Potential service restoration corridor
2 - Potential regional rail corridor
3 - Existing transit service area or corridor
4 - Potential transit opportunity corridor
5 - Listed as potential park and ride site
6 - Listed as potential transportation center
7 - Park and ride study completed
8 - Park and ride plan completed
9 - Park and ride study in progress

County: **Chester**

Area No., Municipality	Focal Intersection	Trip Factors	Rideshare Options	Current Transit Routes	Average Transit Frequency	Projected Demand	Local Land Use	Prox. Vacant Land	Status on State/ Local Plans	Recommendations
82. Caln	US 30 & US 322	1	c,v,b,r	K(A) S(R5)	P - 4/hr OP - 3/hr	378	Res, Ind, Vac	<1	S5	Recommended for site selection and focused demand analysis. This is a good area in which to intercept commuters before they reach congestion on US 30 or US 202. Parking is at capacity at the Downingtown rail station.

Trip Factors
1 - excessive distance
2 - restricted parking
3 - tolls

Rideshare Options
c - carpool
v - vanpool
b - bus
r - rail

Current Transit Routes
S - SEPTA
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K - Krapf's Transit
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8 - Park and ride plan completed
9 - Park and ride study in progress

County: **Montgomery**

Area No., Municipality	Focal Intersection	Trip Factors	Rideshare Options	Current Transit Routes	Average Transit Frequency	Projected Demand	Local Land Use	Prox. Vacant Land	Status on State/ Local Plans	Recommendations
76. Limerick	US 422 & Sanatoga Rd.	1	c,v,b	S(93)	P - 1/hr OP - 1/hr	86	Res, Com, Otr	<1	C7 S3 S2	Recommended for focused analysis and preliminary engineering. Site selection has been performed by the county.
77. Upper Providence	US 422 & PA 29	1	c,v,b	S(125a)	P - 2/hr OP - 0/hr	115	Com, Ind	<1	C7 S3	Recommended for focused demand analysis and preliminary engineering. Site selection has been performed by the county. This area could serve origins in both Montgomery and Chester Counties.
83. Whitemarsh	Spring Mill Park	1	c,v,b,r	S(R6) S(97)	P - 4/hr OP - 1/hr	433	Res, Ind, Vac	<1	C7 S3	Recommended for focused demand analysis and preliminary engineering. County has selected a site on county-owned land. SEPTA parking at the nearby Spring Mill station is being used to capacity.

Trip Factors
1 - excessive distance
2 - restricted parking
3 - tolls

Rideshare Options
c - carpool
v - vanpool
b - bus
r - rail

Current Transit Routes
S - SEPTA
N - NJ TRANSIT
R - Reeder, Inc
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Transit Frequency
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OP - off-peak

Projected Demand
Taken from table in demand analysis section of the report.

Local Land Use
Res -residential
Ind - industrial
Com -commercial
Vac - vacant
Otr - other

Proximity of Vacant Land
>1 - over 1 mile distant
<1 - less than 1 mile distant

StatusState/Local Plan
S - SEPTA
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NJ - NJDOT
PA - PennDOT
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9 - Park and ride study in progress

County: **Montgomery**

Area No., Municipality	Focal Intersection	Trip Factors	Rideshare Options	Current Transit Routes	Average Transit Frequency	Projected Demand	Local Land Use	Prox. Vacant Land	Status on State/ Local Plans	Recommendations
84. Lower Providence	US 422 & PA 363	1	c,v,b	S(125a)	no stops	228	Com, Res, Ind, Otr	<1	C7 S5	Absence of a full interchange in this area limits its potential for success. SEPTA's 125a bus line cannot be accessed. Not recommended for further study.

Trip Factors
1 - excessive distance
2 - restricted parking
3 - tolls

Rideshare Options
c - carpool
v - vanpool
b - bus
r - rail

Current Transit Routes
S - SEPTA
N - NJ TRANSIT
R - Reeder, Inc
B - Carl R. Beiber
M - Martz Trailways
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APPENDIX B

Potential Demand Tables

Potential Demand and Distances to Selected Regional Employment Centers from Proposed Park and Ride Areas

Park and Ride		Trenton		Cherry Hill		Camden		West Trenton/Ewing		Princeton		Center City		West Philadelphia		Kensington/Allegheny/Frankford		King of Prussia		Paoli/Malvern/Exton		
Area No.	Location	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Total
1	GL130/295	0	54	2	26	4	20	0	58	0	68	7	21	2	25	0	25	1	28	1	27	17
2	GL322/NJTPK	0	55	3	24	7	20	0	59	0	69	11	21	2	25	1	25	0	33	1	33	25
3	GL551sp/295	0	51	6	21	15	16	0	55	0	65	32	17	4	21	1	21	1	31	1	31	60
4	GL322/45	0	53	5	22	11	19	0	57	0	67	17	20	3	24	1	24	0	37	1	37	38
5	GL553/55	1	50	22	18	43	17	0	54	0	64	79	18	11	21	4	22	2	41	1	17	163
6	GL322/55	1	52	15	21	28	20	0	56	0	66	45	21	8	25	3	25	1	42	1	18	102
7	GL47/55	2	45	52	14	85	13	1	49	0	61	136	14	20	19	7	18	2	42	1	43	306
8	GL42/168	3	44	90	13	104	14	1	48	1	58	164	16	25	21	9	20	3	37	2	45	402
9	GL40/55	0	61	2	31	3	32	0	65	0	75	7	34	1	37	0	37	0	55	0	54	13
10	CA73/ACX	1	51	10	26	7	31	0	55	0	65	13	33	2	37	1	37	0	54	0	62	34
11	CA73/561	3	40	79	12	44	18	1	44	1	54	59	21	10	24	5	24	1	42	1	49	204
12	GL667/295	1	46	20	16	46	11	0	50	0	60	91	13	10	16	4	16	1	36	1	35	174
13	GL55/DeptCtrRd	4	41	109	10	0	9	2	45	1	55	188	10	29	14	11	14	3	32	2	39	349
14	GL42/NJTPK	4	40	0	9	0	8	2	44	1	54	0	9	38	12	15	13	4	30	2	37	66
15	CA168/295	4	38	0	7	0	7	1	42	1	52	0	9	43	13	18	13	5	31	2	37	74
16	NJ41/70	7	32	0	1	0	8	3	36	1	46	253	10	38	14	25	13	5	32	2	53	334
17	BR537/73	8	28	0	3	0	8	3	32	1	42	186	11	25	15	0	8	3	32	1	41	227
18	CA130/73	6	27	0	5	0	8	2	31	1	41	152	10	21	14	0	6	3	31	1	40	186
19	BR70/73	8	31	0	5	91	14	3	35	1	45	139	16	17	20	13	23	2	38	1	46	275
20	BR541/70	5	29	43	12	16	20	2	33	1	42	37	23	4	27	3	21	1	44	0	53	112
21	BR206/70	3	30	10	18	4	26	1	34	1	42	8	29	1	33	1	27	0	50	0	59	29
22	BR38/295	14	24	0	8	47	15	5	28	2	38	86	17	10	21	11	20	1	39	1	47	177
23	BR541/38	16	21	30	14	13	22	5	25	2	35	21	24	3	28	3	21	1	46	0	54	94
24	BR636/130	15	21	49	10	36	14	6	25	2	34	60	17	9	21	10	16	1	37	1	45	189
25	BR541/130	24	15	23	16	14	21	8	19	3	29	26	23	4	27	5	20	1	39	1	50	109

Potential Demand and Distances to Selected Regional Employment Centers from Proposed Park and Ride Areas

Park and Ride		Trenton		Cherry Hill		Camden		West Trenton/Ewing		Princeton		Center City		West Philadelphia		Kensington/Allegheny/Frankford		King of Prussia		Paoli/Malvern/Exton		
Area No.	Location	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Total
26	BR130/NJTPKX	29	11	5	21	3	27	8	15	6	24	7	29	1	33	1	14	0	43	0	55	60
27	BR206/NJTPK	41	10	2	26	1	32	12	14	5	21	3	34	1	38	1	31	0	48	0	60	66
28	ME195/NJTPK	109	12	1	37	1	42	30	16	21	15	2	43	0	47	0	40	0	57	0	69	164
29	BU332/95	145	10	2	33	2	32	0	5	13	19	43	32	6	34	7	27	4	38	2	51	224
30	BU1/95	0	8	3	30	3	29	0	8	10	21	98	29	13	31	17	24	7	37	3	49	154
31	BU276/95	70	12	4	25	5	25	28	13	6	25	149	24	19	27	27	20	7	36	3	47	318
32	BU413/95	100	10	4	24	5	29	44	10	9	23	149	26	20	29	27	21	9	36	4	47	371
33	BU1/276	38	16	6	22	7	21	21	16	4	29	254	21	32	23	53	16	10	31	4	42	429
34	PH1/63	19	19	9	19	11	18	11	19	2	32	434	18	56	20	103	13	12	28	5	39	662
35	BU63/95	20	19	7	18	9	18	8	20	2	33	359	17	45	20	83	12	8	31	3	42	544
36	PHNEAIR	9	25	14	13	20	12	5	25	1	38	932	12	132	14	0	7	22	26	10	37	1145
37	MO611/276	1	25	1	23	2	20	1	23	0	37	73	19	11	20	12	15	10	21	3	33	114
38	BU202/263	2	22	0	38	0	35	2	18	0	28	12	34	2	34	1	30	6	32	2	43	27
39	BU32/202	2	20	0	44	0	42	2	16	0	21	2	41	0	42	0	36	1	41	0	51	7
40	BU202/611	3	32	0	46	1	43	2	28	1	34	19	42	3	41	3	38	10	33	3	44	45
41	MO202/309	1	33	1	32	1	27	1	30	0	42	41	25	7	24	6	23	43	17	11	28	112
42	MO309/276	2	31	2	26	4	18	1	29	0	42	166	17	31	16	25	14	45	15	13	26	289
43	MO476/276/9	1	37	1	27	3	19	1	35	0	48	140	17	29	14	15	16	0	9	42	21	232
44	ME1/295	0	7	1	38	1	42	0	8	0	7	5	43	1	46	1	38	1	52	0	64	10
45	MO63/9	1	40	0	40	1	31	0	37	0	48	30	29	5	27	4	28	58	14	16	24	115
46	BU152/309	1	41	0	48	0	40	0	37	0	46	11	38	2	36	2	36	12	24	4	32	32
47	BU663/9	0	50	0	57	0	49	0	45	0	53	4	47	1	45	0	45	3	30	1	36	9
48	MO29/663	0	53	0	57	0	49	0	49	0	58	3	47	1	44	0	45	4	28	2	32	10
49	MO73/29	0	51	0	45	0	37	0	45	0	56	12	34	2	31	1	34	41	14	14	20	70
50	MO100/73	0	60	0	57	0	49	0	57	0	67	3	47	1	43	0	47	9	26	6	26	19

Potential Demand and Distances to Selected Regional Employment Centers from Proposed Park and Ride Areas

Park and Ride		Trenton		Cherry Hill		Camden		West Trenton/Ewing		Princeton		Center City		West Philadelphia		Kensington/Allegheny/Frankford		King of Prussia		Paoli/Malvern/Exton		
Area No.	Location	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Total
51	MO663/RDG	0	61	0	55	0	48	0	58	0	69	7	46	1	40	0	44	21	22	19	19	48
52	MO422/LEWIS	0	54	0	38	0	39	0	51	0	62	11	36	2	33	1	37	47	15	25	16	86
53	MO422/TWPLN	0	52	0	47	1	36	0	50	0	61	19	34	4	30	1	34	94	12	59	14	178
54	MO29/GMTWN	0	50	0	45	1	32	0	49	0	59	23	29	5	26	2	30	0	8	39	12	70
55	MO422/EGYPT	0	48	0	43	1	29	0	45	0	58	33	27	7	23	2	27	0	5	75	12	118
56	CH30/352	0	57	0	40	1	32	0	55	0	69	26	29	6	25	2	31	70	12	0	1	105
57	CH30/100	0	62	0	45	1	37	0	60	0	74	20	34	4	29	1	36	51	16	0	4	77
58	CH100/76	0	63	0	47	0	38	0	61	0	75	11	36	2	32	1	38	31	18	0	6	45
59	CH30/82	0	72	0	54	0	37	0	70	0	83	11	43	2	39	1	46	21	27	183	14	218
60	CH30/10	0	82	0	66	0	54	0	79	0	92	4	52	1	48	0	55	6	35	39	24	50
61	CH1/41	0	79	0	59	0	49	0	78	0	91	9	46	2	42	1	50	2	36	9	24	23
62	CH202/926	0	61	0	44	1	33	0	61	0	74	33	29	9	25	2	33	32	20	204	11	281
63	DE1/202	0	62	0	40	1	31	0	61	0	74	22	28	5	24	1	32	9	21	49	14	87
64	DE322/452	0	59	1	35	2	27	0	42	0	55	88	24	19	20	4	28	12	22	29	18	155
65	DE476/30	0	44	1	27	4	19	0	43	0	56	205	16	52	12	11	18	0	8	101	14	374
66	DE476/3	1	45	3	24	9	16	0	44	0	57	424	13	0	9	21	16	76	11	56	17	590
67	DE476/BALT	1	50	3	25	9	18	0	49	0	62	379	15	115	11	15	20	46	18	49	19	617
68	DE476/95	1	51	3	24	8	18	0	51	0	64	305	16	90	12	13	20	29	21	32	22	481
69	CA47/130	3	40	144	10	0	6	1	44	1	67	0	7	41	10	16	11	4	28	2	35	212
70	CA295/70	9	32	0	2	0	9	3	36	2	50	234	12	32	16	23	15	4	11	2	42	309
71	ME195/295	0	4	4	32	2	36	0	8	56	15	15	37	2	41	2	34	1	50	1	62	83
72	CH1/272	0	97	0	73	0	66	0	95	0	109	3	63	0	60	0	67	1	53	3	41	7
73	CA70/644	7	33	0	3	0	6	3	37	1	50	0	9	48	13	28	11	6	30	2	39	95
74	BU13/276	79	10	7	21	6	25	29	16	7	24	110	27	14	30	19	22	5	40	3	52	279
75	GL45/534	1	44	46	14	95	10	1	44	0	58	134	11	20	14	7	15	2	32	1	39	307

Potential Demand and Distances to Selected Regional Employment Centers from Proposed Park and Ride Areas

Park and Ride		Trenton		Cherry Hill		Camden		West Trenton/Ewing		Princeton		Center City		West Philadelphia		Kensington/Allegheny/Frankford		King of Prussia		Paoli/Malvern/Exton		
Area No.	Location	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Trips	Distance	Total
76	MO422/SAN	0	63	0	51	0	43	0	61	0	77	12	39	2	35	1	39	45	18	26	18	86
77	MO422/29	0	54	0	41	1	33	0	54	0	59	28	29	6	25	2	30	0	8	78	12	115
78	CH202/401	0	57	0	38	1	33	0	55	0	63	26	29	6	24	2	31	70	12	0	1	105
79	CH202/30	0	59	0	40	1	35	0	57	0	64	26	31	6	26	2	33	64	14	0	4	99
80	CH202/3	0	61	0	39	1	34	0	60	0	66	34	30	8	25	2	33	49	17	0	7	94
81	CH422/100	0	67	0	55	0	47	0	65	0	72	6	43	1	39	0	44	19	22	17	18	43
82	CH30/322	0	69	0	49	1	44	0	67	0	74	16	40	4	35	1	43	35	31	321	11	378
83	MOSPRNGMLL	1	38	2	24	6	17	0	36	0	43	283	14	66	14	24	14	0	9	51	20	433
84	MO422/363	1	47	1	36	2	28	0	45	0	52	67	24	14	19	5	23	0	2	138	12	228
Totals		**828**		**848**		**853**		**260**		**167**		**7,392**		**1,357**		**753**		**1,216**		**1,789**		**15,463**

APPENDIX C

Market Area Evaluation and Demand Analysis Methodology

MARKET AREA EVALUATION

Considerable research has been done by transportation planners to ascertain the factors that lead to successful park and ride lots. These factors can be grouped into four categories: trip factors, rideshare options, locational factors, and potential demand. This section of the report discusses the first three groups of factors and how they can be used to assess the viability of a potential park and ride area. By weighing each area against these criteria, it is possible to predict the probability of an area's success or failure. Because commuters are more likely to be involved in ridesharing, the criteria are discussed in relation to work trips. Where reasonable, maximum or minimum values are given which are based on either DVRPC survey data or a study completed by Daniel Consultants, Inc. for the Federal Highway Administration (FHWA), *Park-And-Ride Facilities Guidelines for Planning, Design and Operation*, 1986.

Trip Factors: Ridesharing is more likely to occur when certain aspects of the commute trip make driving alone less desirable. These deterrents include excessive travel time, distance, or cost. Evaluating travel time and distance is important in locating park and ride areas in relation to both the user's origin and destination. Besides total origin-to-destination time and distance, these measures are usually broken into two segments: origin-to-lot, and lot-to-destination. Which measure is used depends on the travel corridor to be served by the park and ride lot. In areas with severe congestion, travel time becomes the more important factor. If congestion is light to moderate, then distance may be used.

Travel distance: TOTAL - Nationally, the typical total distance traveled by a park and ride user ranges from 20 to 25 miles. Statistics gathered from the FHWA study show that over three-quarters of the commuters who rideshare in New Jersey and Pennsylvania travel at least 20 miles.
ORIGIN-TO-LOT - Nationally, the typical park and ride user travels 3 to 4 miles from home to reach a park and ride lot. In the DVRPC region, that figure ranges from 1 to 6 miles, depending on the type of ridesharing and the transportation facility being served. For planning purposes, a park and ride lot should be located within 5 miles of the residential areas to be served.
LOT-TO-DESTINATION - The typical distance that a park and ride user travels from the lot to the final destination ranges from 10 to 20 miles. Again, statistics from the FHWA study show that the majority of car poolers from Pennsylvania and New Jersey travel more than 10 miles from the lot to the final destination. For the purpose of estimating demand from each market area, the minimum was held at 10 miles. For a focused analysis, every attempt should be made to determine an appropriate minimum distance that is suitable for the market area being served.

Travel time: TOTAL - Nationally, the majority of park and ride users spends 35 or more minutes traveling from origin to final destination (home-to-work). In the DVRPC region, that figure ranges from 39 minutes for car poolers to 63 minutes for SEPTA riders. This means that the commuters in the DVRPC region who must travel more than 40 minutes are more likely to rideshare. Consequently, park and ride lots should be located at least 40 minutes from one or more major employment centers.
ORIGIN-TO-LOT - Another important factor in locating park and ride areas is

how long the user must drive from the origin to reach the park and ride lot. Similar to statistics for the northeast corridor, the average access time for DVRPC region commuters to park and ride lots ranges from 10 to 14 minutes. This indicates that future park and ride lots should be constructed within 15 minutes of the residential areas that they are intended to serve. LOT-TO-DESTINATION - With a minimum average total travel time of 40 minutes, and a maximum origin-to-lot time of 15 minutes, the minimum lot-to-destination time should be 25 minutes.

Travel cost: When the cost of commuting to work becomes excessive, ridesharing is more likely to occur. Additional travel costs can include bridge or highway tolls and parking. When the distance between home and work is great enough, the cost of gas becomes an increasingly significant factor. In fact, 90 percent of the park and ride users surveyed at the Yardley car pool/van pool park and ride lot at Scudders Falls mentioned saving money on gasoline as a reason for ridesharing. The respondents to that survey traveled an average total distance of 20 miles. All of the areas included in this plan were considered to be far enough from the employment centers to induce ridesharing, and some areas were chosen because of their proximity to toll facilities.

Rideshare Options: Park and ride lots can serve more than one type of ridesharing, such as carpooling, vanpooling, and mass transit in the form of buses, trains, and trolleys. Though the goal of this study is not to locate transit-oriented park and ride areas, locating highway-related facilities along established transit routes may work to serve both modes, increasing the use of the lot.

Citing transit as one of the potential ridesharing modes for a particular area is based on the presence of an existing transit route operating through or in close proximity to the park and ride area's focal intersection. The rationale for considering routes that operate nearby is that they may be able to serve the actual park and ride site through a minor route change and/or schedule modification.

The amount of traffic attracted to a park and ride lot attributable to transit service depends, in large measure, on the frequency of the service. Ideally, transit service should operate on 15-minute or better headways during the peak travel periods of the day. Because the non-urban portions of the DVRPC region have few corridors in which transit operates at that frequency, service with 20 to 30-minute headways may still generate sufficient park and ride patronage.

Locational Factors: Locational factors exist which are not directly related to the user's trip but must be considered when assessing an area's potential. These factors include land availability and cost, adjacent land uses, and the status of state, regional and local plans. Other location-related factors may present barriers which must be overcome when trying to construct a park and ride facility. These barriers include neighborhood acceptance and driver attitudes toward ridesharing.

Proximity of Transportation Services: The proximity of a park and ride lot to the transportation facility it serves is

as important as its convenience to user's origin. When evaluating a potential area, candidate sites should be located within one mile of the arterial highway facility being served or within 1/4 mile of the transit line being served.

Land Availability and Cost:

Before a park and ride lot can be established, land must be available. Three different options can be pursued to obtain the needed space. First, vacant land can be purchased or leased. The second option involves entering into an agreement with the owner of an existing parking lot that is either under-utilized or used at a different time than a park and ride lot. The third option consists of using land that is already publicly-owned.

The first option is usually the least desirable, since it has the potential of considerably raising the cost of the park and ride project. However, the cost of acquiring land can be reduced by offering tax credits for leased land or contributions of land from developers in lieu of fees.

The second option is best to consider if publicly-owned vacant land is not available, or if the park and ride lot is being opened on a trial basis. Using an existing parking lot can be the least expensive alternative when looking at short-term use.

The third option is usually the best option to pursue because it is less expensive and less complicated administratively; it should be fully investigated before going to the expense of purchasing land. Since many of the proposed park and ride areas are focused around interstate and turnpike interchanges, using publicly-owned land may be a viable option.

Regardless of the option used to acquire the land for a park and ride lot, it must be located within the proper proximity of either the focal intersection or transit line mile; otherwise the investment would be wasted.

Adjacent Land Uses and Neighborhood Acceptance:

When evaluating a market area to determine whether or not candidate sites are available, it is important to examine the local land use mix. While there are advantages and disadvantages to locating a park and ride lot in the midst of each type of land use, some types are more compatible than others. Vacant parcels, other than park land or farm land, would cause the least friction, followed by non-residential. Locating a park and ride lot within a residential area would be the least desirable scenario.

Local zoning regulations traditionally do not recognize park and ride lots as a land use. They regulate parking lot construction only in relation to commercial development. Therefore, it is important to know how the affected municipalities address park and ride development, and how their requirements effect the agency that is implementing the lot.

Regardless of the neighborhood in which it is located, every park and ride proposal needs to be accompanied by a traffic impact study which quantifies the traffic that the park and ride lot will add to the local highway system. The problem of increased traffic can be eased through signage to direct park and ride patrons onto specific routes or through the appropriate use of one-way streets. Overflow parking on residential streets can be avoided by implementing a residential parking permit program which limits the duration of parking on sensitive streets, except for local residents. The permit program can be free to the residents or can be used as a source of income for the municipality to offset enforcement costs. Finally, an attractive design and a well-orchestrated marketing program can be instrumental in making a park and ride appealing to its neighbors as well as to its potential patrons.

Status of Local, State and Regional Plans:

Coordination of planning and development efforts results in reduced costs and efficient implementation. As part of this study, a survey of existing park and ride studies was conducted, and sites recommended by other planning agencies (excluding transit agencies) were included in this plan. It is important when a park and ride lot is planned that each interested party be involved and has a clearly defined role in the planning process. One party needs to be designated as the lead agency, while the remaining parties perform support or advisory functions. As a result, work is not duplicated and resources are used more efficiently. This same coordination of efforts is necessary when developing a strategy to fund park and ride lots. Park and ride development now qualifies for funding under most programs of the Intermodal Surface Transportation Efficiency Act (ISTEA). Implementing agencies should be investigating the use of National Highway System, Congestion Management/Air Quality, Interstate Reconstruction, and Surface Transportation Program monies as well as local money or land contributions to fund them. In addition to public funding, implementing agencies should be looking to private funding sources such as transportation management

associations (TMA), transportation improvement districts (TID), transportation development districts (TDD), and developer fees.

Driver Attitudes Toward Ride Sharing: The motorist's love affair with the single occupant vehicle may cool in the near future as the result of recent legislation. The Clean Air Act Amendments of 1990 require that employers located in severe or extreme non-attainment areas with more than 100 employees reduce the number of vehicle trips entering their establishments through Employee Trip Reduction Programs. Ridesharing is seen as one of the most effective means for employers to meet these requirements. In addition, the new Energy Policy Act increases the tax-free employee transit benefit cap to $60 per month and extends the benefit to employer-sponsored van pools and other commuter vehicles which carry six or more passengers. It also limits the tax-free subsidy for parking to $155 per month.

DEMAND ANALYSIS

In order for a park and ride lot to be successful, it must be used. Estimating the potential demand generated by a market area is accomplished through a demand analysis. Described below is the demand analysis used in conjunction with the market evaluation phase of this study to indicate whether or not further study of a potential park and ride area is warranted. This demand analysis is very general in nature and examines only trips traveling more than 10 miles to major regional employment centers, without regard to mode. Consequently, it provides only a partial picture of the actual demand for any specific park and ride area. Only major employment areas were considered because of limitations within the scope of the project. This analysis can also be used to develop a relative ranking of areas within the region for sketch planning purposes.

The demand analysis for this study was conducted by estimating the number of home-based-work trips each potential park and ride area would serve. This estimate was developed by delineating a market area for each park and ride area, defining employment centers likely to attract park and ride users, compiling the number of trips produced by each market area destined to each employment center, and by multiplying those totals by a potential usage factor. Each step is explained below.

Because of the numerous suburban employment centers found within the region, the demand analysis was completed using a market area approach as opposed to a highway corridor approach. The highway corridor approach usually estimates the potential demand to only one destination. Ten major employment centers, as identified by DVRPC in a 1984 study, "Regional Employment Centers Study: Employment Centers in the Delaware Valley," were selected as work trip destinations. The five largest from New Jersey and the five largest from Pennsylvania were chosen. The employment centers are listed below. The number assigned to each center does not indicate its magnitude, but is used for ease of identification on maps and in tables.

Employment Center Number	Location
1	Trenton City
2	Cherry Hill
3	Camden City
4	West Trenton/Ewing
5	Princeton
6	Center City Philadelphia
7	West Philadelphia
8	Kensington/Allegheny/Frankford
9	King of Prussia
10	Malvern/Paoli/Exton

One-way home-based work trips were chosen as the type of trip that would supply the majority of the users to a park and ride lot. Home-based non-work and non-home based trips may be involved in ridesharing, but past research has shown that these types of trips were infrequent users of park and ride lots.

A market area was outlined for each focal intersection in the list of potential park and ride areas. Each market area was defined as a circle having a five mile radius around the focal intersection, as discussed in the evaluation criteria. The circular shape for the market was chosen because of the diverse locations of the employment centers included as destinations. The boundary of the market area was adjusted to conform to the DVRPC traffic zones (census tracts) most closely matching the radius of the circle. In areas where market areas overlapped, no effort was made to assign trips exclusively to one area or the other. Such an assignment would need to be done during the site selection process.

DVRPC's 2010 home-based work trip table was used in the demand analysis. DVRPC's trip tables are more than 1300 rows by 1300 columns, representing trips between every pair of census tracts within the region (internal-internal). The table was compressed to include only those trips beginning in the defined market areas and destined to the selected employment areas. In keeping with the evaluation criteria previously discussed, trips of less than 10 miles from the market area to the employment center were eliminated. Though not addressed in this level of analysis, trips to or from zones outside of the region (internal-external) should be considered when conducting site selection.

A study of highway-related park and ride lot usage at the Scudders Falls (I-95) park and ride lot in Yardley, PA showed that the number of users in the lot was equivalent to three percent of the year 2010 home-based work trips originating in the Yardley market area destined for I-95. Based on this study, the assumption was made that a successful park and ride lot may be expected to attract three percent of the home-based-work trips originating in the market area that it is intended to serve.

Demand can be used as one of the primary factors in prioritizing park and ride construction projects. However, such an approach can result in delaying the construction of smaller lots that also could be successful. Therefore, other factors besides demand should be considered in the prioritization and selection process, particularly the locational factors in the Market Area Evaluation section of this report. As may be expected, those park and ride areas that are located in the more densely populated areas of the region are show a higher demand. This is the logical consequence of locating a lot in an area where there are more people who must travel to work.

APPENDIX D

Summary of Tasks for Park and Ride Development

SUMMARY OF TASKS

Highway-related park and ride development is a multi-task effort that often requires the involvement of many different agencies. If these tasks are not coordinated properly, the time needed to implement the project can be greatly lengthened. Listed below are the steps which need to be completed, from planning through construction, to implement a highway-related park and ride facility that has been initiated by a county or state agency. Suggestions are offered as to which public agency should take the lead with each task. Other agencies, such as transit agencies and TMA's should be included as support agencies in the performance of each task.

Task	Agency
Area Planning	
Develop a list of market areas.	County
Conduct a market area evaluation.	County, with assistance from the MPO or State
Prioritize the list of areas.	County, with input from the State
Begin coordination with all agencies (including private concerns) interested in park and ride development. At this point a decision should be made as to which is the lead agency and what support/assistance will be provided by other agencies.	County
Site Specific Planning	
Conduct a site selection analysis.	County, with assistance from the State or Municipality
Develop funding strategy.	County, with assistance from the MPO and State
Perform preliminary engineering and site design, including a traffic impact analysis.	State
Develop a marketing program to promote the new lot.	County, with assistance from local concerns
Construct the new lot (or develop a joint-use lot), concurrently implementing the marketing plan.	State and County
Monitor use of the lot.	County