CONCEPTUAL TRAFFIC ANALYSIS
FOR
McDOWELL MOUNTAIN BACK BOWL

January 31, 2005

WP #042054

Prepared for
Crown Community Development
Ms Teri Frankiewicz
3600 Thayer Court, Suite 100
Aurora, Illinois 60504
Phone (630) 851-5490
Fax (630) 898-0480

Prepared by
Wood, Patel & Associates, Inc
2051 West Northern Avenue, Suite 100
Phoenix, Arizona 85021
Phone (602) 335-8500
Fax (602) 335-8580

Engineer

TABLE OF CONTENTS

APPENDIX

EXHIBITS

km
Y \WP\Reports\Traffic\042054 Traffic Analysis Report for McDowell Mountain Back Bowl doc

1 0 INTRODUCTION

Wood/Patel has been retained by Crown Community Development to conduct preliminary site traffic analysis of a proposed residential development located on the northwest corner of the 128th Street / Pinnacle Peak Road alignment in Scottsdale, Arizona This report describes the proposed McDowell Mountain Back Bowl (herein referred to as *Back Bowl*) development and summarizes information regarding the existing geometry and traffic control at adjacent street intersections The analysis presented here estimates traffic generation, and presents a comparison of the projected traffic along Alameda Avenue between various land use zoning combinations for *Back Bowl* and other adjacent developments

2 0 PROPOSED DEVELOPMENT

The *Back Bowl* is located at the eastern edge of the City of Scottsdale, Maricopa County, Arizona, within a portion of Section 11, Township 4 North, Range 5 East The site is currently an assemblage of undeveloped parcels bound to the west by the existing Sonoran Crest Development (122nd Street alignment), to the east by the 128th Street alignment, to the north by the Happy Valley Road alignment, and to the south by the McDowell Mountain Sonoran Preserve Access to the development is planned from the west via the ½ -mile section roadway, Alameda Road Exhibit 1 provides a vicinity map for the project and surrounding areas

The *Back Bowl* is a 330-acre residential custom lot sub-division, nestled at the northern base of the McDowell Mountains The development is planned in four (4) phases and includes approximately 121 lots ranging in size from 2 to 3 acres and a Clubhouse with amenities such as jacuzzis, pools, water falls, and restaurant facilities Interpretive trails and scattered pocket parks with water features will also be incorporated into the site plan

Crown Community Development has considered expanding the *Back Bowl* to approximately 400 acres which would include the acquisition of the 40-acre parcel located at the northeast ¼ of Section 11, four (4) 2 5-acre parcels located at the northeast boundary of Sonoran Crest, and the 30-acre parcel located in the middle of the southern ½ portion of Section 11

3 0 EXISTING ROADWAY FACILITIES

The major roadway facilities connecting the site to the regional roadway network are Happy Valley Road, Alameda Avenue, Rio Verde Drive (Dynamite Boulevard) and 128th Street These facilities are described below and shown in Exhibit 2

Happy Valley Road is an east-west minor arterial providing connectivity to/from the west East of Alma School Road, Happy Valley Road is a fully improved 4-lane divided facility, with two lanes in each direction, curb and gutter on both north and south sides, and a posted speed limit of 40 mph West of Alma School Road, it is 2-lane undivided facility without curb and gutter and a posted speed limit of 50 mph

Alameda Avenue branches off as a minor collector east from Happy Valley Road, and extends approximately 300 feet east of 121st Place up to the western boundary of the site It is a 2-lane undivided facility, with curb and gutter on both north and south sides and a posted speed limit of 30 mph

Rio Verde Drive is an east-west major arterial approximately two miles north of the site's northern boundary It provides regional connectivity to the site through 128th Street West of the 116th Street alignment, Rio Verde Drive is a 4-lane divided facility with two lanes in each direction The north and south sides have wide unpaved shoulders without curb and gutter, and a sidewalk on both sides past the shoulders East of 116th Street alignment, it is a 2-lane undivided facility with a posted speed limit of 50 mph

128th Street is a north-south unpaved facility, which provides connectivity between Rio Verde Drive and the eastern boundary of the site This two-mile unpaved segment of 128th Street varies in width from 22 and 24 feet

Happy Valley Road / Alameda Avenue is an unsignalized intersection with stop control on Alameda Road The east leg of the intersection along Happy Valley Road has one left turn lane, one through lane, and one shared through-right turn lane The west leg has one left turn lane, two through lanes, and one right turn lane whereas, the south leg along Alameda Avenue has one shared left-through-right lane The north leg of the intersection falls along the 115th Street alignment and has a lane configuration matching the south leg

Rio Verde Drive / 128th Street is a T-Intersection with stop control along 128th Street for northbound movements The east leg along Rio Verde Drive has one shared through-left lane and the west leg has one shared through-right lane The unpaved south leg of the intersection along 128th Street operates as one shared left-through-right lane

4 0 ACCESS TO ADJACENT DEVELOPMENTS

External access to adjacent developments (shown in Exhibit 3 as Parcels 1 through 11) within the study area is anticipated using the surrounding roadway network and through internal connections between these developments

Access to Parcel 1 is anticipated using 122nd Street west of Back Bowl's right-of-way, whereas access to Parcel 2 is anticipated through the development to its northwest using Casitas Del Rio Drive Access to Parcels 3, 4, 5 and 6 is also anticipated using Casitas Del Rio Drive through internal connections within these parcels Access using Pinnacle Peak Road is not anticipated for these parcels, primarily due to topographic challenges The Preliminary Plat for Parcel 1 has not indicated right-of-way provision along the Pinnacle Peak roadway alignment, due to this topographic challenge

Access to Parcel 7 is anticipated using State Land to the north as Happy Valley Road is not anticipated to provide access to this parcel Access to Parcels 8 and 11 is anticipated using 128th Street north of *Back Bowl's* right-of way and to Parcels 9 and 10 using Alameda Avenue It should be noted that planned development of 122nd Street is planned entirely outside of the *Back Bowl's* right-of-way Parcel 11 is owned by the same property owner as the parcel adjacent to 128th Street, immediately east of Parcel 11 These parcels should be able to be planned jointly with access considerations from 128th Street

5 0 COMPARISON OF ZONING SCENARIOS FOR TRAFFIC ALONG ALAMEDA AVENUE

The objective of this analysis is to evaluate the total traffic (non-site + site) along Alameda Avenue for two comparisons, each one having two sets of zoning scenarios Comparison 1 involves Scenarios 1 and 2, whereas Comparison 2 involves Scenarios 3 and 4

These are described as follows

Comparison 1 Scenarios 1 and 2

- Scenario 1 Adjacent sites and *Back Bowl* to be developed based on City of Scottsdale's General Plan Zoning (assuming a density of 1 0 DU/acre)
- Scenario 2 Adjacent sites to be developed based on City of Scottsdale's General Plan Zoning (assuming a density of 1 0 DU/acre) whereas *Back Bowl* to be developed using Proposed Zoning (0 36 DU/acre)

Comparison 2 Scenarios 3 and 4

- Scenario 3 Adjacent sites and *Back Bowl* to be developed with Existing Zoning (0 31 DU/acre)
- Scenario 4 Adjacent sites to be developed with Existing Zoning (0 31 DU/acre) whereas the *Back Bowl* Site to be developed with Proposed Zoning (0 36 DU/acre)

The number of dwelling units for sites in the study area is summarized in Exhibit 4 – Table 1

6 0 PROJECTED NON-SITE TRAFFIC ALONG ALAMEDA AVENUE

Based on data available from the online Maricopa County GIS database, Alameda Avenue provides regional access to 279 existing or planned homes located east of Happy Valley Road, either north or south of Alameda Avenue Using ITE trip generation rates, it is anticipated that these homes generate 2,670 daily trips, all along Alameda Avenue (shown in Appendix A - *Background Trips* As development of sites in the study area is independent of other existing/planned development, the background traffic for all scenarios remains constant

7 0 PROJECTED SITE TRAFFIC ALONG ALAMEDA AVENUE

To obtain projected site traffic along Alameda Avenue for each scenario, trips are estimated for land uses corresponding to each scenario and are assigned to Alameda Avenue The difference in trips between scenarios for both comparisons is then computed and summarized below

Trip Generation A generally accepted method of calculating trip generation rates for a proposed development is to use regression equations and/or average rates developed by the Institute of Transportation Engineers (ITE) through the compilation of field data collected at sites throughout the United States The total trip generation potential for *Back Bowl* and adjacent sites in each scenario was calculated based on the average trip rates presented in the 7th Edition of ITE's Trip Generation Manual and is shown in detail in Attachment A

Trip Distribution Percentages for Alameda Avenue The percentage of total trips from each development in the study area, anticipated to use Alameda Avenue were determined These assumptions are tabulated in Exhibit 4 – Table 2

Total Traffic Based on the trip generation estimate and trip distribution assumptions described above for the study area, traffic was estimated along Alameda Avenue for Scenarios 1 through 4 and added to the non-site (background) traffic Total (site + non-site) Average Daily Traffic (ADT) and AM and PM peak hour traffic corresponding to each scenario is presented in Exhibit 4 – Table 3

8 0 RESULTS AND CONCLUSIONS

Results of the analysis indicate that ADT along Alameda Avenue would be 11,939 trips per day for Scenario 1, 10,312 trips per day for Scenario 2, 5,543 trips per day for Scenario 3 and 5,678 trips per day for Scenario 4 Comparison 1 indicates that *Back Bowl* would generate 1,624 fewer trips per day along Alameda Avenue, if it is developed using Proposed Zoning instead of the assumed General Plan Zoning Comparison 2 indicates that *Back Bowl* would generate 135 more trips per day along Alameda Avenue, if it developed using Proposed Zoning instead of Existing Zoning

However, per the City of Scottsdale *Design Standards and Policies Manual*, Alameda Avenue, which is classified as a minor collector, can have a capacity up to 15,000 vpd Based on the above description, total traffic along Alameda Avenue (Site + Non-site) in any development scenario does not exceed 11,939 trips per day, of which the *Back Bowl* site generates a maximum of 2,560 trips per day (under Scenario 1) at full build-out

Given the low background traffic along Alameda Avenue, and the relatively lower volume generated by the *Back Bowl* site, the proposed development is not anticipated to have any significant impact on the traffic operation of Alameda Avenue Further, given the low number of increase in daily trips caused by the increase in number of dwelling units from 103 under existing zoning to 121 under proposed zoning, the rezoning of the site is also not anticipated to have any significant impact on the traffic operation along the adjacent roadway network

APPENDIX A

Comparisons of Zoning Scenarios

Project	McDowell Mountain Backbowl	W/P Job	042054 02
Location	Scottsdale Arizona	Engineer	Ashish Sabnekar, P E
Date	January 12 2005	Analyst	Chintan Jhaveri E I T

SCENARIO 1 TRIP GENERATION BASED ON GENERAL PLAN ZONING WITHOUT PRESERVE LAND (Assumes 1 D U /Acre) + GENERAL PLAN ZONING FOR SITE (1 D U /Acre)

Proposed Site Trip Generation

	McDowell Mountain Back Bowl	Adjacent Properties***			Site + Adjacent Property Trips on Alameda Ave	Alameda Ave Background Trips**	Total Trips on Alameda Ave
	Residential - Per Current Zoning	Recorp Property	State Land	Others		Residential	
Land Use	Single Family Residential	Single Family Residential	Single Family Residential	Single Family Residential		Single Family Residential	
Land Use Code (LUC)	210	210	210	210		210	
LUC Name	Detached Housing	Detached Housing	Detached Housing	Detached Housing		Detached Housing	
LUC Variable	D U	D U	D U	D U		D U	
Land Area (acres)	333 10	280 02	363 39	483 63		n/a	
Amount (D U)	333	280	363	484		279	
RATE (Average Rates)*							
Weekday	9 57	9 57	9 57	9 57		9 57	
AM Peak Hour	0 75	0 75	0 75	0 75		0 75	
PM Peak Hour	1 01	1 01	1 01	1 01		1 01	
Percent Inbound							
AM Peak Hour	25%	25%	25%	25%		25%	
PM Peak Hour	63%	63%	63%	63%		63%	
Interaction Factor	0%	0%	0%	0%		0%	
TRIPS							
Weekday	**3,188**	**2,680**	**3,478**	**4,628**	**9,266**	**2,670**	**11,936**
AM Pk Hr Inbound	62	53	68	91	182	52	234
AM Pk Hr Outbound	187	158	204	272	545	157	702
PM Pk Hr Inbound	212	178	231	308	616	178	794
PM Pk Hr Outbound	124	105	136	181	362	104	466
Pass-by Percentage							
AM Peak Hour	0%	0%	0%	0%		0%	
PM Peak Hour	0%	0%	0%	0%		0%	
* Pass-by Trip Ends AM	0	0	0	0		0	
Pass-by Trip Ends PM	0	0	0	0		0	

*Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

**Based on lot information available from the online Maricopa County GIS database

*** Adjacent properties in the study area are shown in Exhibit 1

Project	McDowell Mountain Backbowl	W/P Job	042054 02
Location	*Scottsdale, Arizona*	Engineer	Ashish Sabnekar, P E
Date	January 12 2005	*Analyst*	*Chintan Jhaveri, E I T*

SCENARIO 2 TRIP GENERATION BASED ON GENERAL PLAN ZONING WITHOUT PRESERVE LAND (Assumes 1 D U /Acre) + PROPOSED ZONING FOR SITE (0 36 D U /Acre)

Proposed Site Trip Generation

	McDowell Mountain Back Bowl	Adjacent Properties***			Site + Adjacent Property Trips on Alameda Ave	Alameda Ave Background Trips**	Total Trips on Alameda Ave
	Residential - Per Current Zoning	Recorp Property	State Land	Others		Residential	
Land Use	Single Family Residential	Single Family Residential	Single Family Residential	Single Family Residential		Single Family Residential	
Land Use Code (LUC)	210	210	210	210		210	
LUC Name	Detached Housing	Detached Housing	Detached Housing	Detached Housing		Detached Housing	
LUC Variable	D U	D U	D U	D U		D U	
Land Area (acres)	333 10	280 02	363 39	483 63		n/a	
Amount (D U)	121	280	363	484		279	
RATE (Average Rates)*							
Weekday	9 57	9 57	9 57	9 57		9 57	
AM Peak Hour	0 75	0 75	0 75	0 75		0 75	
PM Peak Hour	1 01	1 01	1 01	1 01		1 01	
Percent Inbound							
AM Peak Hour	25%	25%	25%	25%		25%	
PM Peak Hour	63%	63%	63%	63%		63%	
Interaction Factor	0%	0%	0%	0%		0%	
TRIPS							
Weekday	**1,157**	**2,680**	**3,478**	**4,628**	**7,642**	**2,670**	**10,312**
AM Pk Hr Inbound	23	53	68	91	150	52	202
AM Pk Hr Outbound	68	158	204	272	449	157	606
PM Pk Hr Inbound	77	178	231	308	508	178	686
PM Pk Hr Outbound	45	105	136	181	298	104	403
Pass-by Percentage							
AM Peak Hour	0%	0%	0%	0%		0%	
PM Peak Hour	0%	0%	0%	0%		0%	
Pass-by Trip Ends AM	0	0	0	0		0	
Pass-by Trip Ends PM	0	0	0	0		0	

Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

Based on lot information available from the online Maricopa County GIS database

Adjacent properties in the study area are shown in Exhibit 1

Project	McDowell Mountain Backbowl	W/P Job	042054 02
Location	Scottsdale Arizona	Engineer	Ashish Sabnekar, P E
Date	January 12 2005	Analyst	Chintan Jhaveri, E I T

SCENARIO 3 TRIP GENERATION BASED ON EXISTING ZONING WITHOUT PRESERVE LAND (0 31 D U /Acre) + EXISTING ZONING FOR SITE (0 31 D U /Acre)

Proposed Site Trip Generation

	Hidden Valley Site	Adjacent Properties**			Site + Adjacent Property Trips on Alameda Ave	Alameda Ave Background Trips**	Total Trips on Alameda Ave
	McDowell Mountain Back Bowl	Adjacent Properties***	State Land	Others		Residential	
Land Use	Single Family Residential	Single Family Residential	Single Family Residential	Single Family Residential		Single Family Residential	
Land Use Code (LUC)	210	210	210	210		210	
LUC Name	Detached Housing	Detached Housing	Detached Housing	Detached Housing		Detached Housing	
LUC Variable	D U	D U	D U	D U		D U	
Land Area (acres)	333 10	280 02	363 39	483 63		n/a	
Amount (D U)	103	87	113	150		279	
RATE (Average Rates)							
RATE (Average Rates)*	9 57	9 57	9 57	9 57		9 57	
AM Peak Hour	0 75	0 75	0 75	0 75		0 75	
PM Peak Hour	1 01	1 01	1 01	1 01		1 01	
Percent Inbound							
AM Peak Hour	25%	25%	25%	25%		25%	
PM Peak Hour	63%	63%	63%	63%		63%	
Interaction Factor	0%	0%	0%	0%		0%	
TRIPS							
Weekday	**988**	**831**	**1,078**	**1,435**	**2,873**	**2,670**	**5,543**
AM Pk Hr Inbound	19	16	21	28	56	52	109
AM Pk Hr Outbound	58	49	63	84	169	157	326
PM Pk Hr Inbound	66	55	72	95	191	178	369
PM Pk Hr Outbound	39	32	42	56	112	104	216
Pass-by Percentage							
AM Peak Hour	0%	0%	0%	0%		0%	
PM Peak Hour	0%	0%	0%	0%		0%	
Pass-by Trip Ends AM	0	0	0	0		0	
Pass-by Trip Ends PM	0	0	0	0		0	

Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

* Based on lot information available from the online Maricopa County GIS database

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

Project	McDowell Mountain Backbowl	W/P Job	042054 02
Location	Scottsdale, Arizona	Engineer	Ashish Sabnekar, P E
Date	January 12, 2005	Analyst	Chintan Jhaveri, E I T

SCENARIO 4 TRIP GENERATION BASED ON EXISTING ZONING WITHOUT PRESERVE LAND (0 31 D U /Acre) + PROPOSED ZONING FOR SITE (0 36 D U /Acre)

Proposed Site Trip Generation

	Hidden Valley Site	Adjacent Properties**			Site + Adjacent Property Trips on Alameda Ave	Alameda Ave Background Trips**	Total Trips on Alameda Ave
	McDowell Mountain Back Bowl	Adjacent Properties***	State Land	Others		Residential	
Land Use	Single Family Residential	Single Family Residential	Single Family Residential	Single Family Residential		Single Family Residential	
Land Use Code (LUC)	210	210	210	210		210	
LUC Name	Detached Housing	Detached Housing	Detached Housing	Detached Housing		Detached Housing	
LUC Variable	D U	D U	D U	D U		D U	
Land Area (acres)	333 10	280 02	363 39	483 63		n/a	
Amount (D U)	121	87	113	150		279	
RATE (Average Rates)							
RATE (Average Rates)*	9 57	9 57	9 57	9 57		9 57	
AM Peak Hour	0 75	0 75	0 75	0 75		0 75	
PM Peak Hour	1 01	1 01	1 01	1 01		1 01	
Percent Inbound							
AM Peak Hour	25%	25%	25%	25%		25%	
PM Peak Hour	63%	63%	63%	63%		63%	
Interaction Factor	0%	0%	0%	0%		0%	
TRIPS							
Weekday	**1,157**	**831**	**1,078**	**1,435**	**3,008**	**2,670**	**5,678**
AM Pk Hr Inbound	23	16	21	28	59	52	111
AM Pk Hr Outbound	68	49	63	84	177	157	334
PM Pk Hr Inbound	77	55	72	95	200	178	378
PM Pk Hr Outbound	45	32	42	56	117	104	222
Pass-by Percentage							
AM Peak Hour	0%	0%	0%	0%		0%	
PM Peak Hour	0%	0%	0%	0%		0%	
Pass-by Trip Ends AM	0	0	0	0		0	
Pass-by Trip Ends PM	0	0	0	0		0	

Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

*Source Trip Generation Manual 7th Edition Institute of Transportation Engineers 2003

**Based on lot information available from the online Maricopa County GIS database

EXHIBIT 1

Vicinity Map

WOOD/PATEL

McDowell Mountain Back Bowl

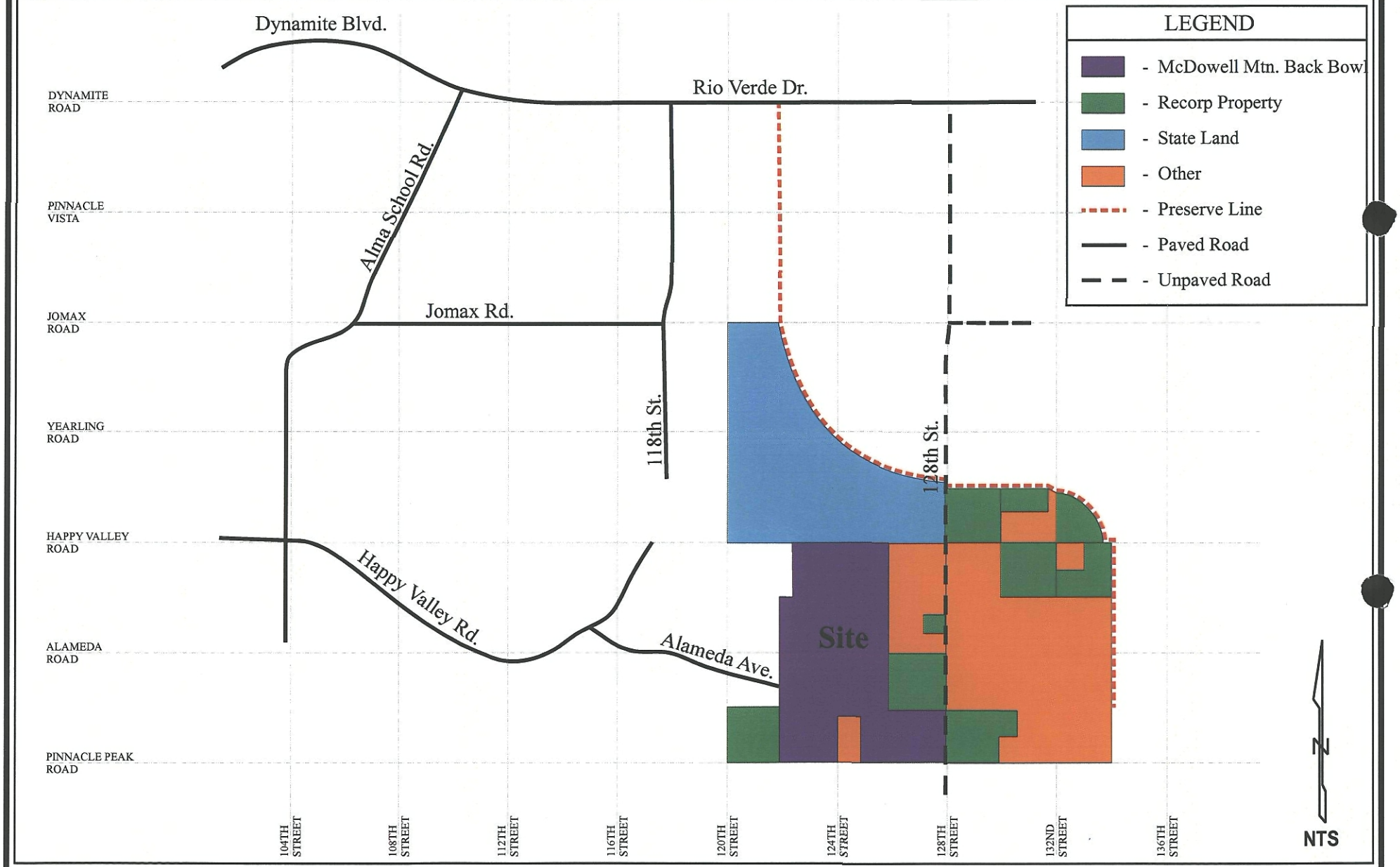


EXHIBIT 1

Vicinity Map

N:\2004\042054\042054.02 - Traffic\Exhibits\Ex1_Vicinity.cdr

EXHIBIT 2

Existing Roadway Conditions

WOOD/PATEL

McDowell Mountain Back Bowl

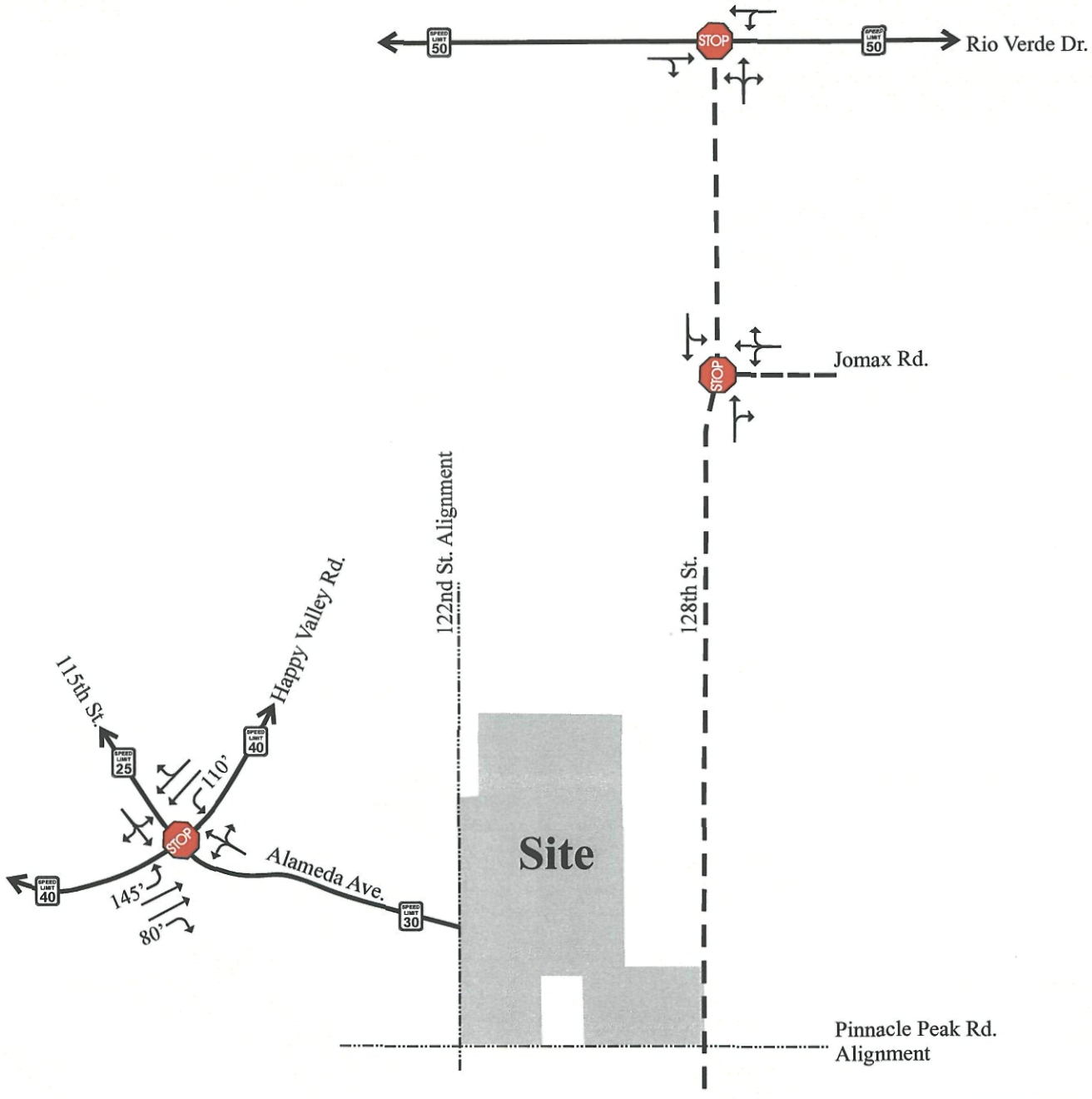


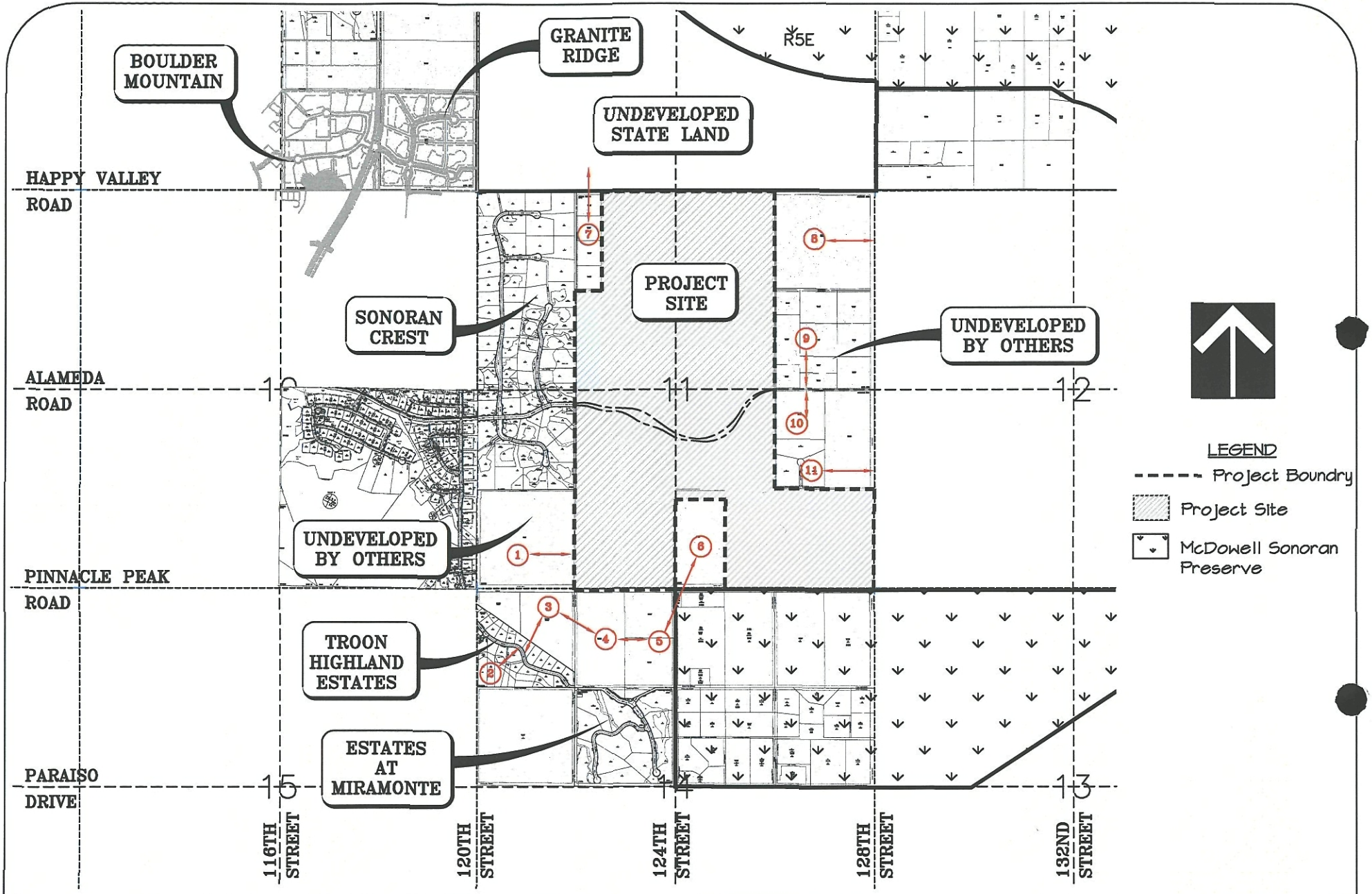
EXHIBIT 2

Existing Roadway Conditions

N:\2004\042054\042054.02 - Traffic\Exhibits\Ex2_Existing Conditions.cdr

EXHIBIT 3

Access to Adjacent Developments



CROWN COMMUNITY DEVELOPMENT
A Henry Crown Company

McDOWELL MOUNTAIN BACK BOWL

Exhibit 3

Access to Adjacent Developments

WOOD/PATEL ASSOCIATES
Civil Engineers
Hydrologists
Land Surveyors
(602) 335-8500

N:\2004\042054\042054.02 – Traffic\Exhibits\Exhibit 3 – Access to Adjacent Developments.dwg

01/07/05

EXHIBIT 4

Comparison of Trips on Alameda Avenue

Project	McDowell Mountain Backbowl	W/P Job	042054 02
Location	Scottsdale, Arizona	Engineer	Ashish Sabnekar, P E
Date	January 12, 2005	Analyst	Chintan Jhaveri, E I T

Table 1 Summary of Dwelling Units for Each Property by Scenario

Alternative Number	No of D U in the McDowell Mountain Back Bowl Site	No of D U in Adjacent Properties			Total Site + Adjacent Property D U
		Recorp Property	State Land	Others	
Scenario # 1	333	280	363	484	1,460
Scenario # 2	121	280	363	484	1 248
Scenario # 3	103	87	113	150	453
Scenario # 4	121	87	113	150	470

Table 2 Trip Distribution Assumptions

Property	% of Trips on Alameda
McDowell Mountain Back Bowl	80%
Recorp Property	80%
State Land	25%
Other	80%

Table 3 Traffic Assignment Summary

Alternative Number	*Total Traffic On* Alameda Ave (including backgroud traffic)				
	ADT	AM		PM	
		IN	OUT	IN	OUT
Scenario # 1	11,936	234	702	794	466
Scenario # 2	10 312	202	606	686	403
Scenario # 3	5,543	109	326	369	216
Scenario # 4	5,678	111	334	378	222

Table 4 Comparison of Trips on Alameda Ave

Difference In Trips	ADT	AM		PM	
		IN	OUT	IN	OUT
Comparison 1 Scenarios 1 & 2	-1,624	-32	-95	-108	-63
Comparison 2 Scenarios 3 & 4	135	3	8	9	5