SURPRISE
ARIZONA

Royal Ranch

Amendment	Case Number	Approval Date	Approval Doc.	Page
Original PAD	PAD98-110	2/10/00	ORD99-23	2
Z-lot Revision	PADA02-013	9/27/04		292
Pool Revision	PADA03-102	6/12/03	ORD03-13	328
Z-lot Revision	PADA04-264	9/27/04		350

ROYAL RANCH

PLANNED AREA DEVELOPMENT

PROJECT REPORT

CITY OF SURPRISE
PLANNING AND ZONING DEPARTMENT
APPROVED
Case No.: PAD98-110
P&Z Comm. Approval: _____
City Council Approval: 2/10/2000 (ORD #99-23)
B.O.A. Approval: _____
Stipulations: _____

CITY OF SURPRISE

OFFICIAL APPLICATION FOR PLANNED AREA DEVELOPMENT AMENDMENT

Petition No: _____
Date Filed: _____
Filing Fee: _____
Check No: _____
Receipt No: _____
Received By: _____
Public Hearing: _____
Approved/Denied: _____

Office Use Only

LOCATION OF PROPERTY (ADDRESS OR DESCRIPTION):

The Northwest quarter; and the North half of the Southwest quarter; and the Southwest quarter of the Southwest quarter, ALL in Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona;

Except that portion of the West half of the Southeast quarter of the Southwest quarter of s Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

BEGINNING AT THE Southeast corner of the West half of the Southeast quarter of the Southwest quarter of said Section 9; Thence North along the East line of the West half of the Southeast quarter of the Southwest quarter of Section 9, 1320.75 feet to the Northeast corner thereof; Thence Westerly along the North line of the West half of the Southeast quarter of the Southwest quarter of Section 9, 34.000 feet; Thence Southerly along the centerline of a 12 inch irrigation pipe and along a wire fence and a Southerly prolongation thereof 1320.80 feet to a point on the South line of the West half of the Southeast quarter of the Southwest quarter of Section 9; Thence Easterly along the South line of the West half of the Southeast quarter of the Southwest quarter of Section 9, 21.00 feet to the POINT OF BEGINNING.

Containing 298.926 acres gross.

PETITIONER: Fred E. Fleet, P.E.

PETITIONER'S ADDRESS: 4250 EAST CAMELBACK ROAD, SUITE 410K, PHOENIX, ARIZONA 85018. TELEPHONE: (602) 264-3335

PROPERTY OWNER (If other than petitioner): CITRUS HEIGHTS RANCHES

OWNER'S MAILING ADDRESS: 7332 EAST BUTHERUS DRIVE, SCOTTSDALE, ARIZONA 85260.

CONTACT PERSON: JOSEPH T. ODDO

NAME OF P.A.D.: ROYAL RANCH (most likely will be changed at a later date)

PRESENT ZONING: R1-43

ACREAGE: 298.926 Acres

PROPOSED LAND USE: Single-Family Residential

PRELIMINARY DEVELOPMENT PLAN CHECKLIST

The following are preliminary development plan requirements of Surprise Zoning Ordinance. The following information shall be submitted, and all items checked NA (Not Applicable) must be accompanied with a statement of explanation.

YES	NA	
XX	___	Completed application and checklist forms for Preliminary Development Plan.
XX	___	Filing Fee of $ 5,585.00
XX	___	Complete list of names and mailing addresses of adjacent property owners within 300 feet.
XX	___	15 copies of the Preliminary Development Plan.
XX	___	One 8-1/2 X 11 transparency of the Preliminary Development Plan.
XX	___	Public notices to be published in the newspaper for the Planning and Zoning Commission public hearing as per the example.

THE FOLLOWING INFORMATION MUST BE SUBMITTED

___	NA	The project located on a quarter section map (scale of 1" = 100') Explanation: *Quarter section maps are not available for this area. Figures that have been included in the Project Narrative accurately locate the project.*
XX	___	Legal description of the property and indication of gross area.
XX	___	Nature of applicant's interest in the land to be developed.
XX	___	A generalized location map showing surrounding land use and traffic circulation patterns.
XX	___	(1) Topographic map with contour interval of no more than two feet to a distance of 100 feet beyond the property boundary.
XX	___	(2) Location and extent of tree cover (if any). Explanation: The property is existing an existing farm land/citrus orchard. A row of trees exists along Greenway Road to the north.
___	NA	(3) Location and extent of major rock outcropping, perennial or intermittent streams and water ponding areas. Explanation: *No major rock outcropping, perennial or intermittent streams and water ponding areas exist on-site. Off-site features are discussed in Section V – Preliminary Master Drainage Study included in the bound Project Report.*
XX	___	(4) Existing drainage patterns. (See Section V – Preliminary Master Drainage Study included in the bound Project Report.)
___	NA	(5) Other information considered relevant by the applicant or City staff. Explanation: *No other information has been requested by staff at this time.*

XX	____	Proposed allocations of land use expressed as a percentage of the total area, as well as in acres. Uses indicated are: (1) Arterial streets. (2) Open Space (public) (3) Open Space (private) (4) Residential (5) A stratification of residential use in terms of single family detached dwelling units, patio homes townhouses, garden apartments, etc.
XX	____	A land use plan at a scale of not smaller than one inch equals 100 feet, indicating land uses, acres, and development densities of each land use and the most nearly equivalent zoning categories; all arterial and collector street circulation elements including exact perimeter locations of any/all arterial and major collector streets; pedestrian and/or bicycle circulation elements; open space; and recreational space. Note: For convenience, a scale of 1" = 200 feet has been used
XX	____	Plans indicating the approximate alignment and sizing of water lines, sanitary sewer and storm sewer (if any), as well as easements for all utilities. Also indicated should be proposed surface drainage patterns.
XX	____	A phasing plan, if the project involves more than one development phase, which sets forth the chronological order of construction and relates the proposed uses and structures to the construction of various service facilities, and gives estimated completion dates.
____	XX	Conceptual architectural renderings indicating the elevations and exterior wall finishes of proposed buildings. Explanation: *A builder has not yet been selected. Architectural renderings, elevations, and color finishes for housing products that will be built will be provided at the time of submittal of the Preliminary Plat for each phase.*
XX	____	Conceptual landscaping plans, indicating landscaping theme and character of the development.
XX	____	A traffic analysis report if deemed necessary by the City.
____	XX	15 Copies of the Preliminary Plat if land subdivision is proposed – as per Subdivision Ordinance. (Please request application and checklist forms for Preliminary Plat). Explanation: *A Preliminary Plat will be submitted later, for each phase of the project.*
XX	____	The owner's signature shall appear on the face of the plan in the lower right hand corner.
XX	____	On the face of the plan in the right hand corner, the following certificates shall appear.

PLANNING AND ZONING COMMISSION

Preliminary Development Plan approved by the Planning and Zoning Commission of the City of Surprise this_____day of _____, 199___.

_____

Chairperson

_____

Secretary

MAYOR AND COUNCIL

Preliminary Development Plan approved by the Planning and Zoning Commission of the City of Surprise this_____day of _____, 199___.

_____

Mayor

_____

Clerk

I acknowledge that the above information I have given on this checklist, the accompanying application and Preliminary Development Plan to be true and accurate.

FRED E. FLEET

for FLEET • FISHER ENGINEERING, INC. (Petitioner)

for CITRUS HEIGHTS RANCHES (Owner)

ROYAL RANCH

PLANNED AREA DEVELOPMENT

PROJECT REPORT

CITY OF SURPRISE
PLANNING AND ZONING DEPARTMENT
APPROVED
Case No.: PAD 98-110
P&Z Comm. Approval:
City Council Approval: 2/10/2000
~~B.O.A.~~ Approval: Ord 99-23
Stipulations:

City of Surprise, Arizona
May 18, 1999

AMENDMENT/ DEC. 14, 1999

Submitted by
Citrus Heights Ranches
7332 East Butherus Drive
Scottsdale, Arizona 85255
(602) 998-1444

FLEET • FISHER ENGINEERING, Inc.
4250 East Camelback Road
Suite 410K
Phoenix, AZ 85018
Phone (602) 264-3335 • Fax (602) 840-9368

TABLE OF CONTENTS

Section I – Project Overview

A. Introduction.....10

B. Legal Description.....10

C. Nature of Applicant's Interest in Development of Property.....14

D. Project Team/Contact List.....14

Section II – Existing Site Conditions

A. Existing Topography and Drainage.....15

B. Existing Soils and Vegetation.....15

C. Existing Streams, Ponding Areas And Area Drainage Pattern.....17

D. Existing Utilities.....17

E. Existing Groundwater and Geology.....18

F. Existing Wells and Irrigation.....19

G. Existing Circulation.....20

Section III – Proposed Site Development

A. Land Use.....21

B. Environmental Enhancement and Design.....22

C. Open Space and Recreation.....22

D. Circulation.....23

E. Public Facilities and Services.....23

Section IV – Land Use Standards

A. Low Density Residential.....24

B. School.....28

C. Open Space and Trails.....28

Section V – Circulation

A. Roadways.....30

B. Bus Bays and Traffic Signals.....30

Section VI – Utilities and Phasing

A. Water and Sewer.....34

B. Phasing.....39

Section VII

A. Site Development.....42

B. Architecture.....42

C. Landscape.....46

D. Recommended Plant Palette.....50

E. Use of Design Guidelines.....52

Appendices:

Section IIX - Applicable Current Zoning Ordinances

Section IX - Traffic Impact Analysis

Section X - Drainage Study

LIST OF FIGURES

Figure 1 – General Location Map.....11

Figure 2 – Area Calculations Chart.....27

Figure 3 – Road Cross-Sections.....31

Figure 4 – Road Cross-Sections.....32

Figure 5 – Road Cross-Sections.....33

Figure 6 – Open Space and Trails (Area).....38

LIST OF EXHIBITS

Exhibit A – Alta Survey.....12

Exhibit B – Topographic Map.....16

Exhibit C – Conceptual Land Use Plan / P.A.D Plan.....26

Exhibit D – Open Space and Trails.....29

Exhibit E – Conceptual Water Plan.....35

Exhibit F – Conceptual Off-Site Sewer Plan.....37

Exhibit G – Conceptual On-Site Sewer Plan.....38

Exhibit H – Conceptual Phasing Plan.....41

Exhibit I – Conceptual Landscape Plan.....48

SECTION I – PROJECT OVERVIEW

A. INTRODUCTION

This application and narrative describes a proposed residential development project located within the City of Surprise, Arizona. The project is located on the East Side of Bullard Road between Greenway Road on the north and Waddell Road on the south. (See Figure I – Location Map). The site comprises all but about 20 acres of the west ½ of section 9 and is 298.9 acres in area. The owner and developer is Citrus Heights Ranches (Attention: Mr. Joe Oddo), located at 7332 East Butherus, Scottsdale, Arizona 85260; (602) 998-1444. This application has been prepared by Fleet • Fisher Engineering, Inc. (Attention: Mr. Fred E. Fleet, P.E.; Mr. Carlton F. Beckstead, RLA), 4250 East Camelback Road, Suite 410K, Phoenix, Arizona 85018; (602) 264-3335.

B. LEGAL DESCRIPTION

The Northwest quarter; and the North half of the Southwest quarter; and the Southwest quarter of the Southwest quarter, ALL in Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona;

Except that portion of the West half of the Southeast quarter of the Southwest quarter of s Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

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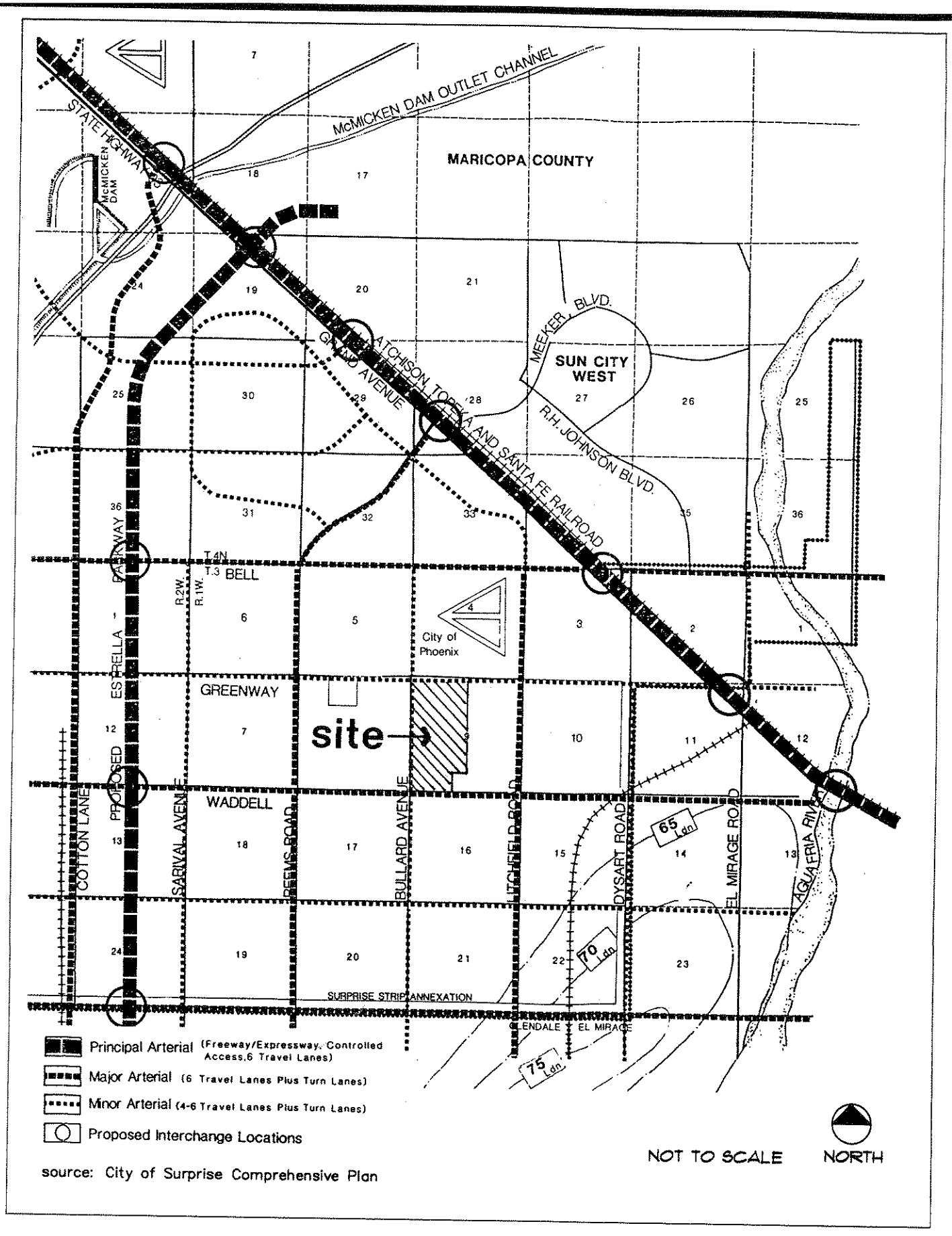
Containing 298.926 acres gross. (See Exhibit A – Alta Survey)



source: City of Surprise Comprehensive Plan

Location Map

figure 1

FLEET • FISHER ENGINEERING INC.

4250 EAST CAMELBACK RD., SUITE 410K
PHOENIX, ARIZONA 85018 PH. (602) 264-3335

EXHIBIT A

C. NATURE OF THE APPLICANTS INTEREST IN DEVELOPMENT OF THE PROPERTY

The applicant has owned and operated a commercial citrus farm on the property since 1968. As the citrus has matured beyond its optimum yield years and the City of Surprise has grown up around the site with planned communities adjacent and nearby, the highest and best use for the land has changed. This growth has been in response to a perceived and real demand for a variety of housing and services in the area. The City of Surprise has also taken steps to secure development of the abandoned air strip to the north of this site as a regional commercial and governmental center. This will generate a need for additional housing within close proximity. The applicant has planned the site to provide low-density a typical single-family neighborhoods. Open space has been distributed throughout the site to provide a pleasant neighborhood with recreational facilities and safe pedestrian circulation. The site is planned to be developed in two phases and master planned to ensure orderly lot absorption, maintenance of agricultural operations and phased off-site infrastructure development. The P.A.D. Plan provides for a fully integrated community at build-out, with common deed restrictions, design standards, landscaping, etc.

The developer intends to construct the infrastructure to provide development parcels to a variety of homebuilders. These development parcels will consist of areas of land with available water and sewer services to each parcel. Subsequent homebuilders will then file Final Subdivision Plat maps for each parcel and construct on and off-site improvements as necessary.

Citrus Heights Ranches is currently preparing a development agreement with the City of Surprise addressing the development plans, infrastructure and public services. Citrus Heights Ranches also intends to construct the necessary water facilities on and off site to provide for the ultimate demand of this project. This project will be developed so as not to place an economic burden on the City of Surprise. In addition, the developer is committed to working with the city in order to provide a development, which is properly planned and engineered, resulting in significant economic and social benefit to the city.

D. PROJECT TEAM / CONTACT LIST

OWNER / DEVELOPER:	Citrus Heights Ranches 7332 East Butherus Drive Scottsdale, AZ 85260 *Attn:* Joseph Oddo Phone: 998-1444 Fax: 951-1392
LAND PLANNER / ENGINEER:	Fleet • Fisher Engineering, Inc. 4250 East Camelback Road Suite 410K Phoenix, AZ 85018 *Attn:* Fred E. Fleet, P.E. / Carlton Beckstead Phone: 264-3335 Fax: 840-9368
LANDSCAPE ARCHITECT:	Fleet • Fisher Engineering, Inc. 4250 East Camelback Road Suite 410K Phoenix, AZ 85018 *Attn:* Carlton Beckstead, R.L.A. Phone: 264-3335 Fax: 840-9368
TRAFFIC ENGINEER:	DMJM Arizona, Inc. 2777 East Camelback Road Suite 200 Phoenix, AZ 85016 *Attn:* Stephen M. O'Brien, P.E. Phone: 337-2615 Fax: 337-2620
HYDROLOGY ENGINEER:	Premier Engineering 4020 North 20th Street Suite 304 Phoenix, AZ 85016 *Attn:* Henry Allen, P.E. Phone: 604-9500 Fax: 604-9502II –

SECTION II - EXISTING SITE CONDITIONS

A. EXISTING TOPOGRAPHY AND DRAINAGE

The project site consists of an approximate half-section of land east of Bullard Avenue between Greenway Road and Waddell Road. Excluded from the project is a 20-± acre parcel in the southeast corner of the half-section. The remaining area to be developed totals approximately 300 acres. The site is currently in use as a production citrus farm. (See Exhibit B – Topography Map)

The site slopes very gently at approximately 0.6% from northwest to southeast with an approximate 29' difference in elevation over the entire site.

Existing drainage flows from the northwest and enters the site at the corner of Greenway Road and Bullard and is conveyed through the site as sheet flows or along a drainage ditch on the south side of Greenway. They exit the site generally at the southeast corner of the site. There is an existing agricultural well near the northeast corner of the site. (See Appendix C - Preliminary Drainage Report for further explanation). This well will remain active during the irrigation period and the channels will be systematically eliminated as part of the phased construction (described elsewhere in this report).

B. EXISITNG SOILS AND VEGETATION

According to the 1972 *Soil Survey for Central Maricopa County, Arizona*, published by the U.S. Department of Agriculture Soil Conservation service, the site is primarily comprised of Gilman-Estrella-Avondale Association soils. These soils are nearly level loams and clay loams that occur on valley plains and low stream terraces. There are minor intrusions of Mohall-Laveen Association Soils - nearly level loams on old alluvial fans and valley plains.

Antho sandy loam, Estrella loam, Gilman loam (subgroups of the Gilman-Estrella-Avondale Association), interspersed with Laveen loam and Mohall loam (subgroups of the Mohall-Laveen Association) are the predominant site soil groups. Erosion hazard is slight for Antho sandy loam, Estrella loam, and Mohall loam. Erosion hazard is slight-to-moderate for Laveen loam; and is moderate for Gilman loam.

Existing soils consist of 95% loam and 5% clay loam. The loams were determined to have a moderate permeability rate which makes them appropriate for retention basins, but the flat surface gradients and lack of defined water courses cause these areas to be subject to shallow sheet flow flooding. The day loam soils have a moderately slow permeability rate, which makes them a poor choice for retention basins but the consolation is that there is very little area of this soil. All the soils have only slight erosion potential.
The entire site is currently under cultivation as a citrus orchard. There is a row of large Tamarisk trees along the north edge of the property, within the future R.O.W.

EXHIBIT B

C. EXISTING STREAMS, PONDING AREAS, AND EXISTING AREA DRAINAGE PATTERN

The site is fairly flat, sloping to the southeast at a gradient of 6%. The site is divided into four sections by east-west trending roads and irrigation ditches. In the southeast corner of the site is a 1200-foot-long, 60-foot-wide and 10-foot-deep irrigation storage pond (which will be removed during development).

The current FEMA (Federal Emergency Management Agency) maps (FIRM, No's 0401361585 & 04013C1605) indicate that the site is located in flood hazard zone X. Flood Zone "X" are areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood. This designation covers the remainder of the parcel.

The project site is within the Flood Control District of Maricopa County (F.C.D.M.C.) White Tanks/Aqua Fria Area Drainage Master Study (W.T.A.D.M.S.) completed in 1994. The study is currently being updated to reflect changes, which have occurred within the drainage basin, upstream from the site. It is clear at this time that discharge onto the site from the northwest will be reduced.

Area drainage generally flows from the northwest to the southeast. Storm water typically flows into the site from the intersection of Greenway and Bullard Road Avenue. The water is then distributed three ways: 1) east along Greenway Road 2) sheet flow across the site 3) south along Bullard Avenue. Flows are directed across the site and exit at the southeast corner of the site where they are carried in a ditch east along the north and south sides of Waddell Road.

The proposed project will be required to detain the 100-year, 2-hour storm event and discharge the shortage over a 36-hour period. This discharge point for the detention must be at the same historical point of discharge and at the same historical volume.

(See Appendix C - Drainage Report for detailed explanation of drainage.)

D. EXISTING UTILITIES

Utilities that presently exist on or adjacent to the site are electric (APS), telephone (US West) and water (City of Surprise). There are also two on-site wells; one committed to agricultural use and one small, domestic well. The agriculture well will be converted to a city-owned-potable-water well by development agreement with the City of Surprise. The domestic well will be abandoned in place. (See Section F).

The City has recently become a water service provider and is in the process of developing a water delivery system. Citizens Utilities is currently under contract with the City to operate the municipal water services within the City of Surprise and to provide preliminary water system master planning services. The City of Surprise will provide water for the project proposed with this submittal. The recent agreement between the City and Citizens Utilities provides for cross-connection of an

emergency back up of either distribution system. The City of Surprise has entered into an agreement with the McMicken Irrigation District for the assignment of Central Arizona Project (CAP) water. The CAP allocation will be used for ground water recharge, enabling the City to continue to withdraw water from the wells. There is currently a 16" water line in Greenway Road and a 16" line is under construction along Bullard Avenue, as part of The Ashton Ranch Development directly to the east of the project.

The sanitary sewer will be connected to the existing City of Surprise sewer system. There is an existing 30" line at the intersection of Cactus and Litchfield Roads, which extends southward from the City of Surprise to their new wastewater treatment facility ½ mile south of Cactus Road – between Litchfield and Dysart Roads. The existing sewer line is a trunk line for the treatment facility, and is 16 feet deep ± at the Litchfield and Cactus Road intersection.

Arizona Public Service (APS) presently provides electric services to the immediate area. Overhead power lines, which will require relocation prior to or during construction, are visible along Dysart Road and Waddell Road. Overhead power lines located west of the property on Greenway Road extend south to the (2) well site locations, providing power for the existing well irrigation pumps. These will also require relocation during the phased development.

Telephone service is available through US West. Presently US West has overhead telephone service lines shared with APS's overhead service along Dysart and Waddell Roads.

Cable television (Cox Cable) is available in the vicinity and will be made available to the development.

Existing and proposed new utilities will be placed underground.

E. EXISTING GROUNDWATER & GEOLOGY

The Royal Ranch Development lies within the Arizona Department of Water Resources designated West River Valley Sub-Basin (WSRV) in the Phoenix Active Management Area (AMA). The following paragraphs describe the groundwater and geology in the sub-basin and are within the immediate vicinity of the Arena property.

Alluvium – The depth to bedrock in the WSRV ranges from 100 feet near the basin margins to over 10,000 feet in the Luke area west of Glendale. There are (3) recognizable hydrogeologic units within the basin including: an upper sand and gravel unit, middle silt and slay unit, and a low conglomerate unit. The upper unit primarily consists of sand and gravel with some interceded silt and clay and ranges in thickness from 100 feet near the basin margins to 500 feet in the Luke area. The middle unit consists mainly of silt and clay with some interceded sand and gravel and ranges in thickness from 100 feet near the basin margins to over 1,300 feet southwest of Glendale. The lower unit mainly consists of course-graded

conglomerate near the basin margins, becoming finer-grained toward the center of the basin and ranges in thickness from 100 to 10,000 feet.

Groundwater Flow & Volume –

Groundwater enters the WSRV as underflow from the Lake Pleasant sub-basin, the northern Hassayampa sub-basin, and the Maricopa-Stanfield sub-basin. The direction of groundwater flow is generally from the Lake Pleasant sub-basin into the WSRV and out of the WSRV into the East Salt River Valley Sub-Basin. However, development within the WSRV has created a cone of depression in the area of agricultural and municipal activity which groundwater within the WSRV also flows into. The volume of groundwater in storage within the basin is estimated at 59,000,000 acre-feet to a depth of 1,200 feet.

Depth to Groundwater –

The depth to the groundwater over the entire basin varies from 50 feet to over 500 feet. The groundwater level in the two existing wells on the Royal Ranch site is approximately 671 feet.

General Groundwater Quality – (see appendix)

Water Rights –

The owner of the property (298 acres) is permitted to withdraw 1040.46 acre-ft/yr of groundwater for irrigation purposes. The water rights are Grandfathered Rights No. 58-100683.0004. The development of the Royal Ranch property will occur in three phases of approximate equal size. The development of each phase will represent the retirement of the irrigated farmland and with it the extinguishing of the Grandfathered water rights. The Assured Water Supply credits for the extinguishing of the Grandfathered water rights associated with each phase will be conveyed to the City of Surprise.

F. EXISTING WELLS AND IRRIGATION

General –

The subject Royal Ranch property is currently in use as a citrus orchard. The land is being irrigated with groundwater that is pumped from a well near the northwest corner of the site and distributed by a canal system. A second, smaller, domestic well is located near the southwest corner of the site and will be abandoned in place. The locations of the wells are shown on Exhibit A. The following is a description of the wells and water rights associated with the farmland. Existing irrigation ditches on site are owned by Citrus Heights Ranches and will continue to be used.

Ownership of Well –

The well / irrigation system is currently owned by Citrus Heights Ranches. It is proposed that this well be converted to city ownership for domestic use. Citrus Heights Ranches will retain rights to use of the well water for irrigation of the existing citrus trees as construction of the development phases occurs. Agricultural irrigation is to take place during off-peak periods so as not to interfere with domestic water supply.

G. EXISTING CIRCULATION

Bullard Avenue is currently a two-lane, gravel road with plans for west ½ street improvements in place as part of the Ashton Ranch P.A.D.. Bullard Avenue currently dead-ends at Greenway Road. Greenway Road is a two-lane dirt road. Waddell Road is a two-lane paved road.

The principal access to the site is via Waddell Road, eastbound from Grand Avenue, three miles to the east. The major east/west connector road in the area is Bell Road, which is one mile north of the site. Reems Road, one mile east of the site, serves as the area's major north/south connector road.

SECTION III

Proposed Site Development – Relationship of Royal Ranch P.A.D. proposal to The City of Surprise Development Guide.

A. LAND USE – The Comprehensive Plan calls for commercial corners at the Intersections of Waddell Road and Bullard Avenue and at the Corner of Greenway Road and Bullard Avenue (see Figure 3). The Plan also identifies. The need for a school / park site near the center of the section. Residential development is designated for the remainder of the site with high/medium density to the south and low-density single family to the south. The Royal Ranch proposal responds to the current Regional Commercial zoning classification of the Millennium site to the north by switching these two residential Density areas. This change in Land Use designation will be requested in a subsequent Development Plan Amendment to be processed concurrently with the P.A.D.

Land use / growth management goals – (source: City of Surprise Comprehensive Development Guide)

Goal A: CAREFULLY MANAGE AND CONTROL DEVELOPMENT TO ACHIEVE ORDERLY MUNICIPAL GROWTH

The Royal Ranch P.A.D. achieves this community goal by implementing. The City's Land use plan and by developing land in an orderly fashion. Ashton Ranch P.A.D., directly to the west, is currently under development and the next logical extension of City services and growth is to the east. This will begin to fill in the vacant parcels between Ashton Ranch and the approved Arena P.A.D. project approximately one mile to the east. Utilities have been extended to Ashton Ranch and will be further developed by the Royal Ranch P.A.D.

Goal B: ENCOURAGE NEW DEVELOPMENT OF SOUND AND STABLE NEIGHBORHOODS

The Royal Ranch P.A.D. fulfills this goal by creating a neighborhood with a Variety of housing and the reservation of a school site to serve the neighborhood. These facilities are integrated with a system of safe trails and open space areas giving the community a sense of neighborhood identification.

Housing Goals

Goal C: PROVIDE ADEQUATE HOUSING FOR PRESENT AND FUTURE RESIDENTS OF SURPRISE AT ALL INCOME LEVELS

This P.A.D. proposal is intended to provide for housing for moderate income families which will be needed as the Regional Commercial development to the

north ensues. The P.A.D. zoning is substantially the same as "hard zoning", however it encourages complementary development of the "zoning", however it encourages complementary development of the entire ½ section of land.

Goal D: IMPROVE THE SELECTION AND EXPAND THE QUANTITY AND QUALITY OF HOUSING UNITS IN SURPRISE

Royal Ranch P.A.D. will provide in excess of 1400 new homes in a well planned, landscaped community with amenities such as open space/recreation areas and pedestrian walkways linking the homes, play areas and the surrounding community.

B. ENVIRONMENTAL ENHANCEMENT AND DESIGN

Goal E. CREATE AND MAINTAIN A HIGH LEVEL OF ENVIRONMENTAL QUALITY IN THE TOWN OF SURPRISE

This proposal adheres to the vision of the future growth of Surprise as stated in the Comprehensive Plan. Storm water is gathered and recharged into the earth. The site plan encourages activity within the neighborhood to eliminate unnecessary travel and the planned local street system is implemented.

Goal F: ESTABLISH AN ENVIRONMENTAL DESIGN THEME FOR THE TOWN OF SURPRISE

A community's image is, to a great degree, established by its streetscape. This P.A.D. will help establish that streetscape through landscaped buffers with varying depths, interesting perimeter theme walls and orderly landscaping. Strategically located open space/recreation areas help to open up the project to the passerby and present an appealing image. Significant entry monumentation is planned to signify the project entries and establish the design character of the P.A.D.

C. OPEN SPACE AND RECREATION

Goal G: CREATE A COMPREHENSIVE PARK AND OPEN SPACE SYSTEM TO SERVE THE ACTIVE AND PASSIVE RECREATIONAL NEEDS OF THE TOWN.

A system of strategically located open space/recreation areas is located throughout the project. They will incorporate passive and active recreational opportunities with the project's master drainage retention system. These open space areas will be linked by pedestrian sidewalks, which connect to the City's Open Space/Trails system (see Figure 7)

D. CIRCULATION

Goal H: IMPROVE VEHICULAR CIRCULATION THROUGHOUT THE TOWN OF SURPRISE PLANNING AREA

The Royal Ranch P.A.D. plan follows the recommended City of Surprise Future Streets Plan. Significant additions for R.O.W. and major street improvements are planned as part of the development, at no expense to The City of Surprise.

Goal I: WORK TO INSURE THE PROVISION OF FUNCTIONAL AND AFFORDABLE PUBLIC TRANSIT SERVICE TO TOWN OF SURPRISE RESIDENTS

Provisions for bus facilities (bus pullouts) will be made where necessary and appropriate as determined by City Engineering Department recommendations.

Goal J: DEVELOP AND IMPROVE NON-MOTORIZED CIRCULATION WITHIN SURPRISE

Pedestrian and bicycle trails are planned along all major streets.

E. PUBLIC FACILITIES AND SERVICES

Goal K: The Developer has cooperated with the City of Surprise Engineering Department to identify and plan for required local infrastructure improvements to be installed with this project will provide a significant addition to the City's infrastructure.

ROYAL RANCH

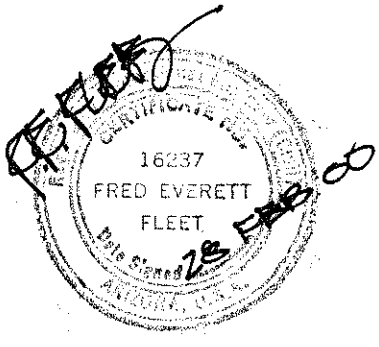
PLANNED AREA DEVELOPMENT

PROJECT REPORT

City of Surprise, Arizona
May 18, 1999

AMENDMENT / DEC. 14, 1999

Submitted by
Citrus Heights Ranches
7332 East Butherus Drive
Scottsdale, Arizona 85255
(602) 998-1444



FLEET • FISHER ENGINEERING, Inc.
4250 East Camelback Road
Suite 410K
Phoenix, AZ 85018
Phone (602) 264-3335 • Fax (602) 840-9368

SECTION IV – LAND USE DESIGNATIONS

The Royal Ranch Planned Area Development is a low-density residential community consisting of *six* lot sizes (See Exhibit C). Open space areas are to be provided to enhance the community. They will consist of a pedestrian trail system and retention areas with passive and active recreation amenities. Storm water detention areas will serve a dual purpose of flood control and as open space amenities. Refer to FIGURE 2 for a breakdown of areas for each land use. The land uses and their associated standards are as follows:

A. LOW DENSITY RESIDENTIAL (LDR)
The single family lot portion of the project shall be developed in compliance with the R1-5 Zoning ordinance of the City of Surprise except where noted in the following standards. The entire project area is to be designated as LDR, with Open Space/Retention and recreation areas occurring within this land use designation. Overall project density shall not exceed *5 dwelling units per acre (DU/AC) or 1494* total units.
The development shall also comply with the Design Standards for Single-Family Residential Districts (Planned Area Developments, R1-8 and R1-5) which are currently under consideration for adoption by the City (See APPENDIX B).

1. Typical Lot Size
Minimum lot width shall be 48 ft. The maximum allowable percentage of 48-ft. wide lots shall be 25%. The remainder of the lots shall be 50 ft. or greater in width. These lots are to be 50 ft., 53 ft., 58 ft.,63 ft. and 70 ft. Frontage of lots on cul-de-sacs or street knuckle may be decreased to 20 ft. provided that full standard lot width is achieved along a line at a point no further back than 20 ft. from the chord of the front property line. Corner lots shall be 5 ft. wider than the typical interior lot. The standard lot depth shall be 110 ft. Perimeter lots whose rear lot lines abut arterial streets shall be 120 ft. in depth except where the lot abuts a perimeter street and is adjacent to a 25 foot deep landscape tract. In that case, a 115' deep lot will be allowed. Minimum lot areas are as follows:

48 ft. lots – 5,280 S.F.
50 ft. lots – 5,500 S.F.
53 ft. lots – 5,830 S.F.
58 ft. lots – 6,380 S.F.
63 ft. lots - 6,930 S.F.
70 ft. lots.- 7,700 S.F.

2. Lot Size at Cul-De-Sacs and Knuckles
Lot size restrictions in Section IV.A.1 apply with the following exceptions:
a) Depth can be less than 110 ft. as long as the minimum lot square footage is maintained.
b) Depth on lots backing up to arterial streets can be less than typical 120 ft. and 115 ft. as long as the minimum lot square footage is met.

2. Setbacks

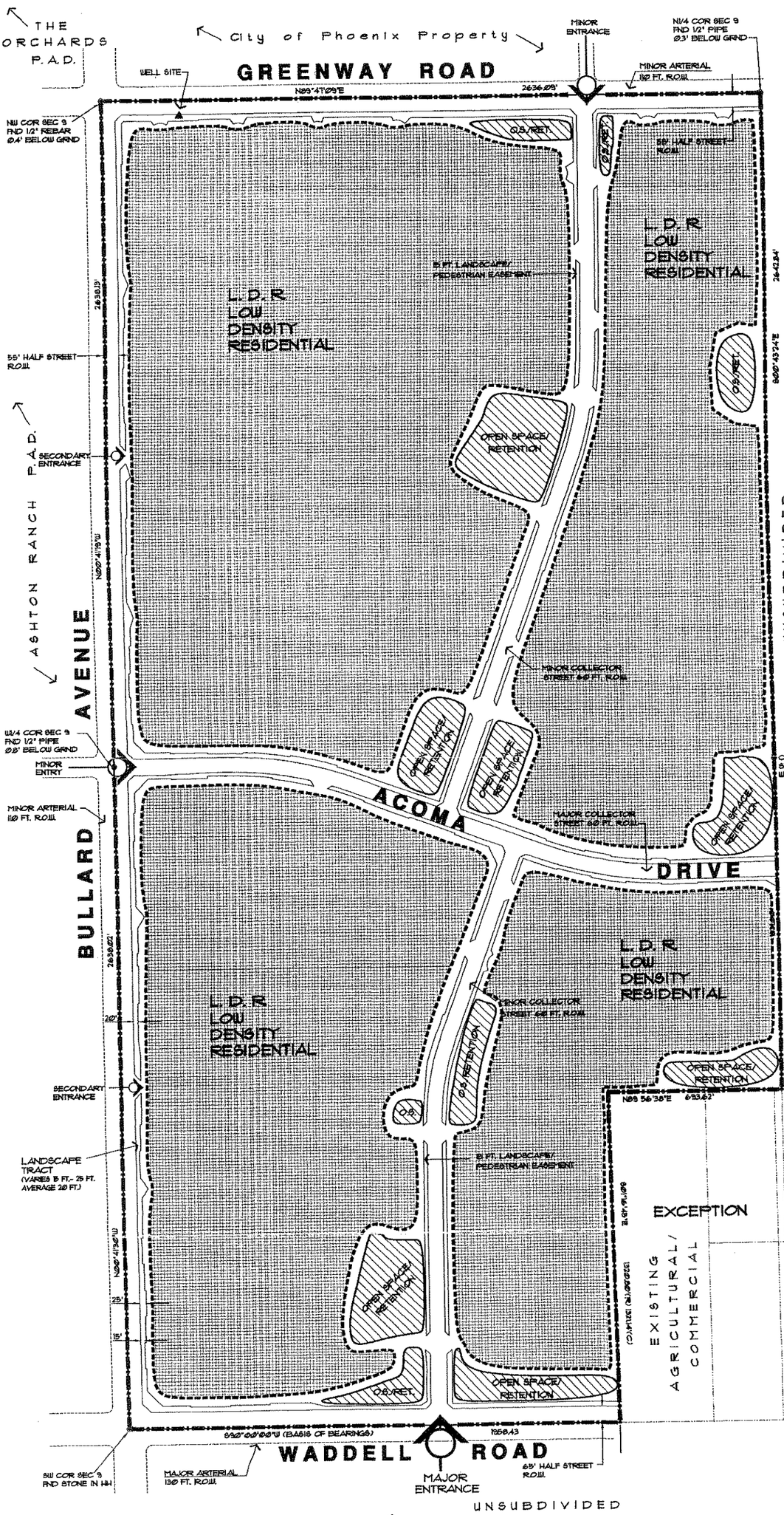
The following minimum residential building setbacks shall apply for this project:

Front/Garage:	-18' from property line to face of garage -12' for side facing garages
Front/Residence:	-18' & 21' – 3' staggers required. -No more than 2 adjacent houses with the same front yard setback shall be allowed. -15' to structure other than garage (such as entryways or other architectural features)
Interior Side Yard:	-13' aggregate per lot. Minimum 5' on either side
Corner Yard:	-13' on property line with a local side street -20' on lots adjacent to a collector street if no landscape tract is provided.(corner lots adjacent to landscape tracts shall require 13' aggregate per lot with minimum 5' on either side)
Rear Yard:	-20'
Maximum Building Height:	-30'

3. Parking

A minimum of 2 – minimum 18-foot spaces per single-family dwelling unit shall be provided in each garage. Parking for 2 additional vehicles shall be provided in the driveway of each single-family dwelling unit.

EXHIBIT C



LEGAL DESCRIPTION

The Northwest quarter and the North half of the Southwest quarter and the Southwest quarter of the Southwest quarter and the West half of the Southeast quarter of the Southwest quarter and the West half of the Southeast quarter of the Southeast quarter of the Southwest quarter, ALL in Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona;

EXCEPT that portion of the West half of the Southeast quarter of the Southwest quarter of Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

BEGINNING at the Southeast corner of the West half of the Southeast quarter of the Southeast quarter of said Section 9; Thence North along the East line of the West half of the Southeast quarter of the Southeast quarter of Section 9, 1320.78 feet to the Northeast corner thereof; Thence Westerly along the North line of the West half of the Southeast quarter of the Southeast quarter of Section 9, 340.00 feet; Thence Southerly along the center line of a 12 inch irrigation pipe and along a wire fence and a Southerly prolongation thereof 1320.80 feet to a point on the South line of the West half of the Southeast quarter of the Southeast quarter of Section 9; Thence Easterly along the South line of the West half of the Southeast quarter of the Southeast quarter of Section 9, 210.00 feet to the POINT OF BEGINNING.

Containing 298.926 acres gross.

SITE DATA

PROPOSED USE	AREA (AC.)	% SITE
TOTAL SITE	298.92 AC.	100 %
CIRCULATION		
ARTERIAL STREETS	12.8 AC.	4.28 %
GREENWAY ROAD (55FT. 1/2 ST.)	3.3 AC.	-
BULLARD ROAD (55 FT. 1/2 ST.)	6.6 AC.	-
WADDELL ROAD (65 FT. 1/2 ST.)	2.9 AC.	-
COLLECTOR STREETS	9.5 AC.	3.18 %
NET SITE AREA	276.62 AC.	92.53 %
RESIDENTIAL (L.D.R)		
SINGLE FAMILY		
LOW DENSITY RESIDENTIAL	247.21 AC.	82.70 %
OPEN SPACE (L.D.R)	29.41 AC.	9.84 %
RETENTION/OPEN SPACE	18.61 AC.	-
LANDSCAPE TRACTS	10.80 AC.	-

RESIDENTIAL DENSITY

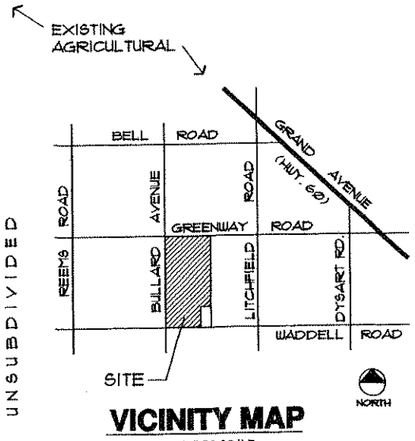
per ordinance formula

Density = total # of dwelling units / total site area-(c + a)

c= total commercial land area

a= arterial rights-of-way

1,716 du. / 298.9 ac.-(12.8 ac.) = 6.0 du/ac.



VICINITY MAP

NOT TO SCALE

PLANNING AND ZONING COMMISSION

PRELIMINARY DEVELOPMENT PLAN APPROVED BY THE PLANNING AND ZONING COMMISSION OF THE CITY OF SURPRISE THIS DAY OF , 1999.

CHAIRPERSON SECRETARY

MAYOR AND COUNCIL

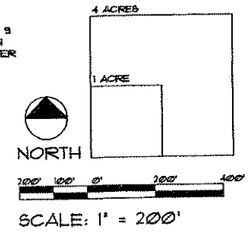
PRELIMINARY DEVELOPMENT PLAN APPROVED BY THE MAYOR AND COUNCIL OF THE CITY OF SURPRISE THIS DAY OF , 1999.

MAYOR CLERK

I ACKNOWLEDGE THAT THE ABOVE INFORMATION I HAVE GIVEN ON THE CHECKLIST, THE ACCOMPANYING APPLICATION AND PRELIMINARY DEVELOPMENT TO BE TRUE AND ACCURATE.

FOR FLEET-FISHER ENGINEERING, INC. (PETITIONER)

FOR CITRUS HEIGHTS RANCHES (OWNER)



SCALE: 1" = 200'

LAND USE / CONCEPT PLAN PLAN FOR

ROYAL RANCH

Planned Area Development

MAY, 1999

OWNER:

CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
SCOTTSDALE, AZ. 85260
PH. 602-998-1444
Contact: Joe Oddo

FLEET • FISHER ENGINEERING INC.
4250 EAST CAMELBACK RD., SUITE 410K PHOENIX, ARIZONA 85018 PH. (602) 264-3338

F.F.E. # 212-01

P:\9398\CONCEPT1 5-13-99 10:10:34 am

EXHIBIT C

FIGURE 2
AREA CALCULATIONS

Proposed Use	Area (acres)	% of Total
TOTAL SITE	298.92 AC.	100%
CIRCULATION	12.80 AC.	4.28%
ARTERIAL STREETS		
Greenway Road (55FT. ½ ST.)	3.3 AC.	---------
Bullard Road (65 FT. ½ ST.)	6.6 AC.	---------
Waddell Road (65 FT. ½ ST.)	2.9 AC.	---------
COLLECTOR STREETS	9.50 AC.	3.18%
NET SITE AREA	276.62 AC.	92.54%
LOW DENSITY RESIDENTIAL	*247.00 AC.*	*82.63%*
OPEN SPACE	*29.89 AC.*	*10.00%*
Retention/Open Space	*19.09 AC.*	---------
Landscape Tract	10.80 AC.	---------

B. OPEN SPACE AND TRAILS (LDR Land Use Designation)

The Open Space component of the P.A.D. shall consist of approximately 18.61 acres of land set aside for joint use as flood retention and recreation facilities and 10.8 acres of perimeter landscape tracts. The total Open Space area is to be approximately 26.9 acres or 9.84% of the site area. Two acres of open space shall be provided for every 100 lots within the development.

Six-foot wide meandering sidewalks shall be installed within the 15-ft. wide landscape tracts along both sides of the internal collector streets (Acoma and the North/South Spine Road). Benches shall be installed along the trails within the site at approximately one per quarter mile.

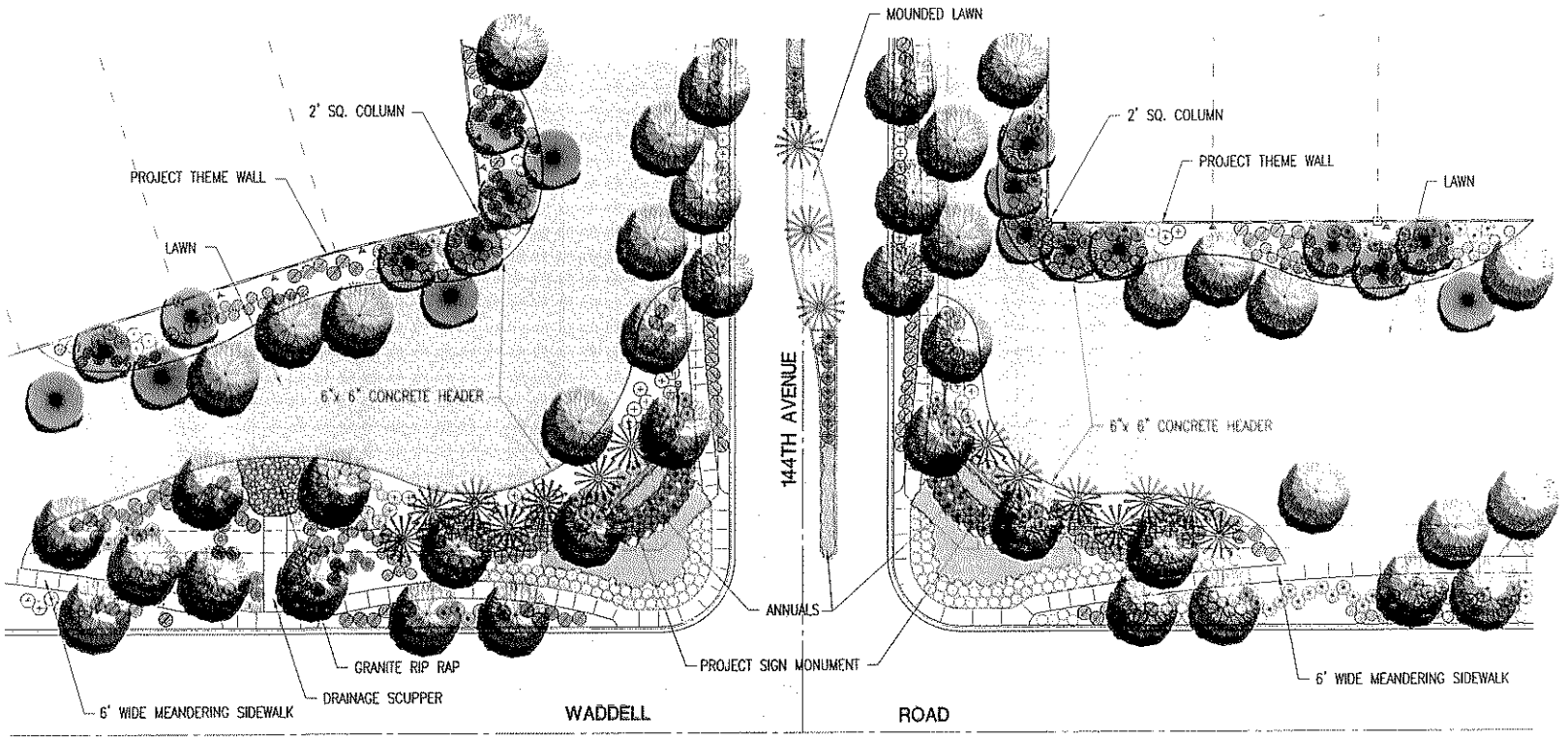
Six foot wide meandering sidewalks shall also be installed in landscape tracts to be dedicated along the perimeter arterial roadways. (project side only) These perimeter landscape buffer tracts shall vary in width from 15 ft. to 25 ft. and shall average a minimum of 20 ft. wide.

Retention basins shall be developed throughout the site to serve as play areas and open space reserves. Recreation facilities such as basketball, volleyball, and tot-lots are to be provided within these open space areas. Ramadas and benches are to be provided at higher elevations within the retention basin areas.

See EXHIBIT D

C. PROJECT OPEN SPACE / AMENITY AREAS

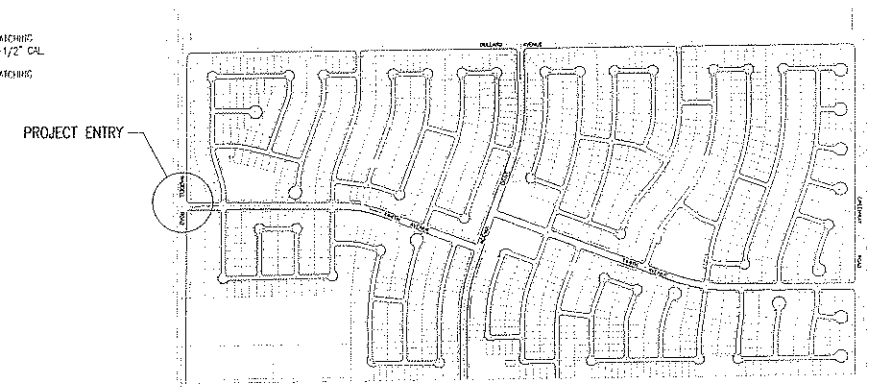
Pages 28b-28k delineate the character, density and quality of the proposed play and recreation areas to be developed throughout the Royal Ranch community. The project will be developed in substantial compliance to these illustrations.



PLANT SCHEDULE:

(FOR THIS SHEET ONLY)

	PHOENIX DACTYLIFERA DATE PALM	20' TRUNK
	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5" SP.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LAEVIGATUM CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.B." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "SP. PFITZERIANA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA CELLOMIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

Project Entry Landscape Plan
Scale 1:20
30 10 0 20
GRAPHIC SCALE
NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
1343 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224

ACOMA DRIVE SUBDIVISION ENTRANCE

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

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4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

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LANDSCAPE ARCHITECTURE & PLANNING
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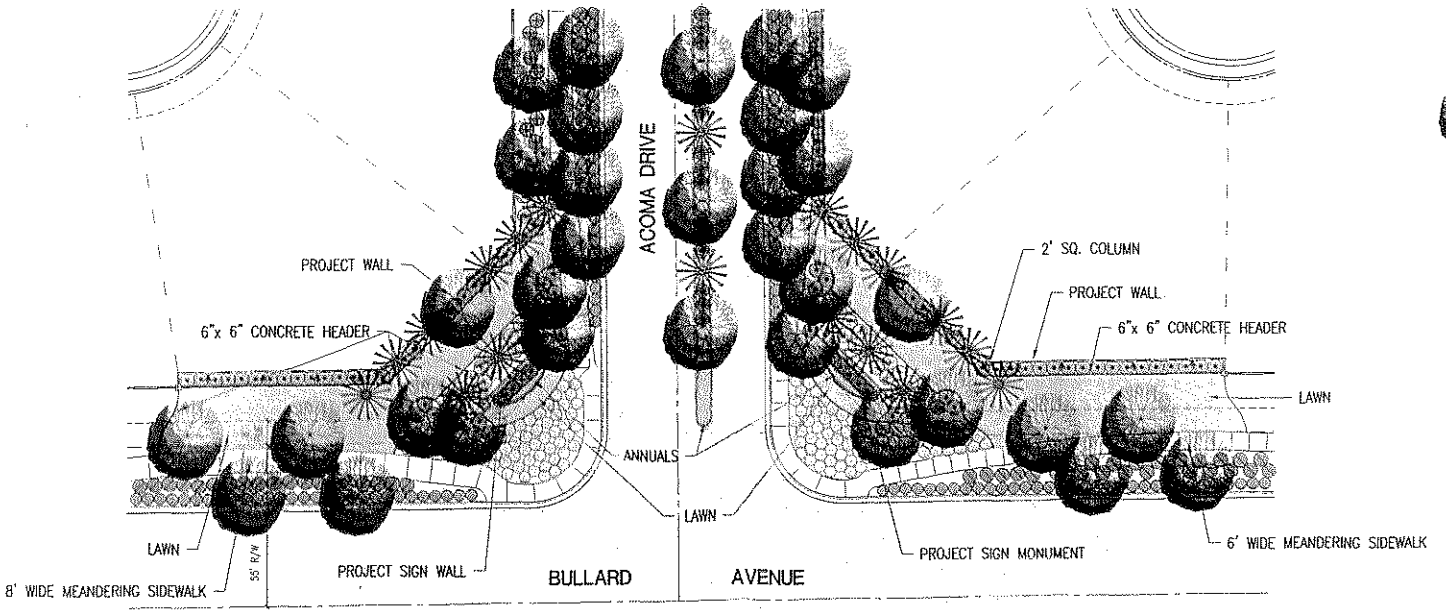
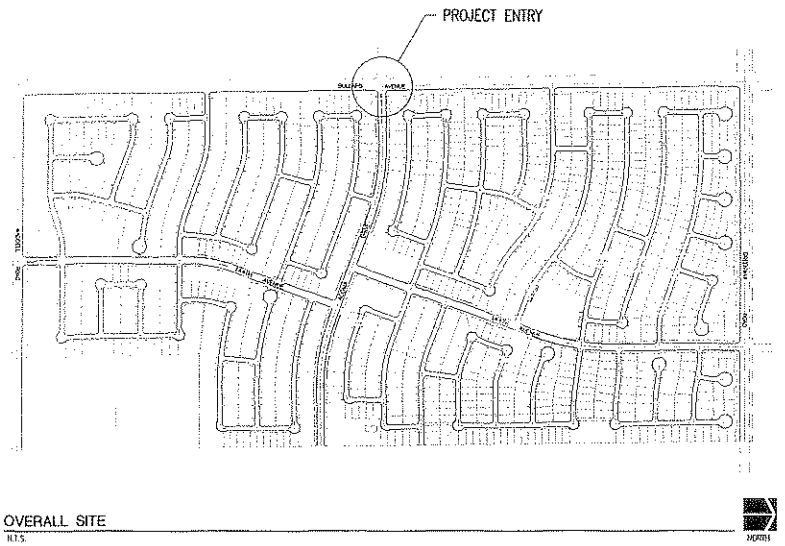
CHANDLER, ARIZONA 85224



PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	PHOENIX DACTYLIFERA DATE PALM	20' TRUNK
	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SPR., 1-1/2" CAL.
	PROSOPIS CHILENSIS 'THORNLESS' THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SPR.
	NERIUM OLEANDER 'DWARF PINK' DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA 'CRIMSON JEWEL' CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM FRUTESCENS 'R.B.' RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS 'PFITZERIANA' COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA 'B.K.' BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. 'PROSTRATUS' DWARF ROSEMARY	5 GALLON MINIMUM FULL PAST CAN
	LANTANA CAMARA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

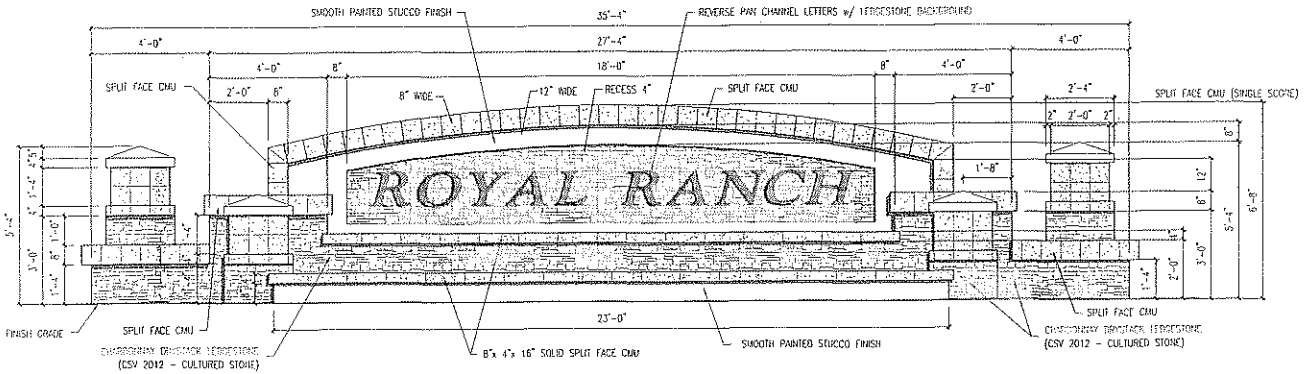
Project Entry Landscape Plan
Scale 1:20
20 10 0 20
GRAPHIC SCALE
NORTH

ROYAL RANCH

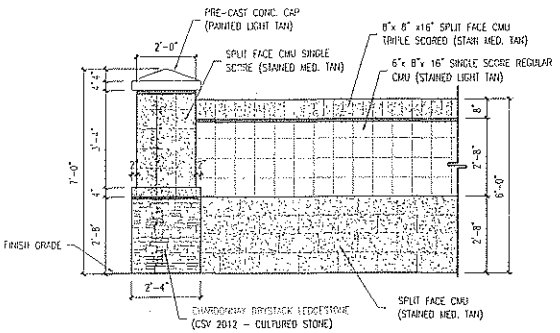
CITY OF SURPRISE, ARIZONA

PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

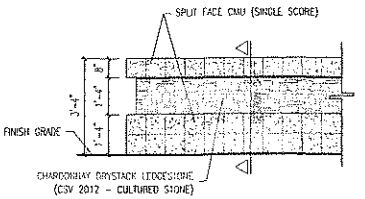
PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
1343 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224



1/43 SIGN MONUMENT
SCALE: 1/2" = 1'-0"



2/43 PROJECT THEME WALL
SCALE: 1/2" = 1'-0"



3/43 DECORATIVE LOW WALL
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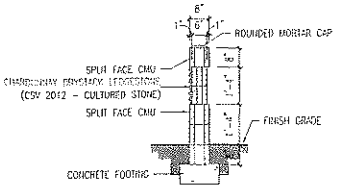
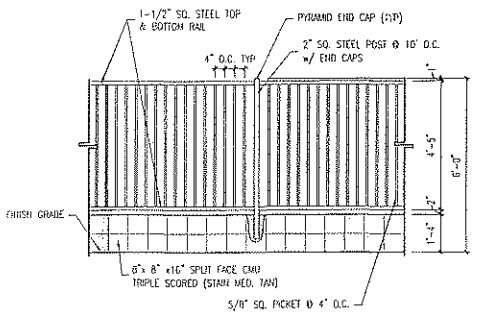


4/43 SECTION C-C
SCALE: 1/2" = 1'-0"



5/43 VIEW FENCE
SCALE: 1/2" = 1'-0"

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

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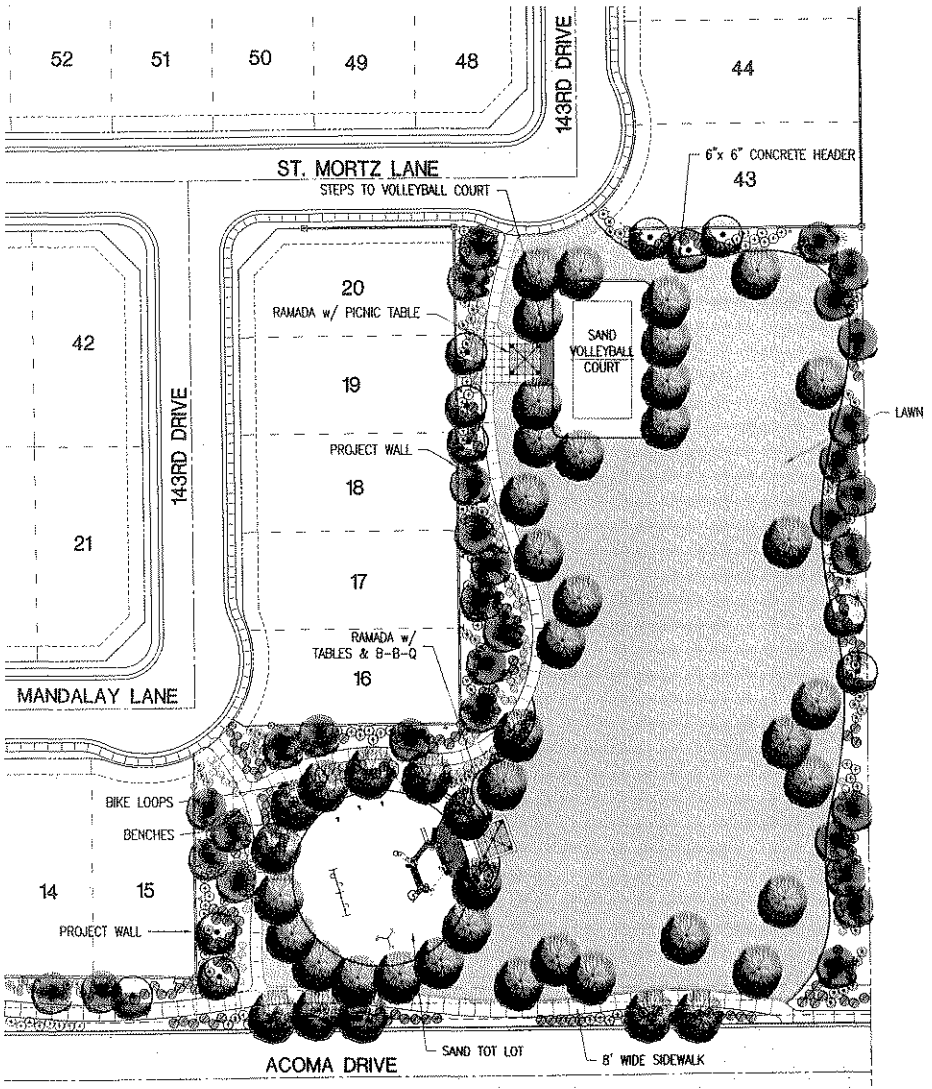
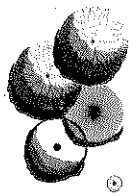


Landscape Plan
Scale 1:30

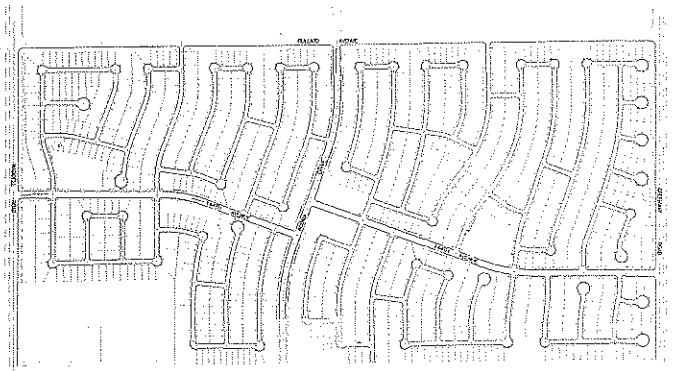
30 15 0 30
GRAPHIC SCALE

NORTH



PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5' SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3' SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LAEVIGATUM CINNAMOMAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.B." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "PFITZ. HEAD" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
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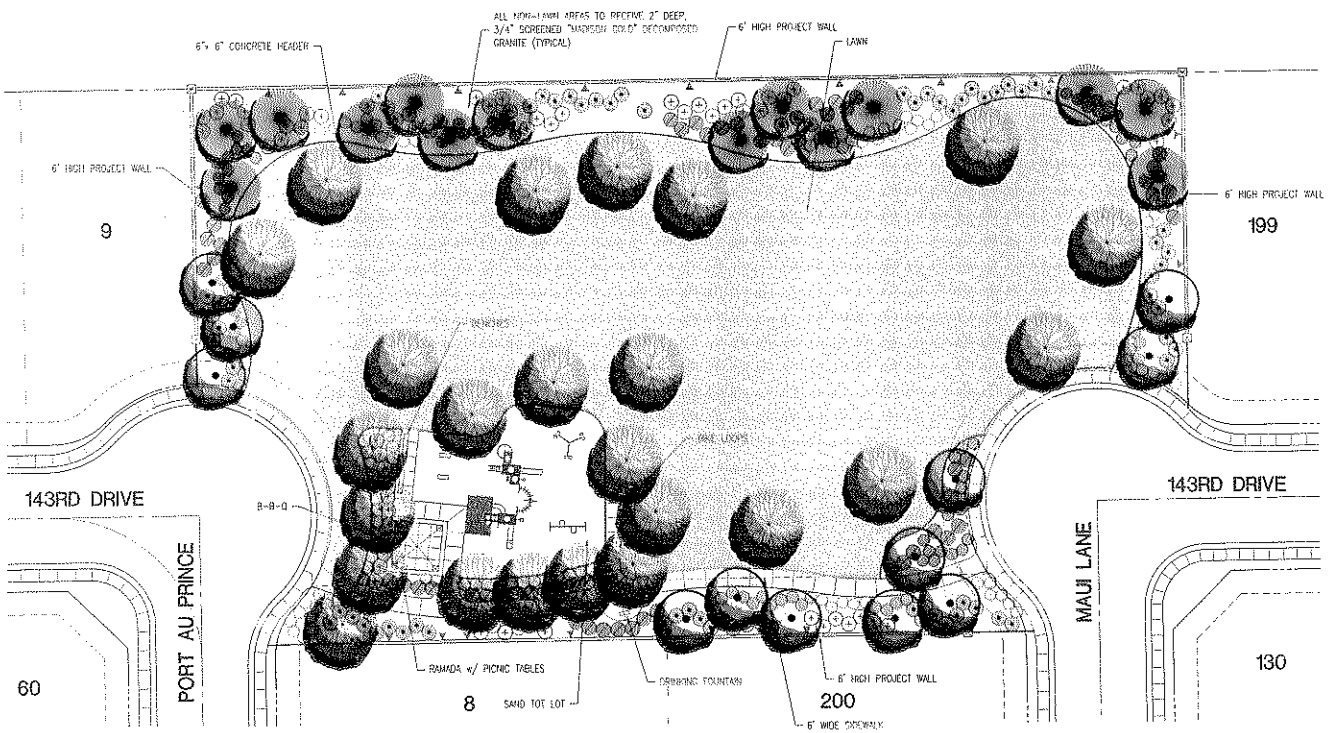

PLANT SCHEDULE: (USE THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM MATCHING 10' HT., 4.5' SP., 1-1/2" CAL.
	PISTACHIA CHINENSIS "KEITH DAVEY" KEITH DAVEY CHINESE PISTACHE	24" BOX MINIMUM MATCHING 10' HT., 4.5' SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5' SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3' SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "PURPLE JEWEL" PURPLE JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE LANGMANIAE SAGE	5 GALLON MINIMUM FULL PAST CAN
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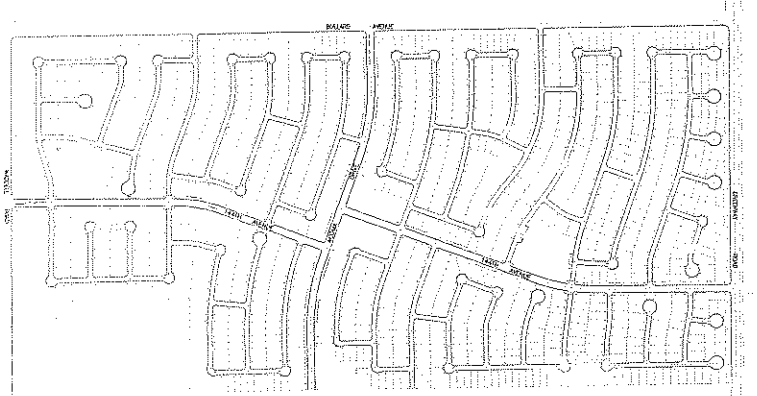
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA MONTEVIDENSIS GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
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Landscape Plan
Scale 1:20
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GRAPHIC SCALE

NORTH

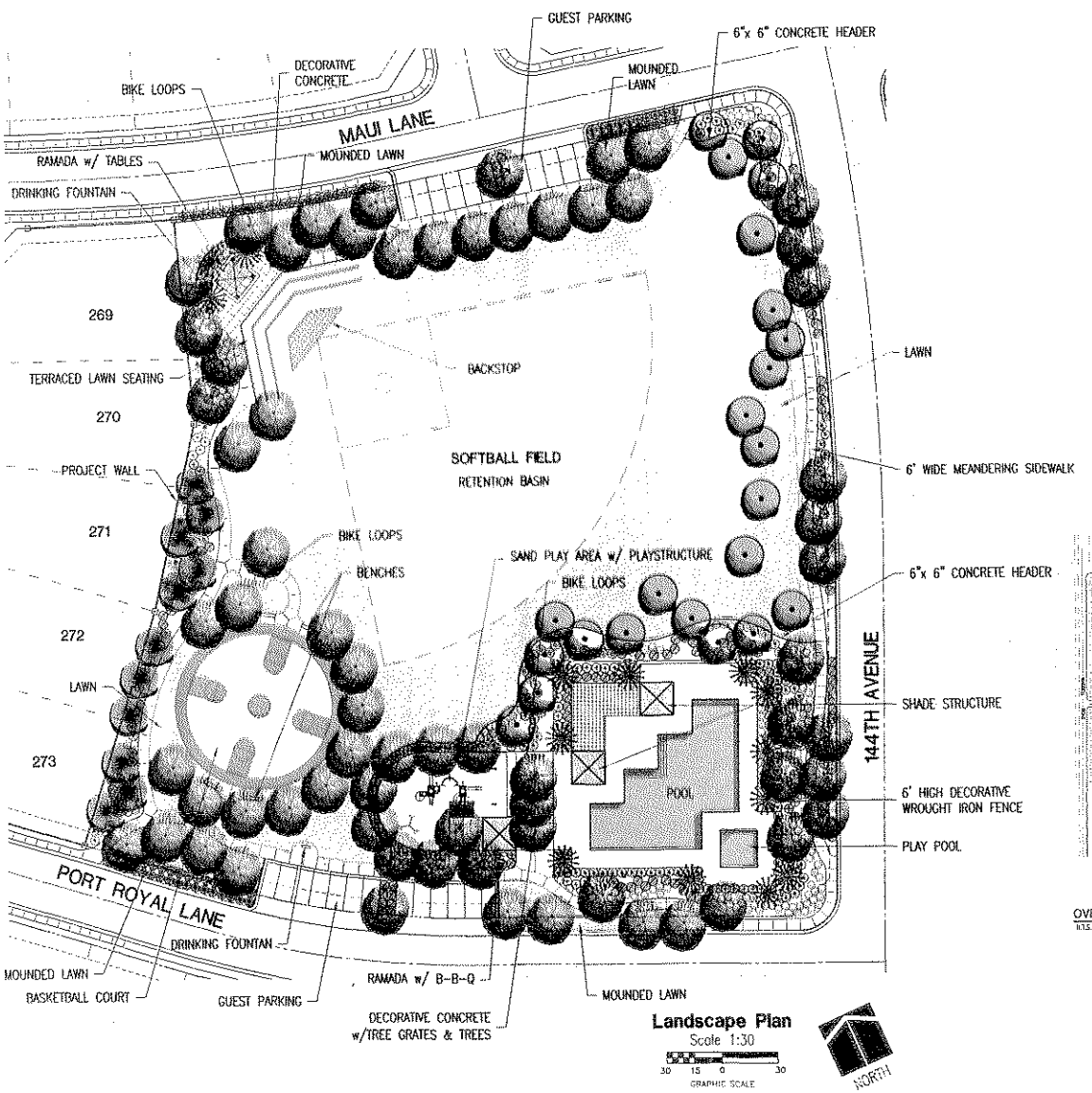
NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

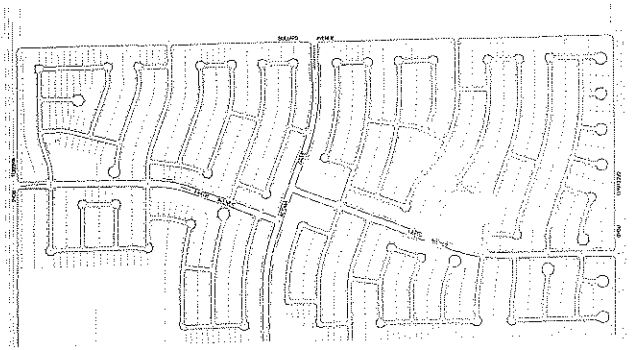
PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
1345 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224



PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	PHOENIX DACTYLIFERA DATE PALM	20' TRUNK
	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5' SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3' SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.B." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "PFITZERIANA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
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NORTH

ROYAL RANCH

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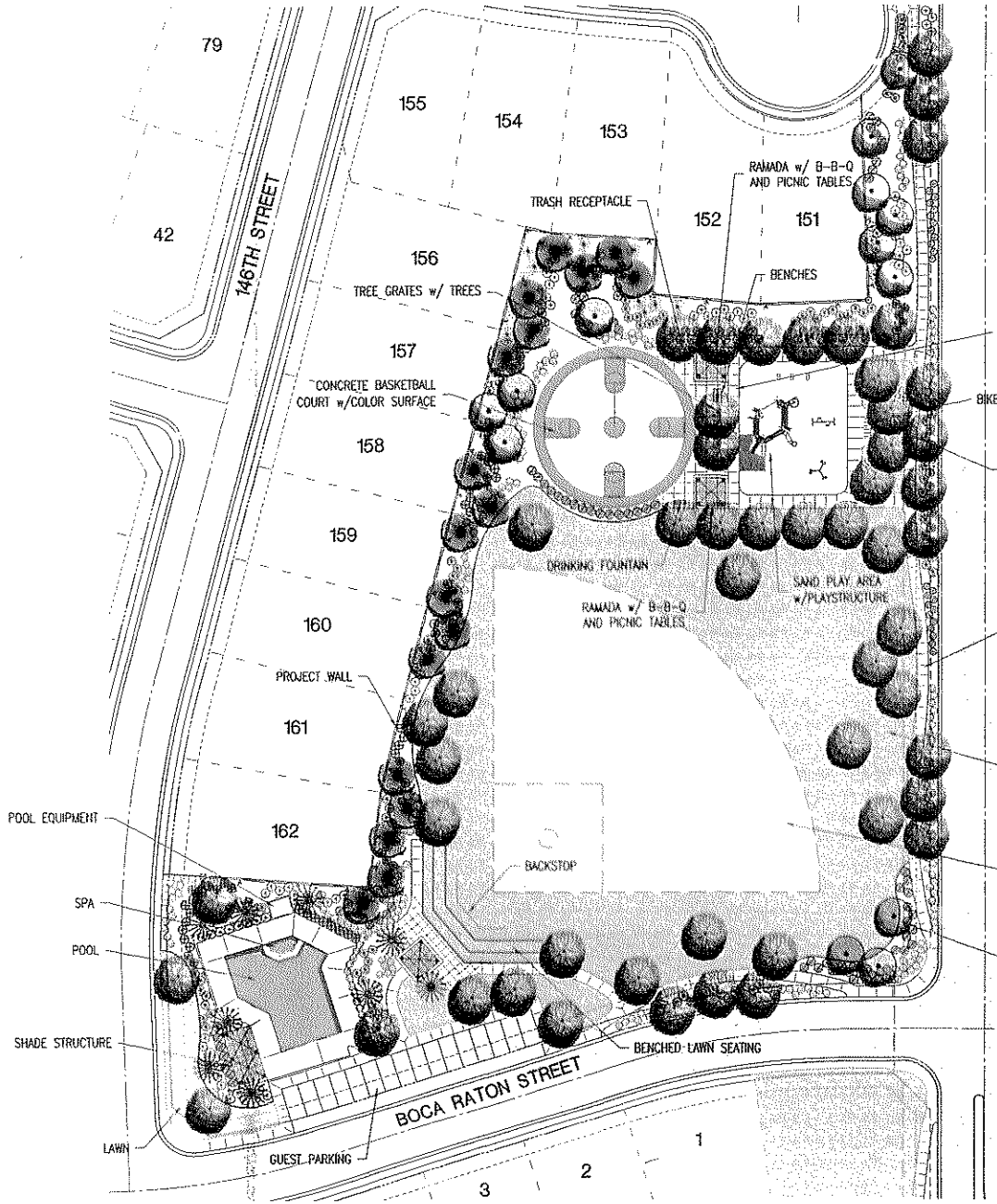
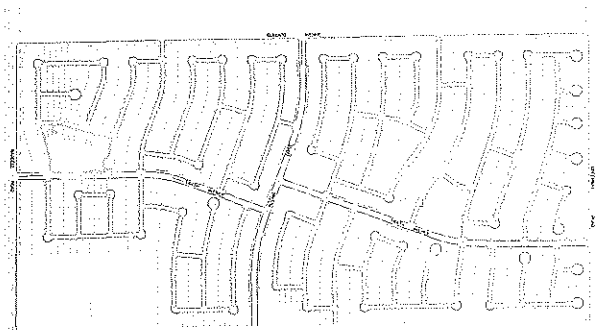
1343 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224



PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	PHOENIX DACTYLIFERA DATE PALM	20' TRUNK
	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, STAKED 10' HT., 4.5" SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5" SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3" SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.B." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "TRIPEDEANA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
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Landscape Plan
Scale 1:30
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GRAPHIC SCALE

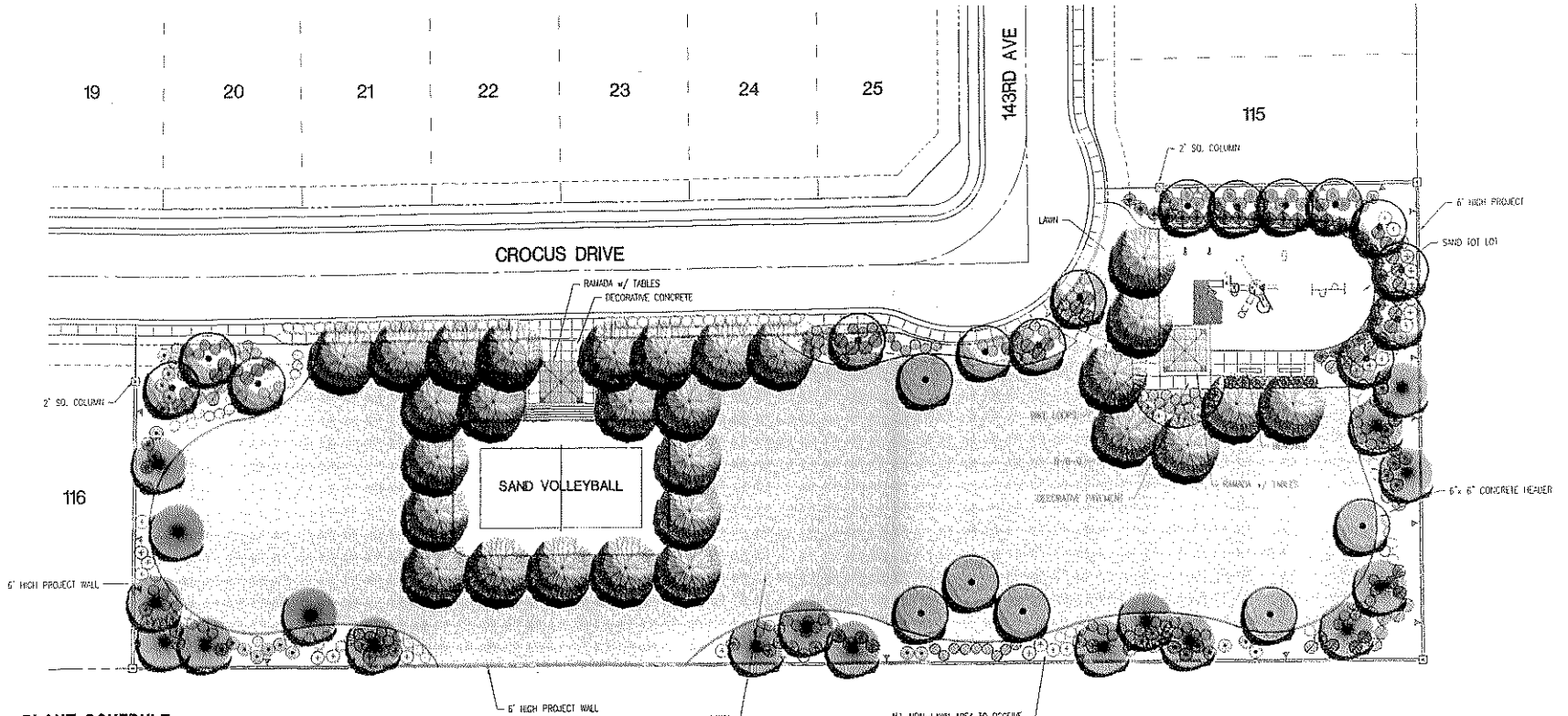
NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

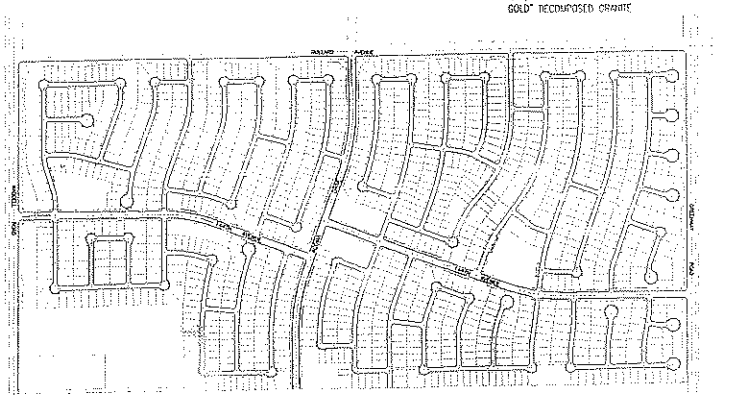
PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
1343 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224



PLANT SCHEDULE (FOR THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5" SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3" SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LAEVIGATUM CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "RIO" RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "PFITZERIANA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "B.K." BARBARA KAPSE BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
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Landscape Plan
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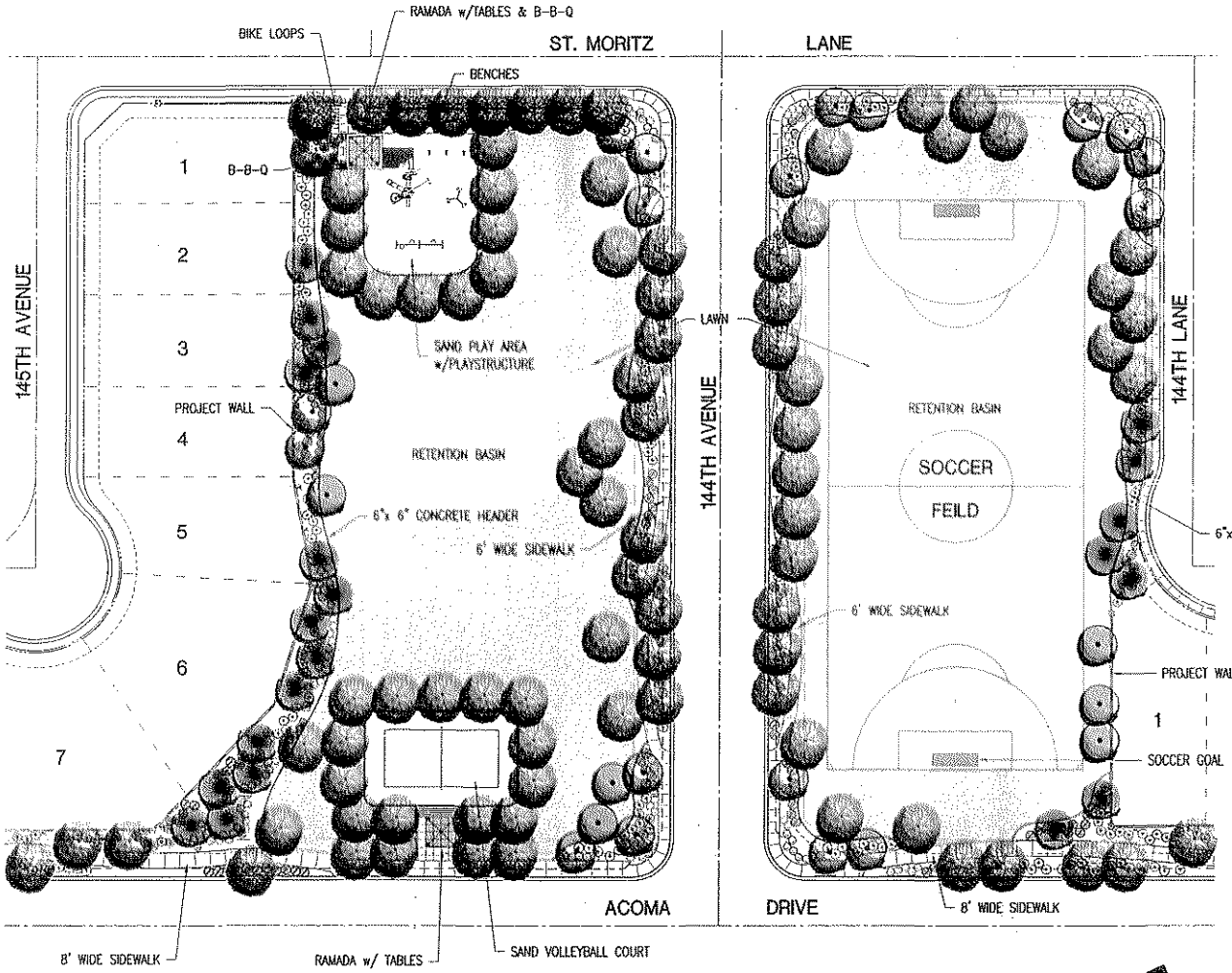
GRAPHIC SCALE
NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

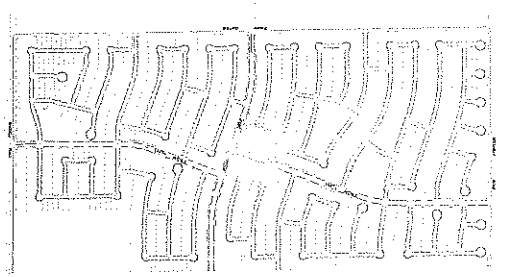
PREPARED FOR: JACKSON PROPERTIES
4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

PREPARED BY: RYAN & ASSOCIATES
LANDSCAPE ARCHITECTURE & PLANNING
1343 N. ALMA SCHOOL ROAD SUITE 125
CHANDLER, ARIZONA 85224



PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5" SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3" SP., 3/4" CAL.
S	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
B	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
C	LEUCOPHYLLUM LANGMANIAE CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
R	LEUCOPHYLLUM LANGMANIAE "RIO" RIO GRANDE SAGE	5 GALLON MINIMUM FULL PAST CAN
J	JUNIPERUS CHINENSIS "OTTOFRENTH" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
D	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
P	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
A	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
R	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
L	LANTANA CAMARA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

Landscape Plan
Scale 1:30

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GRAPHIC SCALE

NORTH

ROYAL RANCH

CITY OF SURPRISE, ARIZONA

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4145 EAST BASELINE ROAD
GILBERT, ARIZONA 85234

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LANDSCAPE ARCHITECTURE & PLANNING
1345 N. ALMA SCHOOL ROAD SUITE 125
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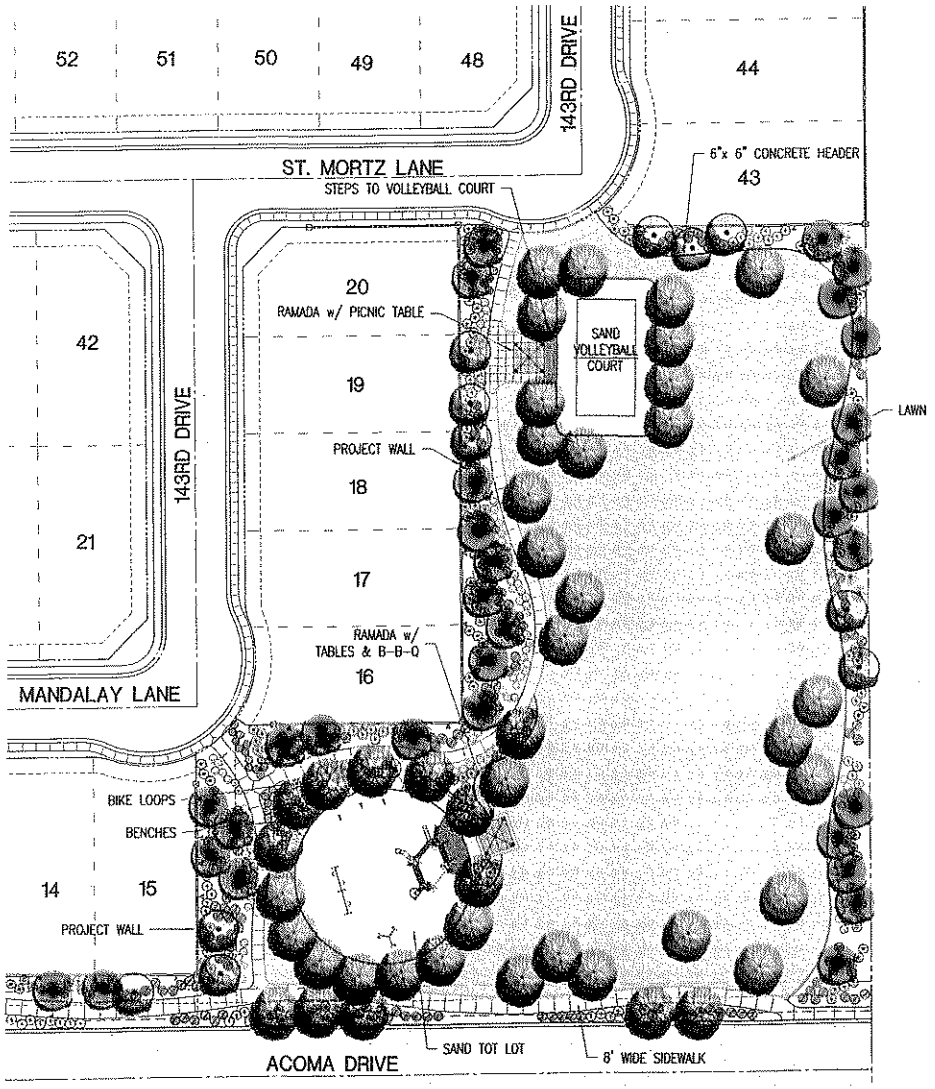

Landscape Plan
Scale 1:30
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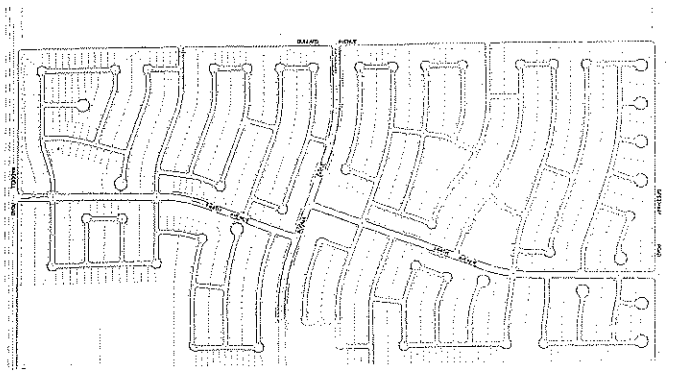
GRAPHIC SCALE

NORTH

PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 60" HT., 4.5" SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5" SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5" SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3" SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LAEVIGATUM CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.D." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "PFITZERANA" COMPACT PFEZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
A	BOUGAINVILLEA "B.K." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

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ROYAL RANCH

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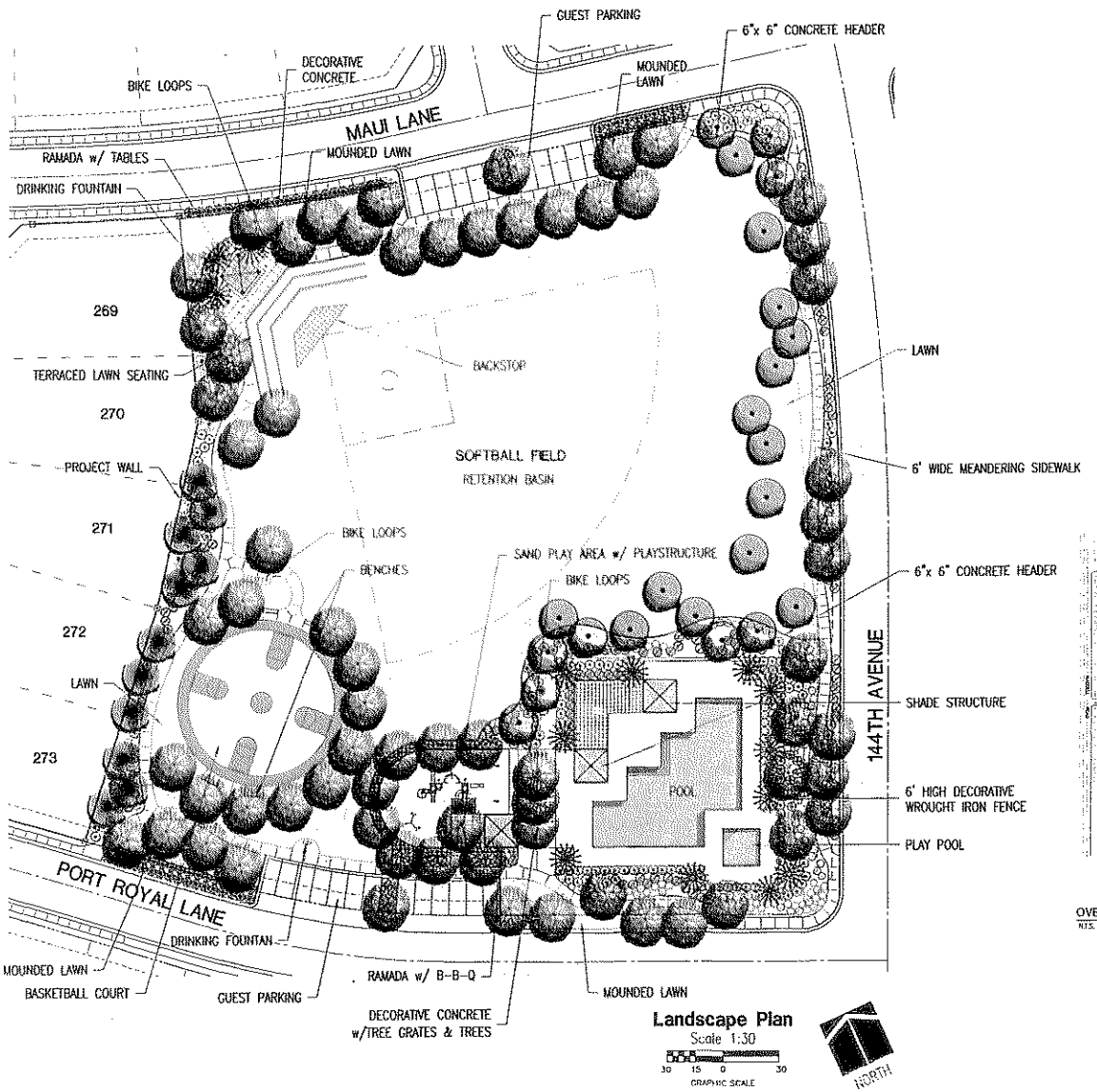

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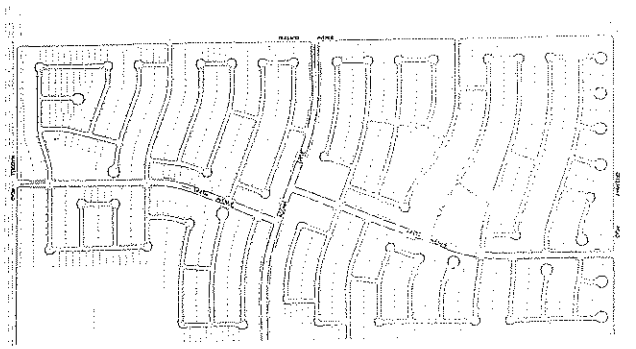
GRAPHIC SCALE

PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	PHOENIX DACTYLIFERA DATE PALM	20' TRUNK
	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5' SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3' SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE CHIHUAHUAN SAGE	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "R.B." RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS CHINENSIS "PFITZERIANA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "BLK." BARBARA KARST BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA SELLOWIANA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

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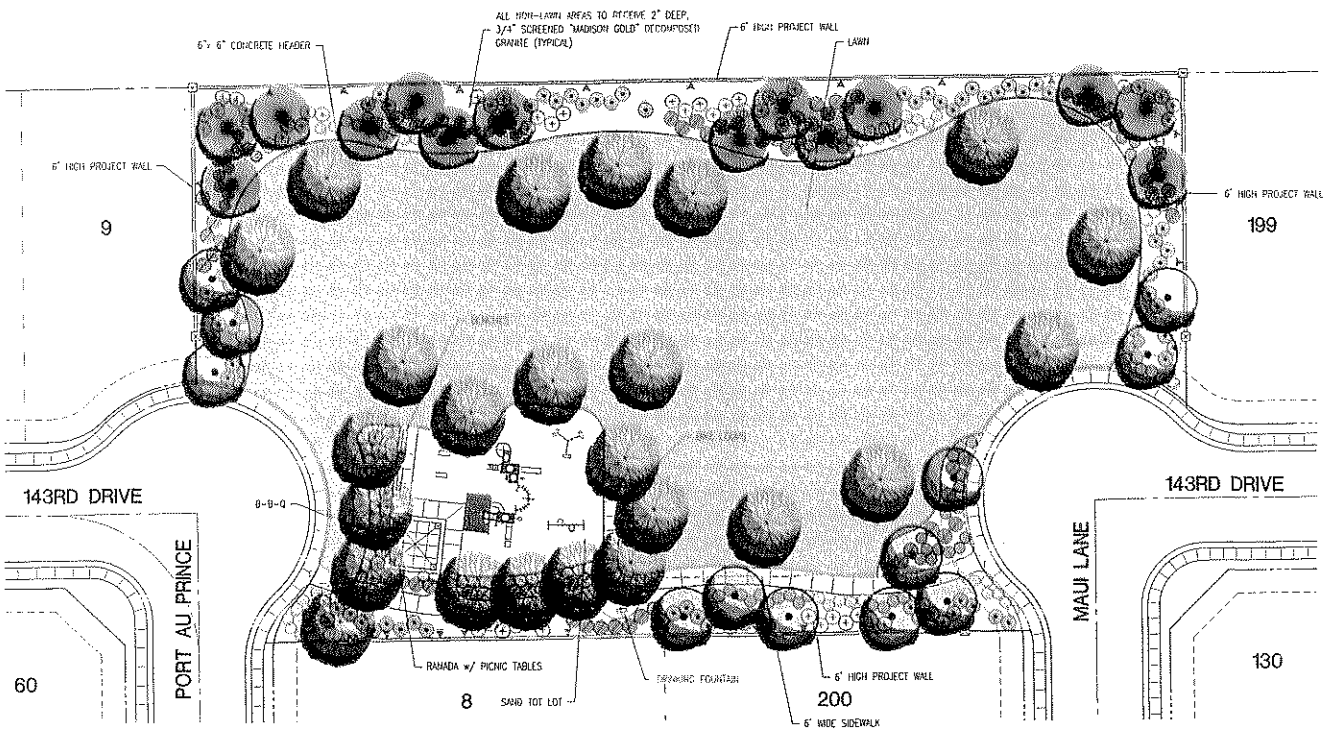
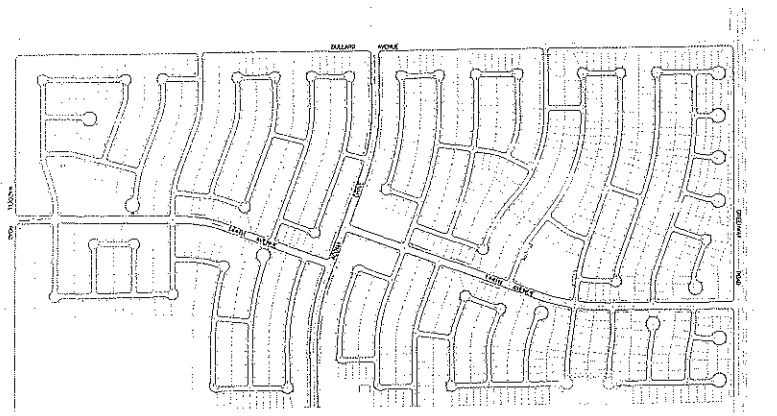


PLANT SCHEDULE: (FOR THIS SHEET ONLY)

	ULMUS PARVIFOLIA EVERGREEN ELM	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP., 1-1/2" CAL.
	PROSOPIS CHILENSIS "THORNLESS" THORNLESS CHILEAN MESQUITE	24" BOX MINIMUM, MATCHING 10' HT., 4.5' SP.
	PINUS ELDERICA MONDEL PINE	24" BOX MINIMUM 10' HT., 4.5' SP.
	ACACIA SALICINA WILLOW ACACIA	15 GALLON MINIMUM FULL, 6' HT., 3' SP., 3/4" CAL.
	NERIUM OLEANDER "DWARF PINK" DWARF PINK OLEANDER	5 GALLON MINIMUM FULL PAST CAN
	BOUGAINVILLEA "CRIMSON JEWEL" CRIMSON JEWEL BOUGAINVILLEA	5 GALLON MINIMUM FULL PAST CAN
	LEUCOPHYLLUM LANGMANIAE "RIO BRAVO" RIO BRAVO SAGE	5 GALLON MINIMUM FULL PAST CAN
	JUNIPERUS PROCUMBENS "TORTUOSA" COMPACT PFITZER JUNIPER	5 GALLON MINIMUM FULL PAST CAN
	RUELLIA PENINSULARIS BAJA RUELLIA	5 GALLON MINIMUM FULL PAST CAN
	CAESALPINIA PULCHERRIMA RED DESERT BIRD OF PARADISE	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS "B.H." BARBARA KARST ROSMARINUS	5 GALLON MINIMUM FULL PAST CAN
	ROSMARINUS OFF. "PROSTRATUS" DWARF ROSEMARY	1 GALLON MINIMUM FULL PAST CAN
	LANTANA CAMARA GOLD MOUND LANTANA	1 GALLON MINIMUM FULL PAST CAN



OVERALL SITE
N.T.S.

NORTH

Landscape Plan
Scale 1:20
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GRAPHIC SCALE

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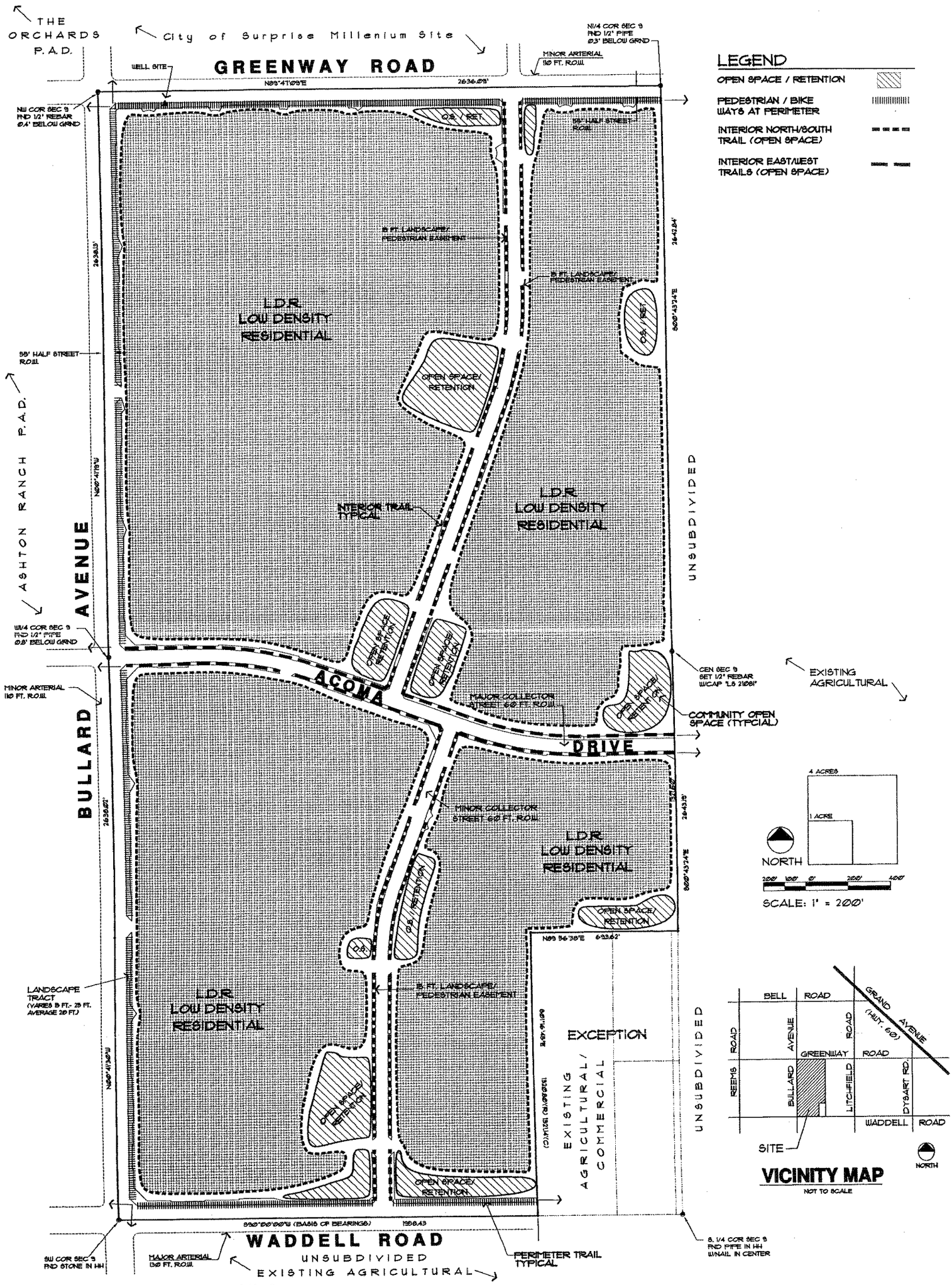
EXHIBIT D



OPEN SPACE AND TRAILS PLAN FOR

ROYAL RANCH

Planned Area Development

MAY 1998

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
SCOTTSDALE, AZ. 85260
PH. 602-998-1444
Contact: Joe Oddo

FLEET • FISHER ENGINEERING INC.
4250 EAST CAMELBACK RD., SUITE 410K PHOENIX, ARIZONA 85018 PH. (602) 264-3338

F.F.E. # 212-01
P:\2121\TRAIL-01 5-7-98 6:25:21 pm

EXHIBIT D

V – CIRCULATION

A. ROADWAYS

Offsite roadway improvements are to consist of the south ½ of Greenway Road adjacent to the site (as a minor arterial), the east ½ of Bullard Avenue adjacent to the site (as a minor arterial) and the north 1/2 of Waddell Road adjacent to the site (as a major arterial). These roadways will be developed as per the Conceptual Road Cross Sections – FIGURES 3,4 & 5.

Acoma Drive is to be extended from its current westerly alignment at Bullard Avenue (Ashton Ranch) as a major collector street. It will carry traffic internally as well as through to east and west neighborhoods. The North/South spine road is designed to provide access within the development to the major arterial to the north and south. Access points on Greenway and on Waddell roads are 660 feet west of the midsection line at Greenway and 1320 feet east of the section line at Waddell. For an overview of traffic within the area, see APPENDIX C – TRAFFIC IMPACT ANALYSIS.

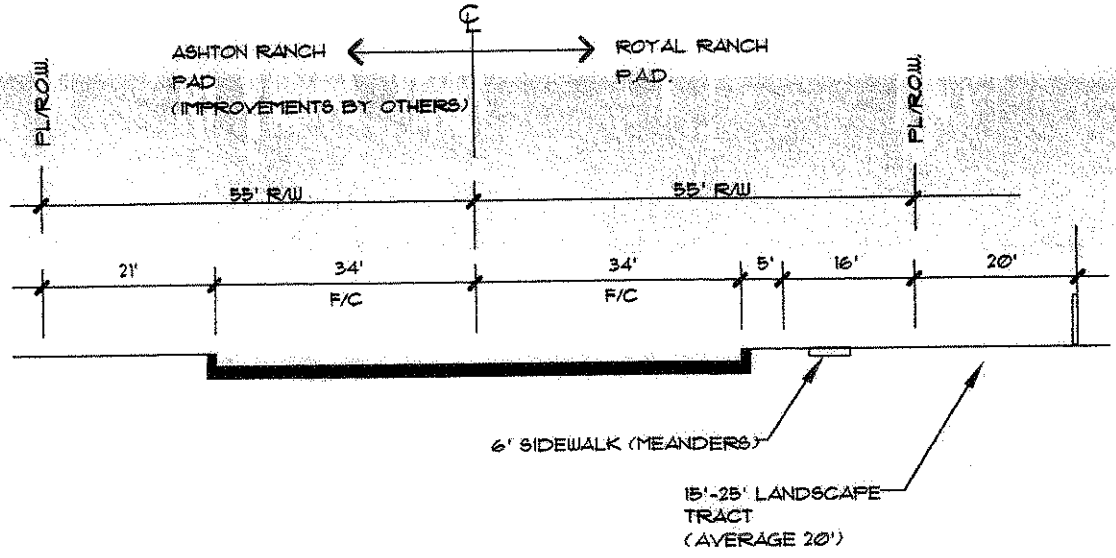
B. TRAFFIC SIGNALS

Traffic signals are to be constructed as per the attached Section IV - TRAFFIC IMPACT ANALYSIS as they are warranted.

FIGURE 3

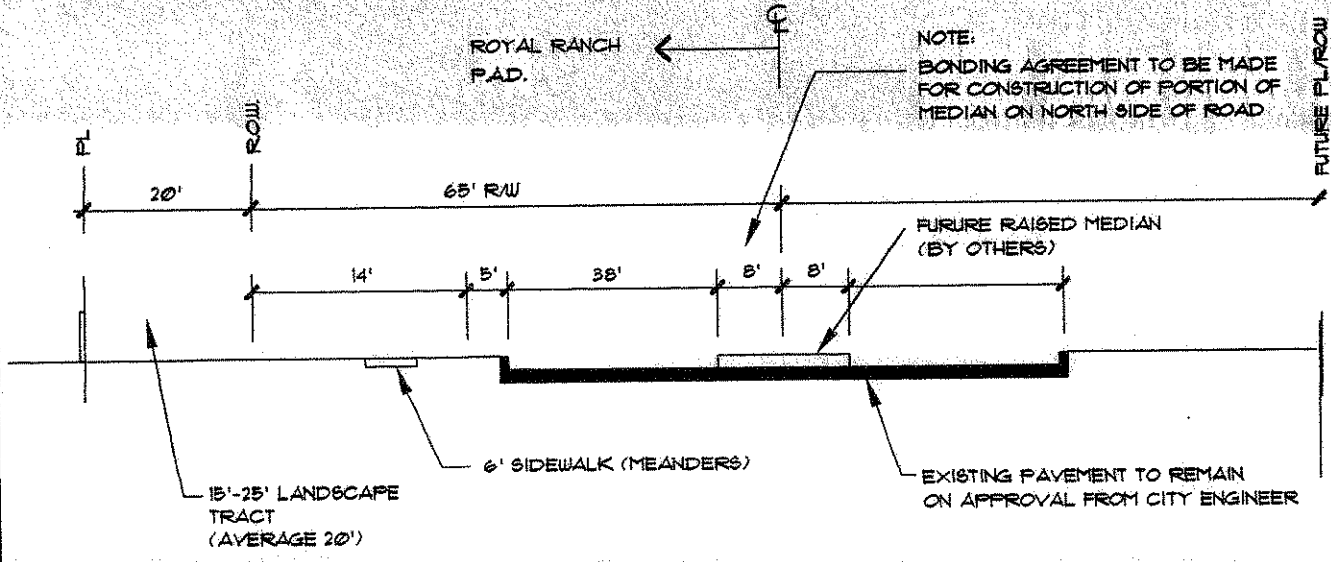
BULLARD AVENUE (LOOKING NORTH)

MINOR ARTERIAL



WADDELL ROAD (LOOKING EAST)

MAJOR ARTERIAL



N.T.S.

CONCEPTUAL
Road Cross-Sections

figure 3

FLEET • FISHER
ENGINEERING INC.
4250 EAST CAMELBACK RD., SUITE 410K
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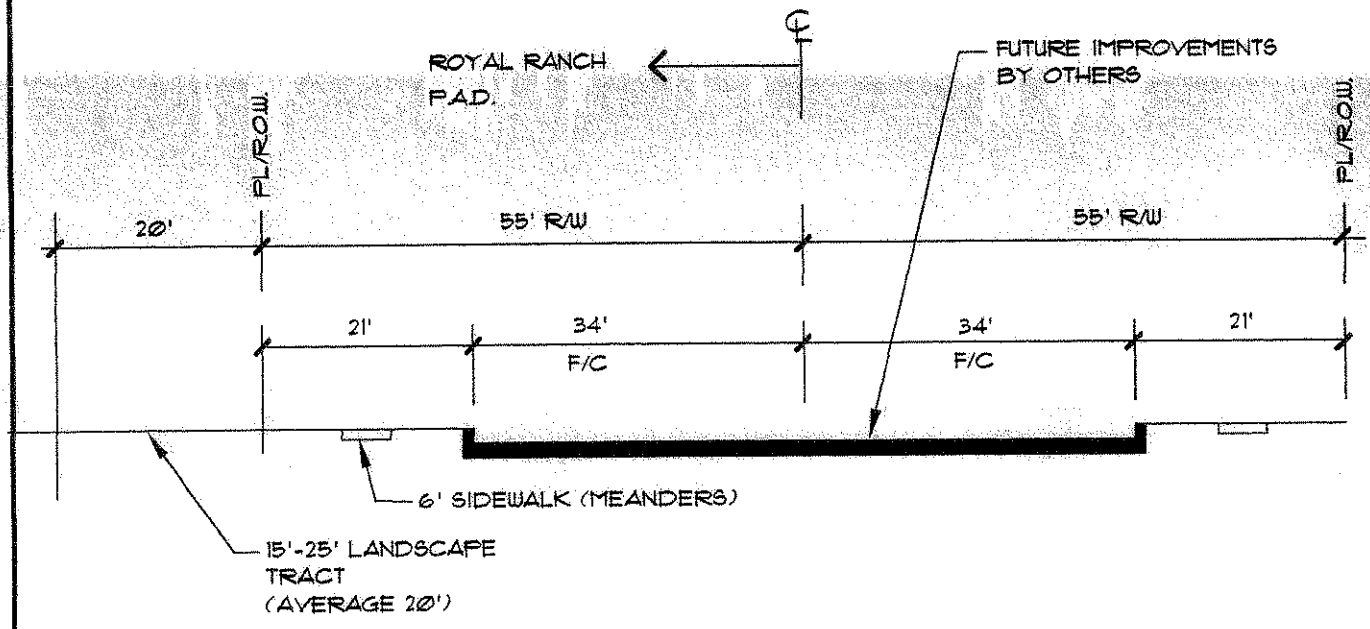
FIGURE 4

GREENWAY ROAD (LOOKING WEST)

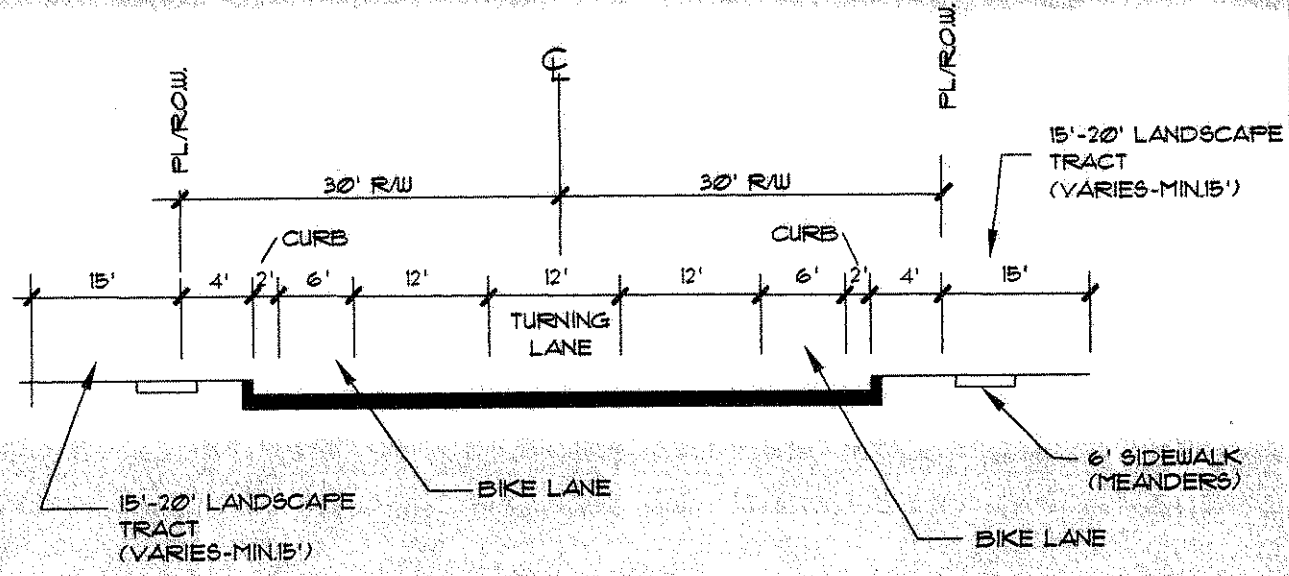
MINOR ARTERIAL



ACOMA DRIVE (LOOKING EAST)

MAJOR COLLECTOR

EAST/WEST THRU SITE



N.T.S.

CONCEPTUAL
Road Cross-Sections

figure 4

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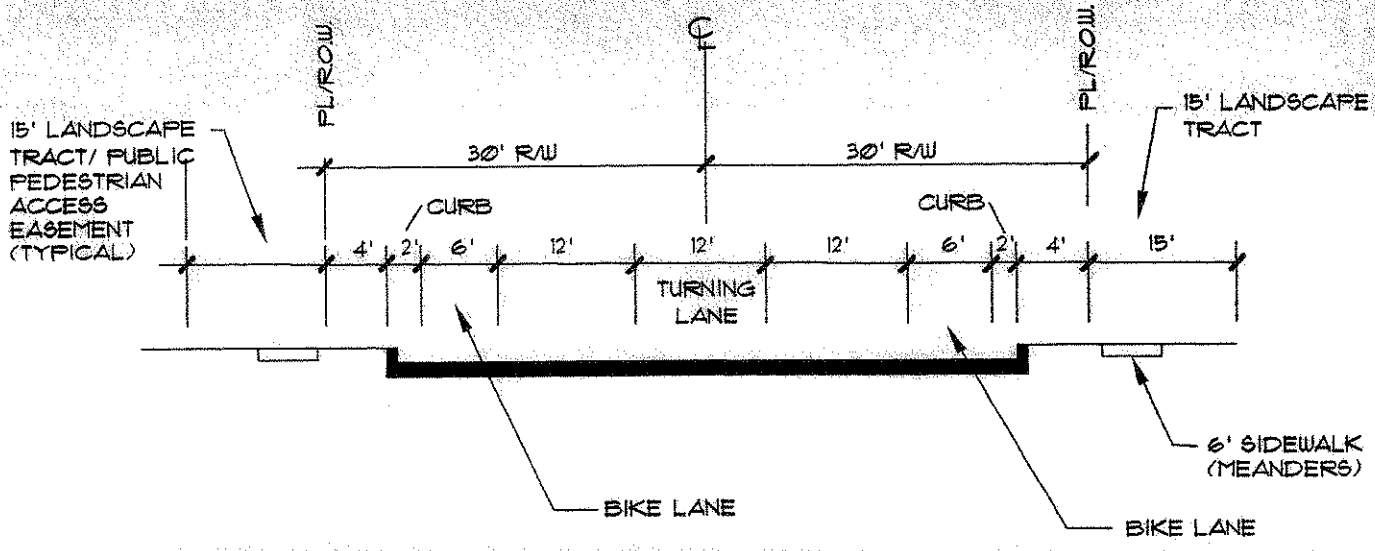
FIGURE 5

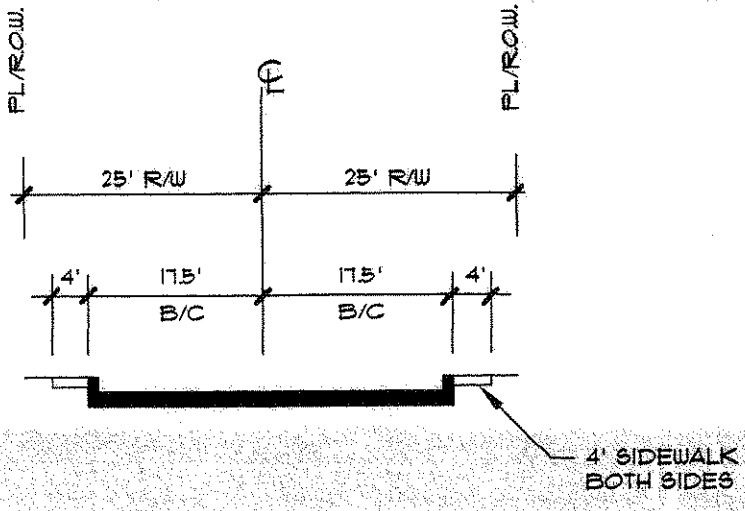
NORTH/SOUTH SPINE ROAD (LOOKING SOUTH)

MINOR COLLECTOR



LOCAL ROADWAYS

RESIDENTIAL STREETS



N.T.S.

CONCEPTUAL
Road Cross-Sections

figure 5

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VI - UTILITIES AND PHASING

A. WATER AND SEWER

1. Assured Water Supply

The City of Surprise will supply water to the Royal Ranch P.A.D. based upon a Development Agreement between the Developer and the City.

2. Water Supply and Storage

The water and sewer improvements to be made are included in the Development Agreement between the City of Surprise and the Developer. The developer has reviewed with the City Engineering Staff, the water supply, storage and distribution needs for this development. The developer will construct or fund a water supply, storage and distribution system for the development. The system will be sized and constructed to accommodate the phased development of the property. The water system will consist of developing an existing well, one storage tank, hydro-pneumatic tank, disinfection, pressure booster pumps and distribution piping. The system will be designed to meet local and State standards for potable water systems. The controls and design criteria for the water system will be consistent with existing water systems serving the City. The storage tanks will be located off-site, in city's "tank farm" west of the project at Reems and Greenway Roads.

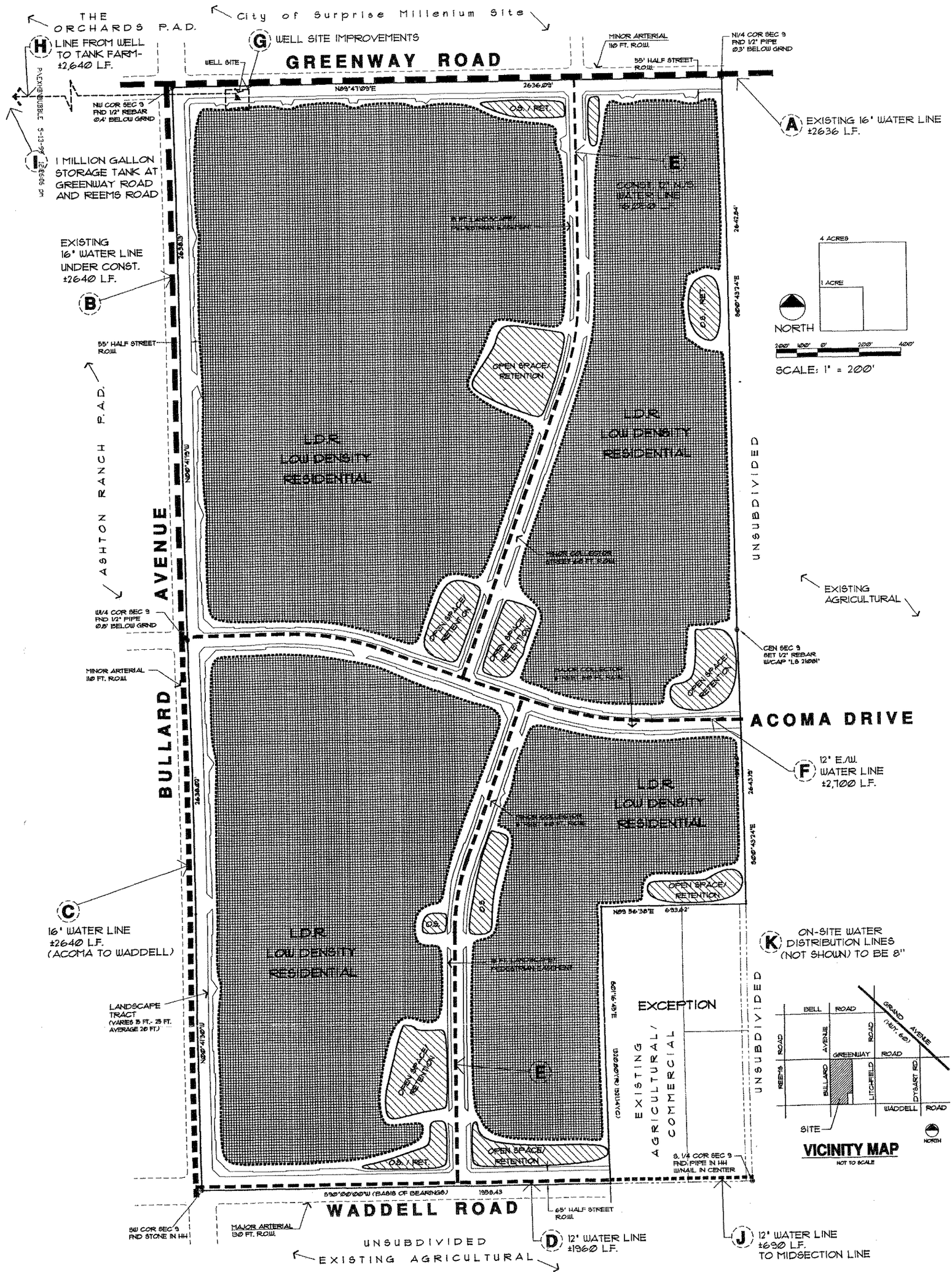
3. Proposed Water Distribution and fire Prevention Systems

The water distribution system consists of a looped pipeline, 16" along Bullard Road, and existing 16" line along Greenway Road, a 12" line along Waddell Road, a 12" line bisecting the parcel at Acoma Drive and a 12" line running north and south within the 60' main collection street.

The proposed development will be served internally by a water distribution system consisting of 8" minimum water lines. This system will be sized to provide enough capacity to serve the entire development for water consumption as well as fire protection. A conceptual layout of the proposed water distribution system can be found in EXHIBIT D; Conceptual Water System Plan. This layout is subject to change in the final design, at which time a detailed hydraulic analysis of system pressures and head losses will be performed.

The fire protection system will be constructed in strict accordance with the City's Fire District requirements. Fire hydrants will be installed along all streets for fire protection, and to be used as blowoffs at low points and dead ends along the water mains. Combination air vacuum relief valves will be installed at high points along the water mains to permit automatic entrance and escape of air in and out of the pipeline during draining and filling, as will as to permit accumulated air to escape while it is in service.

Exhibit E



CONCEPTUAL WATER SYSTEM PLAN FOR

ROYAL RANCH

Planned Area Development

MAY 1999

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
SCOTTSDALE, AZ. 85260
PH. 602-998-1444
Contact: Joe Oddo

FLEET • FISHER ENGINEERING INC.
4250 EAST CAMELBACK RD., SUITE 410K PHOENIX, ARIZONA 85018 PH. (602) 264-3338
P.F.E. # 212-01
P:\EXHIBITS\WATER-01 5-19-99 8:40:40 am

EXHIBIT E

Proposed Sewage Collection System

According to construction as-builts, the nearest sewage collection system for this project is located in Cactus Road. The tie-in point is a manhole at the intersection of Cactus Road and Litchfield Road. The invert at this manhole is 18 feet deep. An offsite 12" sewer collection pipeline will be constructed from the project site east to the intersection of Waddell Road and Litchfield Road. The line will then turn south down Litchfield Road to the intersection of Cactus Road. This line will be upsized to a 27" line in Litchfield Road to accomplish future demands from development to the north. Reimbursement for the upsizing of this line will be addressed in a subsequent development agreement. Proposed off-site sewer locations are shown in Exhibit D; Conceptual Off-site Sewer Plan. Phases I through IV sewer peak flow volumes are estimated to be 0.258 MGD, 0.256 MGD, 0.272 MGD, and 0.235 MGD, respectively. Pipeline design will be based on requirements of the Arizona Department of Environmental Quality (ADEQ) requirements.

Design of sewer mains are based on the following criteria:

Q = 250 GPD / SFD
Q = 150 GPD / APT
Q = 0 GPD / COMM (off-peak use)

Q apartments = 27AC (15 APT / AC) (150 GPD) = 60,750 GPD

Q peak = (60,750 GPD) (4.65×10^{-6})* = 0.28 CFS

Q residential = 1,150 units x 250 GPD = 287,500 GPD

Q peak = (287,500 GPD) (4.65×10^{-6})* = 1.34 CFS

Q peak = 1.62 CFS

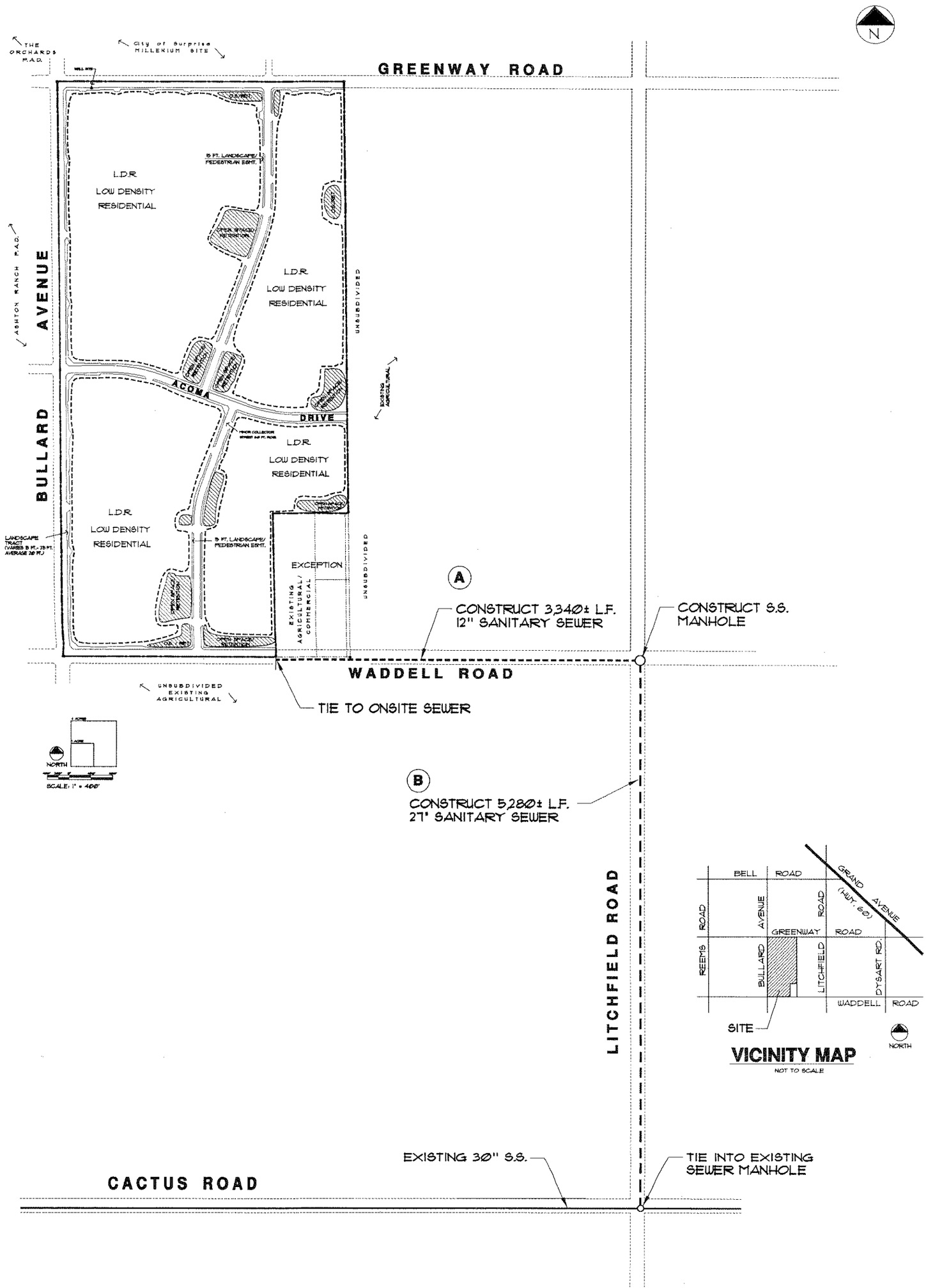
Design Collection System for various scopes Soft Desk Mannings computer runs.

12"Ø	Q = 1.62 CFS	S = 0.0021 FT/FT	U = 2.06
15"Ø	Q = 1.62 CFS	S = 0.0006 FT/F	U = 1.32
10"Ø	Q = 1.62 CFS	S = 0.0055 F/F	U = 2.97

* 1GPD = 1.55×10^{-6} CFS 3X PEAKING FACTOR = 4.65×10^{-6} CFS

(Exhibit F and G to follow)

EXHIBIT F



CONCEPTUAL OFFSITE
SEWER PLAN FOR

ROYAL RANCH

Planned Area Development

MAY 1999

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
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Contact: Joe Oddo

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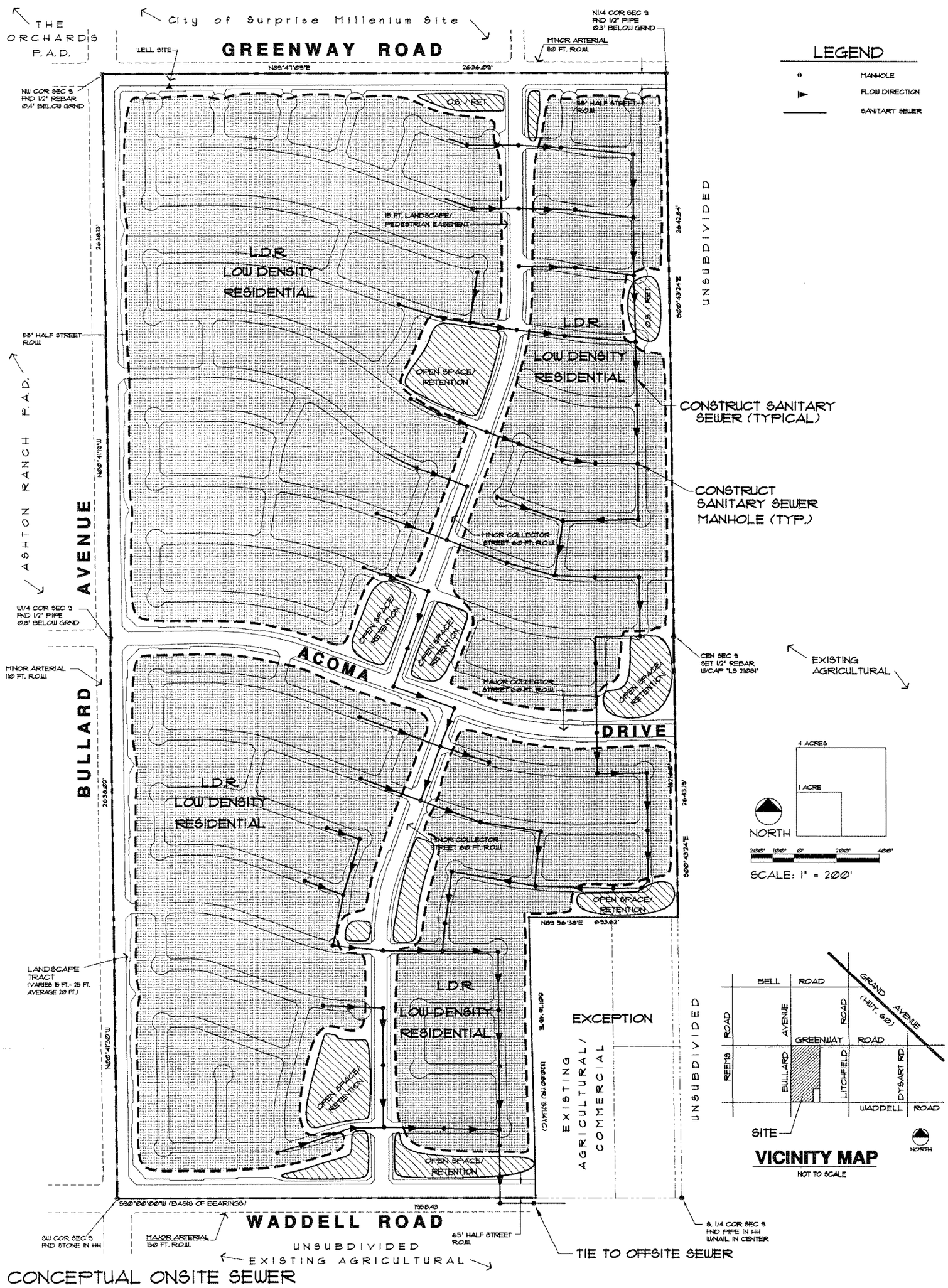
EXHIBIT F



CONCEPTUAL ONSITE SEWER COLLECTION PLAN FOR

ROYAL RANCH

Planned Area Development

MAY 1999

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
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Contact: Joe Oddo

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F.F.E. # 212-01
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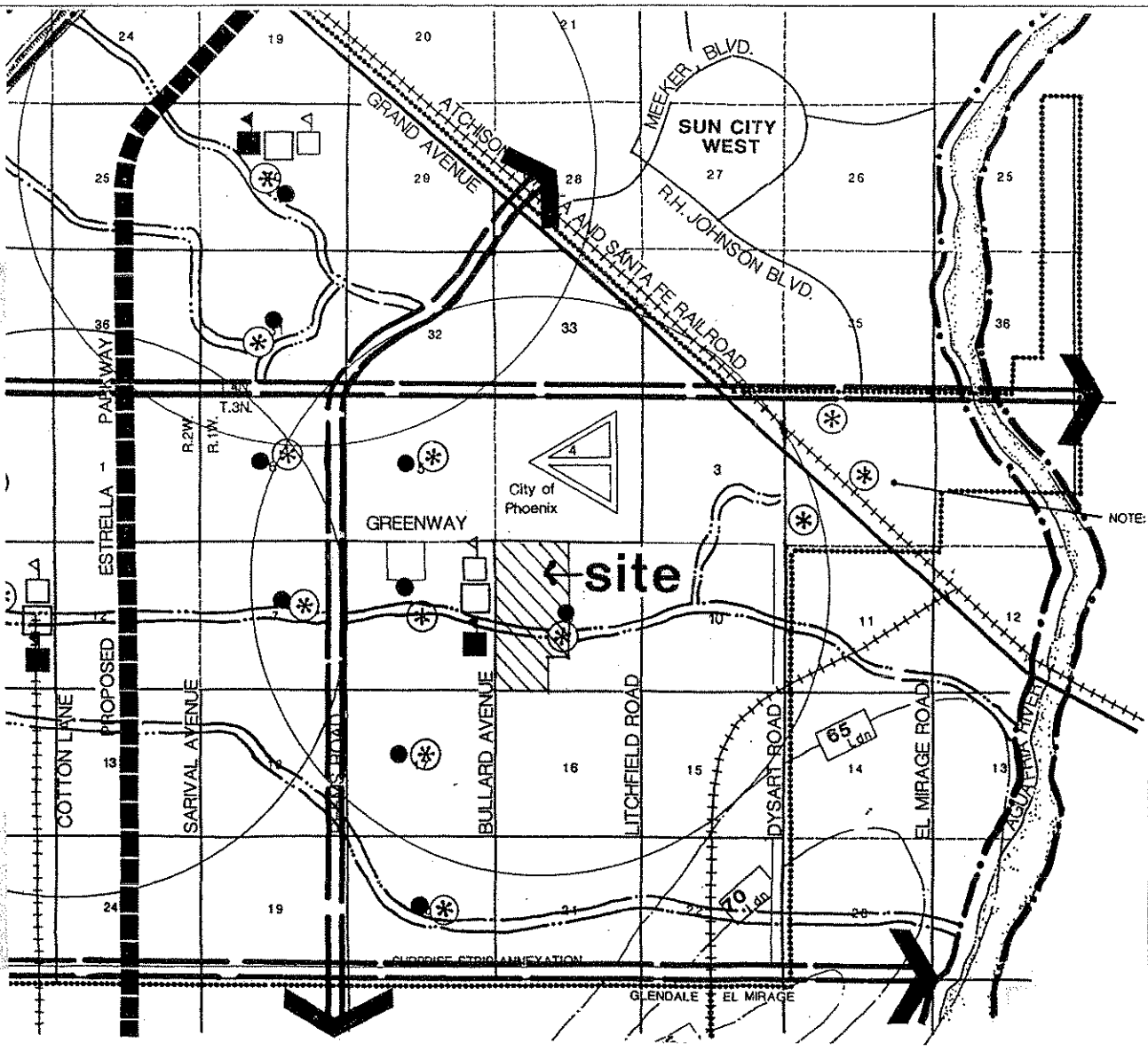
EXHIBIT G

FIGURE 6



Park and Recreational Facilities

- Regional Linear Parks (Agua Fria River, Beardsley Canal)
- Community Parks (40+ Acres)
- Neighborhood Parks (5-10 Acres)
  (Facilities to be Centrally Located within the Open Space of the Typical Neighborhood Alternatives)

Pedestrian/Bicycle Circulation Facilities

- Regional Parkways
  (Bicycle and Pedestrian Pathways Developed Jointly with Major Transportation Corridors)
- Local Neighborhood Trail System
  (Developed Jointly with Neighborhood Parks, School Sites and Adjacent Neighborhood Development Utilizing Natural Drainage Channels When Possible)

Educational Facilities

- Senior High School (Conceptual Location Only)
- Junior High School (Conceptual Location Only)
- Elementary Schools
  (Facilities to be Centrally Located within the Open Space of the Typical Neighborhood Alternatives)
- School Service Area

NOT TO SCALE NORTH

source: City of Surprise Comprehensive Plan

Open Space/Trails

figure 6

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B. PHASING

The Project will be developed in two phases.

The first phase will be the south ½ of the project, including the south half of Acoma Drive. The second phase will include the north half of Acoma Drive and the remainder of the project.

Phasing will be coordinated so that there is an orderly transition between consecutive phases. External and local roadways will be constructed in phases, as will grading, drainage and utilities (see Exhibit H – Conceptual Phasing Plan). The open space/recreation facilities will be constructed along with the roadways and other infrastructure in the two phases.

The project's Phasing Plan allows for the continuation of existing citrus farming operations in undeveloped portions of the property as earlier phases are constructed. Since the irrigation for the citrus orchards comes from the well on the north end of the project site, as the phases develop, the existing irrigation system will be able to be kept intact for undeveloped phases. Details of this operation will be determined at the Preliminary Plat stage.

Roadways (both on and off-site) will be constructed as needed during each phase to assure site access to the developer and homeowners. Access for emergency vehicles and overall traffic safety will continue throughout the local roadway network and surrounding major roadways. Local and collector streets within the residential community will be constructed to full width. Off-site roadways will be constructed to half width. Future widening will be completed by others to achieve the full width section.

Grading will be done to ensure adequate drainage of the site and environment protection measures provided to prevent erosion and sediment transport. Drainage associated with on-site run-off will be conveyed by means of surface streets and drainage swales to retention areas. In some cases temporary measures such as temporary drainage easements will be used until permanent facilities can be installed. Each phase will have a retention area specifically designed to attenuate the post development run-off. Drywells will be sized to draw down the retained run-off within the time period specified by the Maricopa County Flood Control District's design manual. The methodology used for sizing retention basins and drywells is given in Section III, Part C (Drainage).

Utilities will be installed as each phase is developed. Temporary caps, stubouts and plugs will be used where future connections are to be made for the next phase of development. This will assist in locating the utility without creating unnecessary disturbance. Major utilities within the Public right-of-ways of the surrounding roadways (Greenway, Bullard, Waddell and Acoma) will be installed as each phase is developed.

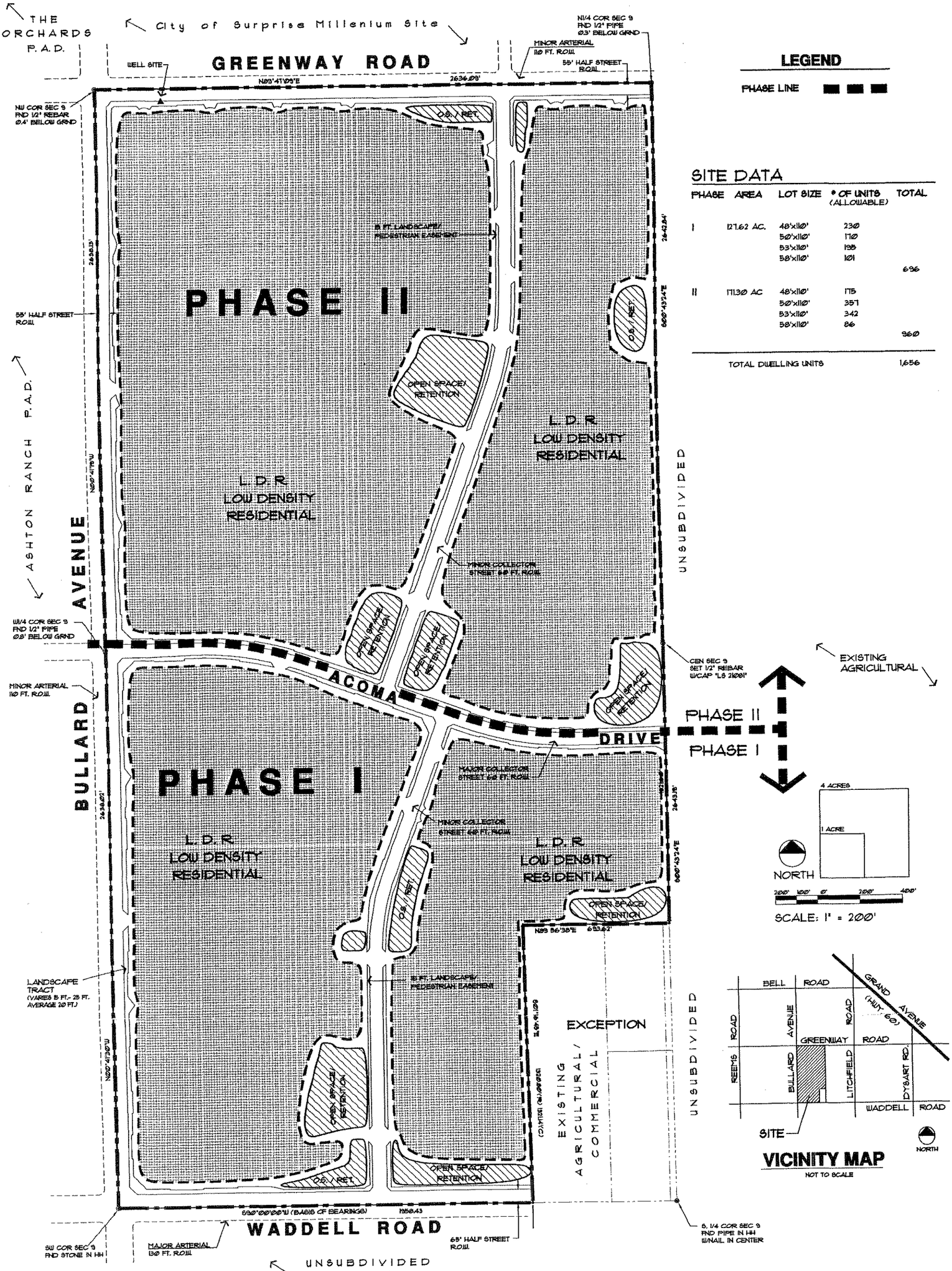
Phasing of the P.A.D. will proceed as follows:

PHASE I

1. Construct Off-site sanitary sewer
2. Construct Waddell Road ½ street improvements
3. Construct Bullard Avenue ½ street improvements to the intersection of Acoma Drive (include intersection)
4. Construct North/South collector street to Acoma Road
5. Construct the south half of Acoma Drive
6. Construct perimeter theme wall adjacent to Phase I
7. Construct landscape improvements along Bullard, Waddell and the south side of Acoma, adjacent to the side and both sides of the North/South collector
8. Construct water lines to Phase I
9. Mass grade Phase I
10. Construct local streets and utilities

PHASE II

1. Extend water and sewer lines to Phase II site
2. Construct Bullard Ave. ½ street improvements from Acoma to Greenway
3. Construct Greenway Rd. ½ street improvements along north edge of site
4. Construct the north half of Acoma Drive
5. Construct North/South collector from Acoma to Greenway
6. Construct perimeter theme wall adjacent to Phase II
7. Construct Landscape improvements along the North side of Acoma, along Bullard, Greenway and both sides of the North/South collector
8. Mass grade Phase II
9. Construct all open space/recreation facilities north of Acoma
10. Construct local streets and utilities



LEGEND

PHASE LINE

SITE DATA

PHASE	AREA	LOT SIZE	# OF UNITS (ALLOWABLE)	TOTAL
I	127.62 AC.	48'x110'	230	
		50'x110'	170	
		53'x110'	195	
		58'x110'	101	
				696
II	171.30 AC	48'x110'	175	
		50'x110'	357	
		53'x110'	342	
		58'x110'	86	
				960
TOTAL DWELLING UNITS				1,656

PHASING PLAN FOR ROYAL RANCH

Planned Area Development

MAY 1999

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
SCOTTSDALE, AZ. 85260
PH. 602-998-1444
Contact: Joe Oddo

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F.F.E. # 212-01
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EXHIBIT H

SECTION VII – ARCHITECTURAL & LANDSCAPE DESIGN GUIDELINES

A. SITE DEVELOPMENT

1. GRADING & DRAINAGE

Any aesthetic landscape berming of individual lots shall not direct drainage onto adjacent lots. Grade transitions shall be even and smooth. Residential runoff shall be directed to open space retention areas, which will serve as the major drainage and retention area for the community. Drainage swales shall be designed to minimize runoff velocities in order to protect sites from erosion. Grading shall be done to minimize erosion, on, or off-site. No slopes shall be steeper than 4:1, pursuant to the standards of the City of Surprise unless approved by a soils engineer. All excavation and fill areas shall be sufficiently compacted to prevent erosion problems. All finished slopes shall be stabilized and planted.

2. PARKING REQUIREMENTS

Driveways for all single-family residential units shall provide sufficient space for a minimum of two off-street parking spaces in addition to garage spaces. Residential parking may be prohibited on arterial and collector streets on either side or both sides. Parking of boats, campers, trailers, etc., is not permitted within public view.

3. UTILITY STRUCTURE PLACEMENT

All exterior on-site utilities (including, but not limited to) sewer, gas, and water lines and electrical, telephone, cable television and communications wires and equipment, shall be installed and maintained underground. Roof mounted equipment for residential units shall be screened. Exterior transformers, utility pads, cable television, and telephone boxes are encouraged to be located out of view of the public right-of-way and screened with vegetation.

B. ARCHITECTURE

1. GENERAL STYLE

All residential structures in a neighborhood shall be of materials, colors and styles that blend with or complement each other. Architectural styles may vary from neighborhood to neighborhood but shall also be cohesive throughout the project. Non-residential structures within a neighborhood shall also be of materials, colors and styles that blend with or complement each other, as determined by the governing homeowner's association.

Homebuilders shall try to de-emphasize garage fronts as the most prominent architectural feature of the dwelling-front by incorporating, front window popouts, covered entries or front porches, L-shaped floor plans, etc. into their product mix.

2. BUILDING ORIENTATION

Buildings shall be oriented as much as possible to take advantage of solar access. Minimize east and west exposures to maximize energy efficiency.

Home builders shall emphasize distinctive architectural details in the front elevations (e.g., covered front entries and/or porches, door and window details, roof overhangs, parapet walls with cap features, etc.)Residential units are encouraged to mix left and right elevations and use variable setbacks. Lotting is oriented toward the street with the emphases on creating activity areas for neighbors to meet and to interact. No lot is to front onto a collector street.

3. BUILDING MATERIALS

Finished building materials must be applied to all exterior sides of buildings and structures. Each material will be used in an appropriate manner with colors and textures compatible with the natural surroundings. Permitted exterior finished materials include plaster and masonry, adobe, slump, split or textured decorative block, brick, wood siding and integral colored aluminum siding. In each subdivision, at least three home colors should be offered as well as three home models each with different elevations, two styles of roof tiles, and three different roof tile colors.

4. ROOFS

Generally acceptable roof covering materials shall be concrete tile, or clay tile. Built-up–type roof covering materials shall be appropriately screened from view with roof parapets except on patio coverswhere built-up roofing is to be used. Roof parapets must be finished with compatible material and color to the building's skin and shall continue around all sides. Roof features, such as overhead screens, shade covers, patio roofs and other similar structures are

encouraged and should flow out of the building form. These features shall be constructed of materials and color to match or complement the main roof. All vent pipe stacks, gutters, flues, and any other equipment protruding above the plane of the roof and visible from neighborhood properties are discouraged and, to the extent they are necessary, must be painted to match the roof. Roof-mounted equipment shall be screened from adjacent properties. Roof colors, such as white or light colored aluminum, shall not produce glare.

5. ACCESSORY BUILDINGS

Accessory buildings are allowed pursuant to the requirements and restrictions of the P.A.D. Such shall be painted a color to match or complement the main structure.

6. WALLS AND FENCES

Acceptable fence materials shall include, but not be limited to, masonry, rails or pickets, stone, brick, or metal. Texture, color and form of walls adjacent to buildings shall harmonize with the building's design. Long, continuous lengths of screen wall at the same height are discouraged. Variations of height and form are encouraged. Perimeter walls should respect the right-of-way line but do not need to follow the alignment exactly. Walls and fences, under normal conditions, shall be a maximum of six feet, as measured from as adjacent grade along rear and side of lot lines and shall conform to City zoning ordinances and visibility triangles. When walls are located adjacent to a road for decorative or screening purposes, they shall be a maximum of three feet in height, conforming to City ordinances and visibility triangles. Chain link fencing is not permitted for perimeter fencing. (See the Zoning Ordinance for further restrictions.) Open fencing, such as decorative block and wrought iron, may be provided adjacent to open spaces.

7. HARDSCAPE

Hardscape elements should be used in coordination with the architecture and landscape to provide a link between the street edge and individual developments. Hardscaping can improve pedestrian safety, movement and visual enjoyment of public areas. Utility lines should not be installed under such special materials if at all possible. Acceptable paving materials include, but are not limited to: integrated color cement, brick, native stone, precast interlocking pavers, cobbles, bomanite or any combinations of the above. Painted paving surfaces other than those for traffic control and marking of parking areas within parking areas are prohibited.

8. EXTERIOR ACCESSORIES AND ELEMENTS

a. MACHINERY AND EQUIPMENT

No machinery, fixtures or equipment of any type, including, but not limited to heating, cooling, air conditioning and refrigeration equipment and clotheslines may be placed on any lot or parcel without screening or concealment from view of neighboring or public property. The screening or concealment shall be sold and integrated architecturally with the design of the building or structure, shall not have the appearance of a separate piece or pieces of machinery, fixtures or equipment, and shall be constructed and positioned in such a manner so it is level and plumb with horizontal and vertical building components and shall be structurally stable in accordance with sound engineering principles. Ground mounted air conditioning units shall be concealed by a solid enclosure on all sides visible to neighboring property. All pool equipment shall be screened from off-site public view.

b. SOLAR PANELS AND EQUIPMENT

Solar energy devices may not be visible from public view. Roof mounted solar panels and equipment must match the roof material. Panels must be an integrated part of the roof design and mounted directly to the roof plane. Solar units must not beak the roof ridge line and must not be visible from view. Roof mounted hot water storage systems must not be visible from neighboring properties.

c. ANTENNAS AND AMPLIFIERS

Exterior television, radio or other antenna or dishes of any kind shall not be visible from the street. Concealment of antennas in non-residential areas will be required, where practical. No radio, stereo, television, broadcast or loudspeaker unit, and no amplifier of any kind, may be placed upon or outside, or be directed to the outside, of any building in residential areas in a manner which would be disruptive to any such area.

d. BASKETBALL BACKBOARDS

When a basketball backboard is installed structurally on a building or structure, the backboard must be painted to match the color of the trim or roof.

e. FLAGPOLES

Flagpoles shall be limited to a height of 20-feet in residential areas.

f. CLOTHES DRYING FACILITIES

All clothes drying facilities must be located and maintained exclusively within a fenced yard or otherwise concealed from the view of neighboring or public property.

g. ADDITIONS OR ALTERATIONS

Any addition or alteration to any building structure, lot or parcel, must, unless the additions and alterations are not visible from neighboring properties or public properties, not violate or conflict with these Guidelines.

h. GARBAGE

No garbage or trash may be placed on any lot or parcel except in covered containers meeting the specifications of the City of Surprise. Rubbish, debris and garbage shall not be allowed to accumulate. Each owner shall be responsible for removal of rubbish, debris and garbage not only from his lot or parcel, but also from all public right-of-way either fronting or siding his lot or parcel, excluding (a) public roadway improvements and (b) those areas on a Tract Declaration or subdivision plot to be maintained by the City of Surprise.

i. WINDOW TREATMENTS

No aluminum material or other reflective material may be installed in windows. Exterior window coverings or treatments used to shelf or decorate openings must be compatible, with respect to materials and color, with the design guidelines applicable to the structure on which the coverings or treatments are being placed.

C. LANDSCAPE

1. PLANT MATERIALS

All plant material shall be drought resistant and selected for compatibility with adjacent landscape material within their particular community setting or neighborhood. Plant material listed on the Recommended Plant Palette (found at the end of this section) reflects the principles of xeriscape. Landscape placed on public rights-of-way must conform to the low water plant list as mandated by the Arizona Department of Water Resources (Phoenix Active Management Area). Each subdivision shall develop similar plant lists to maintain cohesiveness throughout the PAD.

The minimum plant sizes are as follows:

Trees	15 gallon	24" box at project entries
Shrubs	1 gallon	5 gallon at project entries
Groundcovers	1 gallon	

Drip irrigation systems are required, except for turf areas. All plant material shall be provided with fully automated systems. Plants should be selected to fit naturally into their space to avoid the need for excessive trimming and to allow normal growth.

The following landscape standards shall apply to the streetscaped pedestrian trails:

2. STREETSCAPE

Consistent use of plant material, building material for screen walls and sidewalks, street lighting, signage and other street furniture as required. Streetscape landscaping shall accentuate major entrances and define visual corridors.

3. OPEN SPACE AND PEDESTRIAN TRAILS

Neighborhood interaction throughout will be the primary goal for the design of the open space areas and pedestrian circulation systems. The open space and pedestrian trails will extend throughout the project connecting parks with neighborhoods. Pedestrian trails provide users the ability to circulate between neighborhoods, parks and local schools. The pedestrian trail shall be a meandering six-foot wide concrete surface to allow both pedestrian and bicycle traffic. Shaded areas with canopy trees and benches will provide additional interest and will be situated for ease of access adjacent to public streets at approximately ¼ mile spacing. Light standards will be placed along portions of the pedestrian trail where nighttime security can be enhanced with additional lighting.

4. PERIMETER ARTERIAL STREETS

Subject to approval by the City, the landscaping along Bullard Avenue, Waddell Road and Greenway Road shall be xeriscape. Such streets shall have native canopy trees in a regular alignment with desert planting below. Plant material to be selected from the Department of Water Resources official low water plant list for material placed within the public right-of-way. Planted material adjacent to these frontages will be selected for their compatibility and flowering schedule. Boulders and berms may also be used to create interest in the ground plane (See EXHIBIT G – Conceptual Landscape Plan).

5. COLLECTOR STREETS

The landscaping along the collector street and trail system shall be accented with native canopy trees with desert planting below.

6. NEIGHBORHOOD STREET

The landscaping along neighborhood streets should reflect the landscaping of the arterial and collector roadways to provide cohesiveness throughout the project.

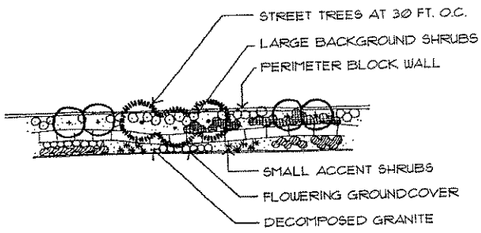
7. MAJOR ENTRIES

Trees and other plant materials will be planted at the three major project entries to complement two entry monument signage. A landscaped median will be constructed at these locations as well. (See EXHIBIT G) Conceptual Landscape Plan.

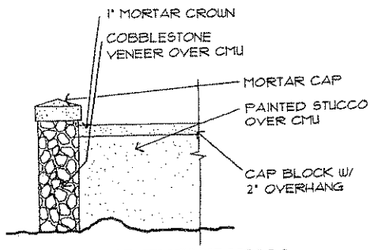
8. RESIDENTIAL SITE DEVELOPMENT

Two (2) 15 gallon trees will be required in the front yard of each single family residential unit. A minimum of 10 shrubs and/or groundcovers will be required in all front yards and will be utilized to soften and screen. Groundcover may be turf, or other planted groundcover. An approved organic or inorganic material (e.g., decomposed granite) to provide a neat, dust-free appearance must cover all bare earth.

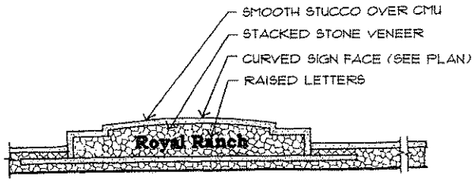
All completed and sold dwelling units must have the front yards landscaped and street trees planted within 90 days of Certificate of Occupancy. All unsold speculative units must have the front yard landscaped and street trees planted at the time of construction completion. Prior to landscaping, all yards must be maintained in a neat, weed-free, dust-free condition.



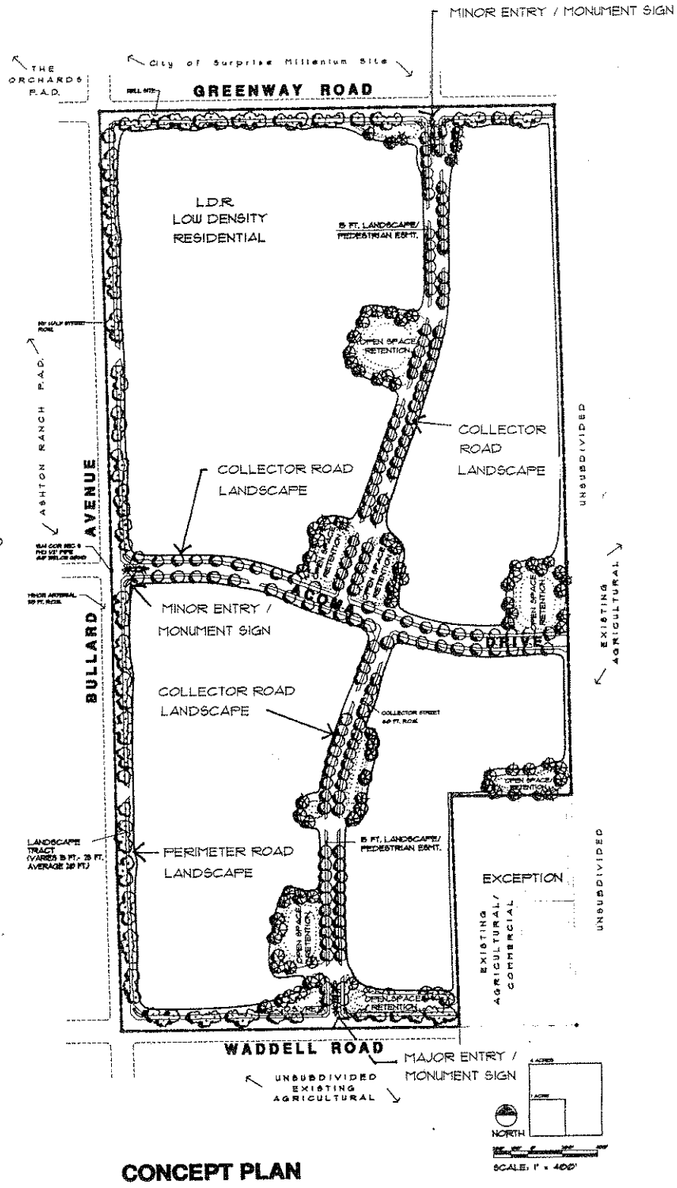
COLLECTOR ROAD LANDSCAPE
SCALE 1" = 40'



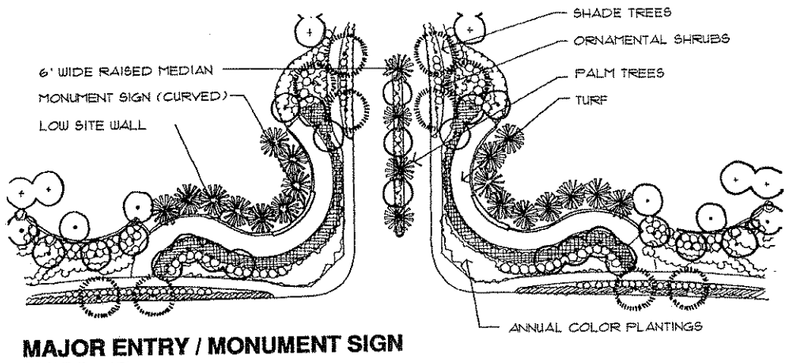
PERIMETER THEME WALL
NO SCALE



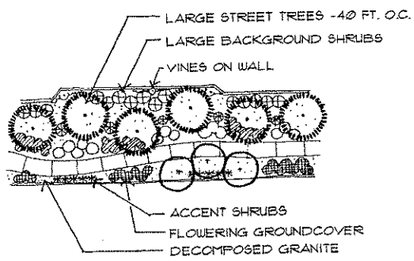
MAJOR ENTRY / MONUMENT SIGN
NO SCALE



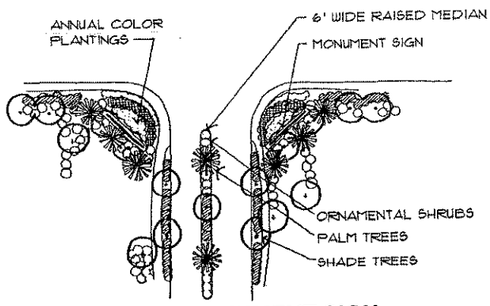
CONCEPT PLAN



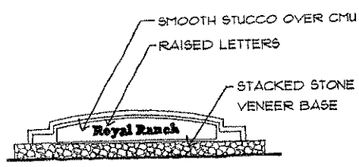
MAJOR ENTRY / MONUMENT SIGN
SCALE 1" = 40'



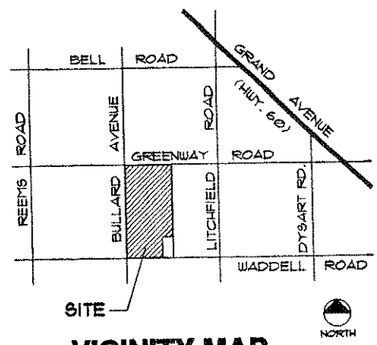
PERIMETER ROAD LANDSCAPE
SCALE 1" = 40'



MINOR ENTRY / MONUMENT SIGN
SCALE 1" = 40'



MINOR ENTRY / MONUMENT SIGN
NO SCALE



VICINITY MAP
NOT TO SCALE

CONCEPTUAL LANDSCAPE PLAN
PLAN FOR

ROYAL RANCH

Planned Area Development

MAY 1999

OWNER:
CITRUS HEIGHTS RANCHES
7332 EAST BUTHERUS DRIVE
SCOTTSDALE, AZ. 85260
PH. 602-998-1444
Contact: Joe Oddo

FLEET • FISHER ENGINEERING INC.
4250 EAST CAMELBACK RD., SUITE 410K PHOENIX, ARIZONA 85018 PH. (602) 264-3335
F.F.E. # 212-01
P:\EDIS\LSCAPE-1 3-13-98 9:33:11 am

EXHIBIT 1

10. LIGHTING

Lighting is primarily for security for streets, pedestrian trails and residential walkways. An effective economical combination of ground and streetlight level fixtures shall be used. No bright, colored or flashing lights will be permitted.

11. SIGNAGE

Signage with the P.A.D. shall conform to the City's current Municipal Code. Signs shall not be located within the right-of-way. Signs shall not be supported by guy wires or braces. Illumination shall be concealed. No flashing or blinking lights are permitted. No animated or sound emitting signs are permitted. No fluorescent or iridescent colors are permitted. Roof signs are not allowed.

12. ENTRY MONUMENT SIGNS

Master community signs shall be designed and installed by the developer. All signs shall conform to City of Surprise's standards.

13. MAINTENANCE

All improvements shall be kept in good and sufficient repair. Plants shall be maintained in a healthy and growing condition. Fertilization, cultivation and natural looking pruning shall occur on a regular basis and shearing of plant material shall be minimized. All trash and weeds shall be removed on a regular basis. Dead plants shall be removed and replaced with it or like species within ten working days, weather permitting. The irrigation system shall be maintained to avoid plant and water loss. Lawns shall be kept mowed. Damages to any improvements shall be repaired as promptly as the extent of the damage shall allow. Buildings, which happen to be vacant for any reason shall be kept, locked and the windows glazed in order to prevent entrance or vandalism of the property.

D. RECOMMENDED PLANT PALETTE

Botanical Name	*Common Name*
TREES	
Acacia aneura	Mulga
Acacia salicina	Willow Acacia
Acacia smallii	Sweet Acacia
Cercidium floridum	Blue Palo Verde
Cercidium praecox	Palo Brea
Chilopsis linearis	Desert Willow
Dahlbergia sissoo	Sissoo tree
Fraxinus velutina 'Rio Grande'	Fan-Tex Ash
Jacaranda mimosifolia	Jacaranda
Phoenix dactylifera	Date Palm
Pinus halepensis	Aleppo Pine
Pithecellobium flexicaule	Texas Ebony
Prosopis chilensis	Chilean Mesquite
Prosopis glandulosa	Honey Mesquite
Prosopis juliflora	Native Mesquite
Ulmus parvifolia	Evergreen Elm
SHRUBS	
Caesalpinia mexicana	Mexican Yellow Bird of Paradise
Caesalpinia pulcherrima	Mexican Red Bird of Paradise
Calliandra californica	Baja Fairyduster
Cassia phyllodenia	Silverbush Morning Glory
Cordia boissieri	Texas Olive
Cordia parvifolia	Little Lead Cordia
Dalea frutescens	Black Dalea
Dalea pulchra	Pea Bush
Dodonea viscosa	Green Hopbush
Justicia californica	Chuparosa
Justicia spicigera	Mexican Honeysuckle
Leucophyllum frutescens 'Green Cloud'	Green Cloud Texas Sage
Leucophyllum laevigatum	Chihuahuan Sage
Myrtus communis 'Boetica'	Twisted Desert Myrtle
Nerium oleander 'Petit Pink'	Dwarf Oleander
Ruellia peninsularis	Baja Ruellia
Simmondsia chinensis	Jojoba
Tecoma stans 'stans'	Arizona Yellowbells

RECOMMENDED PLANT PALETTE (continued)

Botanical Name	*Common Name*
GROUNDCOVER / VINES / PERENNIALS	
Bougainvillea sp. 'Barbara Karst'	Barbara Karst Bouganvillea
Lantana camara	Trailing Yellow Lantana
Lantana montevidensis	Trailing purple lantana
Verbena pulchella	Rock Verbena
Verbena rigida	Verbena
Verbena peruviana	Peruvian Verbena
ACCENTS	
Agave vilmoriniana	Octopus Agave
Agave weberi	Smooth Edged Agave
Dasylirion wheeleri	Desert Spoon
Fouquieria splendens	Ocotillo
Hesperaloe parviflora	Red Yucca
Nolina microcarpa	Bear Grass
Opuntia basilaris	Beavertail Prickly Pear

E. USE OF DESIGN GUIDELINES

These guidelines shall serve as a general guide regarding development within the PAD. They are not CC&R's and they are not intended to be nor shall they be construed to be rigid or inflexible. Instead, they are a flexible guide to be considered by the developer, builders, residents, etc., of the PAD and by the City of Surprise to achieve and maintain the PAD as a compatible, cohesive and high quality development. The Design Guidelines are issues and concepts that the developer, homebuilders and others should consider in preparing their plans.

SECTION IIX

Yard, Side. "Side yard" means a yard extending between the front building line and the rear building line, the width of which is the least distance between the side lot line and the nearest part of the principal building. (Ord. 97-16 §2(part), 1997; Ord. 93-5, 1993; Ord. 90-5 §1, 2, 1990; Ord. 86-6 §5-501, 1986)

Chapter 17.24

ESTABLISHMENT OF ZONES

Sections:

17.24.010 Zone classifications.
17.24.020 Residential zone uses.
17.24.030 Commercial and industrial zone uses.
17.24.040 Interpretation of zone boundaries.

17.24.010 Zone classifications. A. For the purpose of this title, the city shall be divided into the following zones:

R1-43	Single-family residential zone	(Section 17.28.010)
R1-18	Single-family residential zone	(Section 17.28.020)
R1-8	Single-family residential zone	(Section 17.28.030)
R1-5	Single-family residential zone	(Section 17.28.040)
R-2	Multifamily residential zone	(Section 17.28.050)
R-3	Multifamily residential zone	(Section 17.28.060)
C-1	Neighborhood commercial zone	(Section 17.28.070)
C-2	Community commercial zone	(Section 17.28.080)
C-3	General commercial zone	(Section 17.28.090)
BP	Business park zone	(Section 17.28.100)
I-1	Light industrial zone	(Section 17.28.100)
I-2	Heavy industrial zone	(Section 17.28.120)
I-3	Landfill and mineral extraction zone	(Section 17.28.130)
PAD	Planned area development zone	(Section 17.28.140)
AR	Age-restricted overlay zone	(Section 17.28.150)
F-1	Floodway overlay zone	(Section 17.28.160)
F-2	Floodplain overlay zone	(Section 17.28.170)
GU	Governmental use zone	(Section 17.28.180)

B. The boundaries of the above zones are established as shown on a map entitled "Zone Map of Surprise, Arizona," which has been recommended and certified by the Surprise city council with the signature of the mayor affixed thereto and is made a part of this title. (Ord. 97-16 §3, 1997; Ord. 86-6 §6-601, 1986)

17.24.020 Residential zone uses. Residential zone uses are as follows:

A. Principally permitted uses	R1-43	R1-18	R1-8	R1-5	R-2	R-3
Single-family dwelling unit	o	o	o	o		
Two-family structure					o	
Three-family structure					o	
Four-family structure					o	o
Multiple-family structure						o
Townhouse cluster, not to exceed four units or 120 feet in length					o	
Townhouse cluster with four or more units, but not to exceed 160 feet in length						o
Public parks	o	o	o	o	o	o
Manufactured housing subdivisions, as per Section 17.32.140	o	o	o	o		
Modular housing subdivisions, as per Section 17.32.140	o	o	o	o		
Group homes	o	o	o	o	o	o

B. Conditionally permitted uses	R1-43	R1-18	R1-8	R1-5	R-2	R-3
Assisted living facility					o	o
Cemeteries	o	o	o	o		
Churches	o	o	o	o	o	o
Congregate care facility					o	o
Day care center	o	o	o	o	o	o
Electrical substation	o	o	o	o	o	o
Farms	o					
Gas regulating station	o	o	o	o	o	o
Model homes, temporary	o	o	o	o	o	o
Nursing home					o	o
Personal wireless service facilities as per Section 17.32.150	o	o	o	o	o	o
Public buildings	o	o	o	o	o	o
Ranches	o					
Schools	o	o	o	o	o	o
Sewer lift station	o	o	o	o	o	o
Water pump station	o	o	o	o	o	o
Water tower	o	o	o	o	o	o
Golf courses	o	o	o	o	o	o
Temporary sales and office buildings, buildings incidental to construction work	o	o	o	o	o	o
Boarding of horses No more than 2 per acre to a maximum of 5 horses	o					

C. Permitted Accessory Uses	R1-43	R1-18	R1-8	R1-5	R-2	R-3
Greenhouse	o	o	o	o	o	o
Home occupations as per Section 17.32.110	o	o	o	o		
Private garage	o	o	o	o	o	o
Private or jointly owned community center recreational facilities pools, tennis courts	o	o	o	o	o	o
Signs, as per Chapter 15.24	o	o	o	o	o	o
Tool sheds, for storage of domestic supplies	o	o	o	o	o	o

(Ord. 97-16 §4, 1997: Ord. 90-5 §§3, 4, 1990; Ord. 86-6 §6-602, 1986)

17.24.030 Commercial and industrial zone uses. Commercial and industrial zone uses are as follows:

A. Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Antique shop and store		o	o				
Apparel and accessory store		o	o				
Appliance sales, services		o	o				
Appliance repair			o				
Art supply stores		o	o				
Athletic clubs and commercial recreation		o	o				
Automobile, boat or recreational vehicle sales, service and rental			o				
Automobile, auto body repair			o				
Automobile parking lot or garage (public or private)		o	o				
Auto supply store		o	o				
Bakery for on-site sales	o	o	o				
Banks and other savings and lending institutions	o	o	o				
Barber shop	o	o	o				
Beauty parlor	o	o	o				
Bicycle sales, service and repair shop		o	o				
Blueprint shop			o				
Boat repair			o				
Book and stationery store		o	o				
Bowling alley			o				
Building materials sales yard, including sand and gravel			o				
Bus terminals			o				
Business and office machine sales, service and repair shop		o	o				
Business, technical or vocational school			o				
Candy and ice cream store	o	o					
Cement and paving material mixing plant							o
Church and parish house	o	o					
Cigar and tobacco store	o	o					
Clothing and costume rental shop		o	o				
Community center or meeting hall			o				
Contractors storage yard			o				
Convenience food store of not more than 3,500 square feet	o	o	o				
Custom dressmaking, furrier, millinery or tailor shop employing five persons or less		o					
Dancing or theatrical studio		o	o				
Delicatessen and catering establishment		o	o				
Department store		o	o				
Dry goods and notion store		o	o				
Dry cleaning and laundry establishment	o	o	o				
Electronic instruments and devices, assembling and manufacturing				o	o	o	
Equipment rental or storage yard			o				

Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Essential public service or utility installation	o	o	o				
Exterior storage of goods and materials provided that all goods and materials are screened from view from adjacent properties and rights-of-way			o				
Exterminator and insect poison, manufacturing						o	
Exterminator shop			o				
Farming, landscaping and agricultural supplies and equipment, wholesaling and storage					o	o	
Feed store, including yard			o				
Florist	o	o	o				
Foundry casting lightweight, nonferrous metal, not causing noxious odors or fumes						o	
Frozen food locker			o				
Furniture store		o	o				
Game rooms, pool halls		o	o				
Garden supply store			o				
Gasoline and petroleum bulk storage tanks						o	
Gift shop		o	o				
Golf driving range and miniature golf course			o				
Grainery, elevator storage			o				
Grocery store (including retail markets and produce store)		o	o				
Greenhouse			o				
Hardware store, no exterior storage		o	o				
Health and exercise center		o	o				
Hobby, stamp and coin shop		o	o				
Hospital		o	o				
Hotel or motel		o	o				
Hunting and fishing supply store		o	o				
Industrial, scientific or business research, development and testing laboratories and offices				o	o	o	
Interior decorator's shop		o	o				
Jewelry and metal craft store		o	o				
Laundromat, self service	o	o					
Leather goods and luggage store		o	o				
Liquor store	o	o	o				
Lock and key shop		o	o				
Lumber yard, provided that all goods and materials are screened from adjacent properties			o				
Mail order catalog store		o	o				

Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Manufacturing, compounding, assembling or treatment of articles of merchandise from the following previously prepared materials: bone, cellophane, canvas, cloth, cork, feathers, felt, fiber, fur, glass, hair, horn, rubber, leather, paper, plastics, precious or semi-previous metals or stones, shell, straw, textiles, tobacco, wood, wool and yard					o	o	
Manufacturing, compounding, processing, packaging, bottling or treatment of such products as bakery goods, candy, cosmetics dairy products, drugs, perfumes, pharmaceutical, soap, toiletries, beverages and food products, and other personal articles and household goods					o	o	
Manufacturing, fabrication, or assembly, including contractor's facilities, of building materials and construction equipment; acoustical materials, air conditioners, heating and ventilating equipment, bolts, cement and concrete products, ceramics, decorative metals and wrought iron, doors, drills, fences, fire escapes, hardware and machine tools, insulation, lumber yards, machines, nuts, paving and road building equipment, plaster, plastics, plumbing supplies and sewer pipes, pumps, scaffolds, screens, screws, tile, welding equipment, windows; or other similar items					o	o	
Manufacturing of brick and all clay, cinder, concrete, synthetic, cast stone, plastic and pumice stone products						o	
Manufacturing of instruments, toys, novelties, rubber and metal stamps, cameras, photographic equipment, business and household machines and appliances					o	o	
Manufacturing, processing and assembly of malleable metals, signs, monuments, industrial machinery and carbonic ice					o	o	
Medical, dental or health office buildings and clinics		o	o	o			
Medical and orthopedic appliance store		o	o				

Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Messenger or telegraph service station		o	o				
Millwork (woodworking, manufacturing)						o	
Mini-warehouse, for storage purposes without retailing					o	o	
Mobile and manufactured home sales and service			o				
Monument sales and engraving shop			o				
Mortuary			o				
Museum		o	o				
Music and instrument sales, service and repair shop		o	o				
Music or dance studio		o	o				
Motion picture studios				o	o	o	
Newspaper office		o	o				
Newsstand	o	o	o				
Offices greater than 4,000 square feet		o	o	o	o	o	
Offices of not more than 4,000 square feet	o	o	o	o	o	o	
Office supply and office equipment store		o	o				
Optician		o	o				
Package liquor store, including drive-through		o	o				
Packing houses, fruit or vegetable not including processing					o	o	
Paint and wallpaper store		o	o				
Pawn shop		o	o				
Personal wireless service facilities as per Section 17.32.150						o	o
Pet shop		o	o				
Photographic equipment and supply store		o	o				
Photographic studio		o	o				
Picture frame shop		o	o				
Planing mills						o	
Plant nursery			o				
Plant nursery, wholesale			o				
Plating works, bulk (galvanizing)							o
Plumbing shop			o				
Printing and publishing house (including newspapers)			o				
Private club, fraternity, sorority or lodge		o	o				
Public buildings	o	o	o				
Public utility plants					o	o	
Public utility service yard			o				
Radio or television sales, service and repair		o	o				
Radio and television broadcasting stations and studios, but not including transmitter towers and transmitter stations		o	o	o			
Railroad yards, shops or roundhouse						o	
Recreational vehicle repair			o				
Restaurant		o	o				

Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Restaurants of not more than 4,500 square feet, excluding convenience food restaurant	o						
Retail commercial operations directly related to the primary industrial use, provided that they do not exceed ten (10) percent of the gross floor area of the primary industrial use				o	o	o	
Retail commercial operations directly related to the primary industrial use, provided that they do not exceed twenty (20) percent of the gross floor area of the primary industrial use						o	
Rock crushing						o	
Sandblasting yard						o	
Seed treatment, processing, extraction of oil						o	
Sewage disposal or treatment plant						o	
Sewing machine store		o	o				
Sexually Oriented Business as defined by Section 5.09.020 and as further regulated per Section 17.32.150						o	o
Shoe store		o	o				
Shoe repair and shoe shine shop		o	o				
Sporting and athletic goods store		o	o				
Spraying supplies equipment wholesaling and storage					o	o	
Steel fabrication (plate, structural, misc. iron reinforcing)						o	
Storage yards bulk material						o	
Swap meet, flea market			o				
Tailor shop, not more than five employees			o				
Tanks, fabrication						o	
Tavern, bar or lounge		o	o				
Taxidermist			o				
Temporary construction offices and sheds, appurtenant storage incidental to a construction project only for the duration of such project, not to exceed eighteen (18) months				o	o	o	
Theater, excluding drive-in theater		o	o				
Theater, drive-in			o				
Tire sales, repair and mounting			o				
Trade schools			o				
Towed or motor vehicle assembling, repairing including body and fender shops					o	o	
Toy store		o	o				
Travel agency		o	o				

Principally permitted uses	C-1	C-2	C-3	BP	I-1	I-2	I-3
Truck, bus and heavy equipment garages, dispatching and weighing stations					o	o	
Upholstery shop			o				
Variety store		o	o				
Video arcade			o				
Wallpaper store		o	o				
Warehousing and distribution centers					o	o	
Watch repair shop		o	o				

B. Conditionally Permitted Uses. Refer to conditionally permitted uses for the specific zone classification in question.

C. Permitted Accessory Uses. Refer to permitted accessory uses for the specific zone classification in question. (Ord. 97-16 §5, 1997: Ord. 90-9 §2, 1990; Ord. 86-6 §6-603, 1986)

17.24.040 Interpretation of zone boundaries. Where uncertainty exists with respect to any of the boundaries of the zones as shown on the zone map, the following rules shall apply:

A. Where zone boundaries are indicated as approximately following the center lines of street, highway, or railroad rights-of-way or such lines extended, such center lines or such lines extended shall be construed to be the boundaries.

B. Where zone boundaries are indicated as approximately following the corporate limit line of the city, such corporate limit line shall be construed to be such boundaries.

C. Where zone boundaries are indicated as approximately following property lines or such lines extended, such property lines or such lines extended shall be construed to be such boundaries.

D. Where zone boundaries are indicated as approximately following the center line of stream beds or river beds, such center lines or such lines extended shall be construed to be such boundaries.

E. No zone boundary line shall hereinafter be established to divide one lot into two or more zones unless the size of the lot in question is such that division is determined to be essential by the planning and zoning commission and the city council. (Ord. 86-6 §6-604, 1986)

Chapter 17.28

ZONE DISTRICT REGULATIONS

Sections:

17.28.010 Single-family residential zone (R1-43).
17.28.020 Single-family residential zone (R1-18).
17.28.030 Single-family residential zone (R1-8).
17.28.040 Single-family residential zone (R1-5).
17.28.050 Multifamily residential zone (R-2).
17.28.060 Multifamily residential zone (R-3).
17.28.070 Neighborhood commercial zone (C-1).
17.28.080 Community commercial zone (C-2).
17.28.090 General commercial zone (C-3).
17.28.100 Business park zone (BP).
17.28.110 Light industrial zone (I-1).
17.28.120 Heavy industrial zone (I-2).
17.28.130 Landfill and mineral extraction zone industrial zone (I-3).
17.28.140 Planned area development zone--P.A.D.
17.28.150 Age restricted overlay zone (AR).
17.28.160 Floodway overlay zone (F-1).
17.28.170 Floodplain overlay zone (F-2).
17.28.180 Governmental use zone (GU).

17.28.010 Single-family residential zone (R1-43). A. Purpose. The purpose of the R1-43 single-family residential zone is to provide for the development of single-family detached dwellings and directly related complementary uses at a very low density. The zone is intended to be strictly residential in character with a minimum of disturbances due to traffic or overcrowding.

B. Principally Permitted Uses. See Section 17.24.020(A).

C. Conditionally Permitted Uses. See Section 17.24.020(B).

D. Permitted Accessory Uses. See Section 17.24.020(C).

E. Lot Area and Lot Dimensions.

1. Required lot area:

2. Maximum building height: thirty feet.

G. Encroachment into Required Front and Side Yard Setbacks. See Section 17.28.010(G).

H. Additional Building and Performance Standards. Development of any parcel of land within this district shall be subject to all applicable requirements of Chapter 17.32 of this title.

I. Relationship to Overlay Zones. Any property located in the R1-8 zone as well as the F-1, F-2, or AR overlay zones must comply with the regulations of the overlay zones. (Ord. 97-16 §8, 1997; Ord. 86-6 §7-703, 1986)

17.28.040 Single-family residential zone (R1-5). A. Purpose. The purpose of the R1-5 single-family residential zone is to provide for the development of single-family detached dwellings and directly related complementary uses at a moderate density. The zone is intended to be strictly residential in character with a minimum of disturbances due to traffic or overcrowding.

B. Principally Permitted Uses. See Section 17.24.020(A).

C. Conditionally Permitted Uses. See Section 17.24.020(B).

D. Permitted Accessory Uses. See Section 17.24.020(C).

E. Lot Area and Lot Dimensions.

1. Required lot area:

Use	Minimum Lot Area
Single-family dwelling units	5,500 square feet*.
Other permitted uses	Minimum area to be determined by building area, parking requirements and required setbacks.

2. Required lot dimensions:

---

* This may be calculated as an average lot size for lots within a given subdivision, provided no lot is less than five thousand two hundred square feet in size and not more than ten percent of the lots are less than five thousand five hundred square feet in size.

Use	Minimum Lot Width	Minimum Lot Depth
Single-family dwelling units	50 feet	100 feet
Other permitted uses	Lot dimensions to be determined by building area, parking requirements and required setbacks.	

3. Density: There shall not be more than one single-family dwelling unit on any one lot.

F. Setbacks, Yards and Heights.

1. Minimum setbacks from property line:

Use	Front	Interior Side	Corner Side	Rear Yard
Single-family dwelling	20'	10'*	20'	20'
Schools, civic, cultural and religious institutions (including their accessory use structures)	50'	50'	50'	50'
Structures accessory to single-family residences	20'	3'	20'	3'
Structures for all other principal, conditional or accessory uses	20'	10'	20'	20'

Zero lot line development may be permitted which may result in the creation of a two-family residential structure.

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* At least one side yard shall be ten feet; the setback for the remaining side may be less than ten providing principal building separations are at least ten feet and that in the case of detached units, the other side yard is at least three feet.

2. Maximum building height: thirty feet.

G. Encroachment into Required Front and Side Yard Setbacks. See Section 17.28.010(G).

H. Additional Building and Performance Standards. Development of any parcel of land within this district shall be subject to all applicable requirements of Chapter 17.32 of this title.

I. Relationship to Overlay Zones. Any property located in the R1-5 zone as well as the F-1, F-2, or AR overlay zones must comply with the regulations of the overlay zones. (Ord. 97-16 §9, 1997; Ord. 86-6 §7-704, 1986)

17.28.050 Multifamily residential zone (R-2). A. Purpose. The purpose of the R-2 multifamily residential zone is to provide for medium density housing in multiple-family structures and directly related complementary uses. The R-2 zone is designed to allow economical use of land while creating an attractive, functional and safe residential environment.

B. Principally Permitted Uses. See Section 17.24.020(A).

C. Conditionally Permitted Uses. See Section 17.24.020(B).

D. Permitted Accessory Uses. See Section 17.24.020(C).

E. Lot Area and Lot Dimensions. In determining minimum lot area and minimum lot dimensions, the following table should be used:

Use	Minimum Area per Unit	Minimum Lot Dimensions*	Outdoor Living Area**
Two-family dwelling	3,000 sq. ft.	Width: 70' Depth: 90'	600 sq. ft./ dwelling unit

* These dimensions apply to the initial lot size per structure. Initial lots may be divided to accommodate individual ownership of the structures' dwelling units.

** Outdoor living area in the minimum amount specified above must be provided on any lot occupied by the multiple residence or townhouse building. This space must be easily accessible for daily recreational use by the occupants of the building. Driveways, parking areas, ornamental landscaped areas (having a width of less than twenty feet), and required side or front yards shall not be considered as an outdoor living area, except in the case of interior townhouse units where said unit is less than twenty feet in width, in which case the minimum width of the outdoor living area shall be the width of the lot.

Use	Minimum Area per Unit	Minimum Lot Dimensions*	Outdoor Living Area**
Three-family dwelling	3,000 sq. ft.	Width: 80' Depth: 90'	500 sq. ft./ dwelling unit
Four-family dwelling	3,000 sq. ft.	Width: 80' Depth: 90'	400 sq. ft./ dwelling unit
Townhouse cluster	3,000 sq. ft.***	Width: 90' Depth: 90'	400 sq. ft./ dwelling unit
Other permitted uses		Minimum area and lot dimensions to be determined by building area, parking requirements and required setbacks.	

F. Schedule of Allowances. The minimum areas per unit in subsection E of this section may be adjusted according to the following, except allowance shall not be made for two-family or three-family dwellings.

1. For each parking stall in or under the residence, or otherwise completely underground, subtract four hundred square feet from the total minimum lot area.

2. For each unit with a balcony or patio greater than forty square feet, subtract one hundred square feet from the outdoor living area.

G. Setbacks, Yards, and Heights.

1. Minimum setbacks from property line:

Use	Front	Interior Side	Corner Side	Rear
Two-family dwelling structure	20'	10'	20'	20'
Three-family dwelling structure	20'	10'	20'	20'
Four-family dwelling structure	20'	15'	20'	20'
Townhouse cluster structure	20'	15'	20'	20'
Schools, civic, cultural and religious institutions (including their accessory use structures)	50'	50'	50'	50'
Structures accessory to two-family dwelling structures	20'	3'	20'	3'
Structures for all other principal or conditional uses	20'	10'	20'	20'

*** May be calculated as average lot size per unit per structure.

2. For apartment buildings, parking of motor vehicles shall not be allowed within the required front or corner side setbacks.

3. Maximum building height: thirty feet.

H. Multifamily Accessory Buildings.

1. Accessory buildings shall observe the same setback requirements established for the multiple residence building except that accessory buildings located within the rear yard of the multiple-residence buildings may be located to within five feet of the rear or interior side property line. The city council may require common walls for accessory buildings on the same lot where common walls will eliminate unsightly and hazardous areas. Accessory buildings on the same lot shall otherwise be separated by a distance of not less than ten feet.

2. Exteriors of accessory buildings shall have an exterior finish compatible to the main structure. Compatibility shall be determined by the city based on type and use of building materials.

I. Distance Between Buildings. When two or more principal buildings are located on one lot, the minimum separation between any two adjacent principal buildings shall be a distance not less than an amount equal to the height of the taller of the two buildings or twenty feet, whichever is greater when developed as a planned area development. For major and minor site plans, building separation shall be the sum of two interior side yard setbacks.

J. Additional Building and Performance Standards. Development of any parcel of land within this district shall be subject to all applicable requirements of Chapter 17.32 of this title.

K. Relationship to Overlay Zones. Any property located in the R-2 zone as well as the F-1, F-2, or AR overlay zones must comply with the regulations of the overlay zones. (Ord. 97-16 §10, 1997; Ord. 86-6 §7-705, 1986)

17.28.060 Multifamily residential zone (R-3). A. Purpose. The purpose of the R-3 multifamily residential zone is to provide for high density housing in multiple-family structures and directly related complementary uses. The R-3 zone is designed to allow highly economical use of land while creating an attractive, functional and safe residential environment.

B. Principally Permitted Uses. See Section 17.24.020(A).

C. Conditionally Permitted Uses. See Section 17.24.020(B).

D. Permitted Accessory Uses. See Section 17.24.020(C).

E. Lot Area and Lot Dimensions. In determining minimum lot area and minimum lot dimensions, the following table should be used:

Use	Minimum Area per Unit	Minimum Lot Dimensions*	Outdoor Living Area**
Multifamily structure	2,000 sq. ft./unit	Width: 90' Depth: 90'	300 sq. ft./unit
Townhouse cluster	2,000 sq.*** ft./unit	Width: 90' Depth: 90'	400 sq. ft./unit
Other permitted uses		Minimum area and lot dimensions to be determined by building area, parking requirements and required setbacks.	

F. Schedule of Allowances. The minimum areas per unit in subsection E of this section may be adjusted in accordance with Section 17.28.050F.

G. Setbacks, Yards, and Heights.

1. Minimum setbacks from property line:

Use	Front	Interior Side	Corner Side	Rear
Multifamily structure	20'	20'	20'	20'
Townhouse cluster	20'	15'	20'	20'
Schools, civic, cultural and religious institutions (including their accessory use structures)	50'	50'	50'	50'

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* These dimensions apply to the initial lot size per structure. Initial lots may be divided to accommodate individual ownership of the structures' dwelling units.

** Outdoor living area in the minimum amount specified above must be provided on any lot occupied by the multiple-residence or townhouse building. This space must be easily accessible for daily recreational use by the occupants of the building. Driveways, parking areas, ornamental landscaped areas (having a width of less than twenty feet), and required side or front yards shall not be considered as an outdoor living area, except in the case of interior townhouse units where said unit is less than twenty feet in width, in which case the minimum width of the outdoor living area shall be the width of the lot.

*** May be calculated as average lot size per unit per structure.

Use	Front	Interior Side	Corner Side	Rear
Structures accessory to multifamily residences	20'	3'	20'	3'
Structures for all other principal or conditional uses	20'	10'	20'	20'

2. For apartment buildings, parking of motor vehicles shall not be allowed within the required front or corner side setbacks.

3. Maximum building height: thirty-five feet.

H. Accessory Buildings. See Section 17.28.050(H) of this chapter.

I. Distance Between Buildings. See Section 17.28.050(I) of this chapter.

J. Additional Building and Performance Standards. Development of any parcel of land within this district shall be subject to all applicable requirements of Chapter 17.32 of this title.

K. Relationship to Overlay Zones. Any property located in the R-3 zone as well as the F-1, F-2, or AR overlay zones must comply with the regulations of the overlay zones. (Ord. 97-16 §11, 1997; Ord. 86-6 §7-706, 1986)

17.28.070 Neighborhood commercial zone (C-1). A. Purpose. The purpose of the C-1 neighborhood commercial zone is to provide for the establishment of local centers for convenient retail or service outlets which deal directly with the consumer for whom goods or services are intended. These centers are to provide services and goods primarily for the surrounding neighborhood and are not intended to draw customers from the entire community.

B. Principally Permitted Uses. See Section 17.24.030(A).

C. Conditionally Permitted Uses.

1. Convenience food stores with not more than four gas pumps.

a. Pump stands shall be set back not less than twenty-five feet from any street right-of-way, not less than forty feet from any nonstreet property line and not less than one hundred feet from any residential district boundary.

b. Interior curbs of not less than six inches in height shall be constructed to separate driving surfaces from sidewalks, landscaped areas and street rights-of-way.

2. Schools.

3. Day care center:

a. A minimum of seventy-five square feet of outdoor play space per child shall be provided from which at least fifty square feet of fenced in play space per

1. Any property located in the I-3 zone as well as the F-1 or F-2 overlay zones must comply with the regulations of the overlay zones.

2. A conditional use permit approval may include provisions that modify the screening, landscaping, parking or other requirements of Title 17 as necessary to meet the specific site conditions. (Ord. 97-16 §19, 1997)

17.28.140 Planned area development zone--P.A.D.

A. Purpose.

1. As an alternative to conventional zoning and development approaches and processes, the planned area development (P.A.D.) procedures and regulations are set forth in order that the public health, safety and general welfare be furthered in an era of increasing urbanization; to encourage innovations in residential, commercial and industrial development so that greater opportunities for better housing, recreation, shopping and employment, conveniently located, may extend to all citizens and residents of Surprise; to reflect changes in the technology of land development; to encourage a more creative approach in the utilization of land in order to accomplish a more efficient, aesthetic and desirable development which may be characterized by special features of the geography, topography, size or shape of a particular property, and to provide a compatible and stable environment, in harmony with that of the surrounding area.

2. The P.A.D. may include any development having one or more principal uses or structures on a single parcel of ground or contiguous parcels. The P.A.D. shall consist of a harmonious selection of uses and groupings of buildings, parking areas, circulation and open spaces, and shall be designed as an integrated unit, in such a manner as to constitute a safe, efficient and convenient urban area.

B. General Requirements and Standards.

1. Ownership. The tract shall be a development of land under unified control at the time of application and planned and scheduled to be developed as a whole.

2. Conformance with Comprehensive Development Guide. The land uses and design of the proposed P.A.D. shall be consistent with the city comprehensive development guide.

3. P.A.D. Regulations.

a. The minimum total P.A.D. shall be no less than five acres unless the applicant can show that the minimum P.A.D. requirements should be waived because the waiver would be in the public interest and that one or both of the following conditions exist:

i. Unusual physical features of the property itself or of the surrounding neighborhood are such that development under the standard provisions of the residential districts would not be appropriate in order to con-

serve a physical or terrain feature of importance to the neighborhood or community.

ii. The property is adjacent to or across the street from property which has been developed under the provisions of this section and will contribute to the amenities of the neighborhood.

4. Uses in a P.A.D. Any use may be allowed in a P.A.D., provided it is consistent with the Comprehensive Development Guide.

5. Residential Density in P.A.D.s.

a. Residential development in a P.A.D. may provide for a variety of housing types allowed in any one of the basic residential zoning districts. In addition, the number of dwelling units allowed may be flexible relative to the number of dwelling units per acre that would otherwise be permitted by the zoning regulations applicable to the site. However, the total number of dwelling units and the resulting density allowed in a P.A.D. shall be consistent with the land use plan of the city's comprehensive development guide.

b. In determining the reasonableness of the densities in a P.A.D., the planning and zoning commission and city council shall consider increased efficiency in the provision of public facilities and services based, in part, upon:

i. The location, amount and proposed use of common open space;

ii. The location, design and type of dwelling units;

iii. The physical characteristics of the site;

iv. Particular distinctiveness and excellence in siting, design and landscaping.

6. Front, Rear and Side Yard Building Setback Regulations.

a. Front and rear yard setbacks shall be established by the city council at the time of approval of the final subdivision plat and shall be clearly identified on the final subdivision plat.

b. Unless a common wall or zero lot line is approved by the city council, there shall be a minimum separation between structures on adjoining residential lots of ten feet.

c. There shall be a side yard setback of not less than twenty feet from the curb line on any lot which adjoins a public or private street.

d. Commercial building setbacks shall be a minimum of thirty-five feet or such greater distance as may be equal to the maximum height of the building.

7. More than One Building per Lot. More than one building may be placed on one platted or recorded lot in any P.A.D. Areas for single-family detached dwellings or

other housing types providing privately owned lots must comply with the city's subdivision ordinance in all respects not specifically noted in this section as appropriate variances or waivers.

8. One Housing Type not Inconsistent with Intent. A P.A.D. which only involves one housing type such as all detached or all attached units shall not be considered inconsistent with the stated purposes and objectives of this section and shall not be the sole basis for denial or approval.

9. Architectural Style, Appearance. Architectural style of buildings shall not solely be a basis for denial or approval of a plan. However, the overall appearance and compatibility of individual buildings to other site elements or to surrounding development will be primary considerations during P.A.D. review by the planning and zoning commission and council.

10. Phasing of Development.

a. Any P.A.D. plan proposed to be constructed in phases shall include full details relating thereto, and the city council may approve or modify where necessary any such proposals.

b. The phasing shall include the time for beginning and completion of each phase. Such timing may be modified by the city on the showing of good cause by the developer.

c. The land owner or developer shall make such easements, covenants, and other arrangements and shall furnish such financial guarantees as may be determined by the city to be reasonably required to assure performance in accordance with the plan and to protect the public.

11. Streets, Utilities, Services and Public Facilities. The uniqueness of each proposal for a P.A.D. may allow specifications and standards for streets, utilities and services to be subject to minor modifications of the specifications and standards established in this and other city ordinances governing their construction. The city may, therefore, waive or modify the specifications or standards where it is found that they are not required in the interests of the residents of the P.A.D. or the city. The plans and profiles of all streets, utilities and services shall be reviewed, modified if necessary, and approved by the city prior to the final approval of the P.A.D. All P.A.D.s shall be served by public or community water and sewer systems.

12. Open Space Provision. At least seven percent of the total P.A.D. area shall be set aside for public and/or private open space and recreational use. The city shall determine what portion of the seven percent shall be private and what shall be public.

13. Operating and Maintenance Requirements for Planned Area Development Common Facilities. In the event

that certain land areas or structures are provided within the P.A.D. for private recreational use or as service facilities, the owner of such land and buildings shall establish an arrangement to assure the city of a continued standard of maintenance. These common areas may be placed under the ownership of one of the following, depending which is more appropriate:

a. Dedicated to public where a communitywide use would be anticipated;

b. Landlord control;

c. Landowners association, provided all of the following conditions are met:

i. The landowners association must be established prior to any sale.

ii. Membership must be mandatory for each owner and any successive buyer.

iii. The open space restrictions must be permanent or tied to a long-term agreement (e.g., ninety-nine years).

iv. The association must be responsible for liability insurance and the maintenance of recreational, service and other facilities as deemed necessary by the city.

v. Landowners must pay their pro rata share of the cost and the assessment levied by the association can become a lien on the property in accordance with Arizona statutes.

vi. The association must be required to adjust its assessment to meet changing needs.

vii. The association must be required to, at minimum, adjust its assessment on an annual basis by a percentage not less than the previous year's increase in the consumer price index.

14. Building Height and Setbacks. Maximum building height: thirty-five feet; provided, however, that a building may exceed thirty-five feet in height if the entire portion of the building which exceeds thirty-five feet is so constructed that it cannot be used or occupied by humans for any purpose, and if the planning and zoning commission approves the extension above thirty-five feet prior to the commencement of construction. In determining whether to approve a height extension, the planning and zoning commission shall consider whether the proposed extension will pose an unreasonable risk of injury to persons or property in light of the city's fire fighting equipment and capabilities. In general, a building's setback from property adjacent to the P.A.D. site shall approximate its height.

15. Landscaping. Landscaping and/or fencing shall be provided according to a plan approved by the city and shall include a detailed planting list with sizes indicated.

16. Utilities. All utilities, including electricity and telephone, shall be installed underground. (Ord. 97-16 §16(part), 1997; Ord. 94-5 §5, 1994; Ord. 91-7, 1991; Ord. 86-6 §7-711, 1986)

17.28.150 Age restricted overlay zone (AR). A. Purpose. The age restricted (AR) overlay zone is intended to allow for orderly and planned residential development which is specially designed for residency by persons of advanced age by enacting age-specific conditions, covenants, restrictions, or regulations on parcels in the city.

B. Principally Permitted Uses. The principally permitted uses shall be the same as are allowed in the underlying zoning district which may be any of the residential zones or planned area development zone (PAD) as defined in the Code of Ordinances as it exists or may be amended, but not with any other zoning district.

C. Conditionally Permitted Uses. The conditionally permitted uses shall be the same as are allowed in the underlying zoning district which may be any of the residential zones or planned area development zone (PAD) as defined in the Code of Ordinances as it exists or may Be amended, but not with any other zoning district.

D. Permitted Accessory Uses. The permitted accessory uses shall be the same as are allowed in the underlying zoning district which may be any of the residential zones or planned area development zone (PAD) as defined in the Code of Ordinances as it exists or may be amended, but not with any other zoning district.

E. Size. The age restricted overlay zone shall only be established on parcels of forty or more contiguous acres.

F. Application Requirements.

1. Any person applying for an age restricted overlay zone shall submit the following:

a. A petition signed by one hundred percent of the owners of property within the proposed district; or

b. Clear and convincing documentation that all of the property within the proposed district has been developed, advertised and sold or rented under specific age restrictions.

2. The city will not consider any application for an age restricted overlay zone until all requirements of this subsection have been met.

G. Application Procedure. Any person requesting an age restricted overlay zone shall follow the procedure specified in Section 17.36.020 of the Code of Ordinances as it exists or shall be amended.

H. Prohibited Acts. No person shall enact age-specific conditions, covenants, restrictions, or regulations on any parcel in any area of the city except where an age

a. Mobile homes shall be anchored in accordance with Section 17.32.140.

b. For new mobile home parks and mobile home subdivisions; for expansions to existing mobile home parks and mobile home subdivisions; for existing mobile home parks and mobile home subdivisions where the repair, reconstruction or improvement has commenced; and for mobile homes not placed in a mobile home park or mobile home subdivision; require that:

i. Stands or lots are elevated on compacted fill or on pilings so that the lowest floor of the mobile home will be at or above one foot above the base flood level;

ii. Adequate surface drainage and access for a hauler are provided; and

iii. In the instance of elevation on piling, that lots are large enough to permit steps, and piling foundations are placed in stable soil no more than ten feet apart.

c. No mobile home shall be placed in a floodway. (Ord. 97-16 §16(part), 1997; Ord. 86-6 §7-713, 1986)

17.28.180 Governmental use zone (GU). A. Purpose. The purpose of this governmental use zone (GU) is to conditionally accommodate all governmental uses.

B. Principally Permitted Uses. None.

C. Conditionally Permitted Uses. All governmental uses.

D. Permitted Accessory Uses. All uses which are ancillary to governmental uses.

E. Procedure for Conditional Use permits within a Governmental Use Zone. An applicant for a conditional use permit within a governmental use zone shall comply with Section 17.36.050 of the Code of Ordinances, except that any review and decision regarding an application for a conditional use permit as set out in Section 17.36.050(C) shall be made by the city council. (Ord. 97-16 §21, 1997)

Chapter 17.32

GENERAL BUILDING AND PERFORMANCE REQUIREMENTS

Sections:

17.32.010 Purpose.
17.32.020 Screening.
17.32.030 Landscaping requirements.
17.32.040 Dwelling unit restrictions.
17.32.050 Accessory buildings, uses and equipment.
17.32.060 Fences.

Sections: (Continued)

17.32.070 Setback and height encroachments, limitations and exceptions.
17.32.080 Off-street parking requirements.
17.32.090 Off-street loading.
17.32.100 Signs.
17.32.110 Home occupations.
17.32.120 Miscellaneous performance requirements.
17.32.130 Nonconforming uses and structures.
17.32.140 Manufactured home subdivisions.
17.32.150 Personal wireless service facilities.
17.32.160 Sexually oriented businesses.

17.32.010 Purpose. The purpose of this section of the zoning ordinance is to establish general development performance standards. These standards are intended and designed to assure compatibility of uses; to prevent urban blight, deterioration and decay; an to enhance the health, safety and general welfare of the residents of the community. (Ord. 86-6 §8-801, 1986)

17.32.020 Screening. All multifamily and mobile home developments' principal and accessory uses (except signs) which are situated on a parcel which abuts a single-family residential district and all business and industrial developments' principal and accessory uses (except signs) which are situated on a parcel which abuts a residential district shall be screened from such a district by an approved wall or fence not less than six feet in height above the level of the adjacent property at the district boundary. Walls or fences of lesser heights or planting screens may be permitted by the city if there is a finding that the nature or extent of the use being screened is such that a lesser degree of screening will adequately promote the use and enjoyment of the properties within the adjacent residential district, or there is a finding that a screening of the type required by this chapter would interfere with the provision of adequate amounts of light and air to same said properties. All required screening devices shall be designed so that they are architecturally harmonious with the principal structures on the site and they shall be properly maintained so as not to become unsightly, hazardous or less opaque than when originally constructed. (Ord. 86-6 §8-802, 1986)

17.32.030 Landscaping requirements. A. Generally. Landscaping requirements as set forth in this chapter have been established to encourage quality development within the city; to provide a smooth transition between adjoining properties; to screen service yards, parking lots and other areas which tend to be unsightly; to facilitate the buffer-

ing of one land use from other land uses; to encourage harmonious relationships between buildings which are part of one development and buildings located on abutting properties; to provide open space and recreational areas to serve the needs of the residents of the city; to soften the effect of development; to improve erosion and storm-water runoff control; to reduce the particulate matter in the air; to encourage a sense of commitment to the city and its residents on the part of the developers; and to provide for the health, safety and general welfare of the residents of the city.

B. Definition. Landscaping for the purposes of this chapter shall be defined as including any or all of the following: lawn or grass areas; trees, shrubs, ground cover or other plantings; sprinkler or irrigation systems; decorative rock, natural or human-made; decorative lighting; benches, tables, fountains, planters or other similar outdoor furniture; decorative screen walls; detention and retention ponds; waterfalls and human-made streams; and berms or mounds.

C. Landscaping Plan. A landscaping plan, consisting of a preliminary plan and a final plan, shall be prepared, submitted and approved for all applicable development projects.

1. Preliminary Landscape Plan.

a. Five copies of a preliminary landscape plan shall be submitted along with the required development site plan for review by the city manager or designee. The preliminary landscape plan may be shown on the development site plan drawings. The preliminary landscape plan shall be a conceptual plan and shall include the following information in generalized form:

i. The location and identification of all proposed landscape areas (on-site, street right-of-way, parking area, landscape buffers and others).

ii. Preliminary data pertaining to the amount of net site area, the ground floor areas of all proposed commercial and industrial buildings, the number of required and proposed parking spaces, and the amount of all proposed landscaped areas, required and provided.

iii. The approximate location of all proposed trees, shrubs, and other landscape materials and improvements.

iv. The location of all visibility site triangles.

v. Notes or graphical representations adequately showing the intent of the proposed plans and materials and indicating how those plans will comply with this chapter.

vi. The location, height, type, and general design and finish of all proposed screening walls.

vii. The location of all proposed storm-water retention areas.

b. The preliminary landscape plan shall be reviewed and approved by the city manager or designee as part of the development site plan review, and may be approved with stipulated changes or additions.

2. Final Landscape Plan.

a. Five copies of a final landscape plan shall be submitted along with all other required site improvement and building plans prior to or concurrent with the application for a building permit. The final landscape plan shall contain the final calculations, data, and specific details and information of all proposed landscaped areas, landscape materials, screening walls, irrigation system, and other items that were required and identified in conceptual form on the preliminary landscape plan. The final landscape plan shall contain a specific schedule of all trees and shrubs identified by common name and botanical name, and shall clearly indicate the quantity and size of each tree and shrub to be installed.

b. The final landscape plan shall be in conformance with the approved preliminary plan and any stipulated changes or additions, and shall be approved by the city manager or designee prior to the issuance of a building permit.

c. All changes in landscape plans before, during, or after preliminary or final landscape plan approval and/or landscape installation shall be approved by the city manager or designee.

D. Minimum Landscaping.

1. Single-Family Residential Subdivisions. Landscaping shall be required along the rear of reverse frontage single-family lots along collector or arterial streets in accordance with the standards specified below.

a. Trees with a minimum size of fifteen gallons shall be planted at the rate of one tree per twenty feet of linear street frontage. At least twenty-five percent of the trees shall be twenty-four inch box size.

b. Shrubbery with a minimum size of five gallons shall be planted in appropriate numbers to complement the placement of trees, but in no case shall be less than two shrubs per twenty feet of linear street frontage.

c. Clustering of trees and shrubbery shall be encouraged to accent focal points or landmarks and to provide variety to the streetscape. Contouring of the ground and placement of mounds and earth berms along streets shall be required.

d. A minimum of twenty-five percent of all frontage landscaped areas shall be covered with vegetative or organic ground cover consisting of grass or other living plant materials characterized by horizontal growth which generally does not exceed eighteen inches in height.

e. Vegetative ground cover shall be so located to accentuate landmarks or focal points on a site and to create a "lush" appearance to the landscaped area from public streets and areas.

f. Inorganic ground cover, consisting of decomposed granite (3/4 inch), crushed rock, gravel, river run rock and/or boulders, shall be of sufficient variety in terms of color, texture, and materials to provide a pleasant and diverse appearance to the streetscape. Mounding and contouring of landscaped areas is required.

g. All landscaping shall be in accordance with the Department of Water Resources' water conservation guidelines. Plant material shall be selected from the approved DWR plant list.

h. Maintenance. No landscaped area shall be used for the parking of vehicles or the storage or display of materials, supplies or merchandise.

i. The maintenance of landscaping in the public right-of-way shall be the responsibility of the adjacent property owner, whether an individual, corporation, or homeowner's association.

2. Multi-Family Residential Developments.

a. A minimum ten foot wide landscaped area shall be required along all interior property lines separating individual development sites. Trees with a minimum size of fifteen gallons shall be planted every fifteen feet on center within the area.

b. Along public street frontages, minimum fifteen gallon sized trees shall be planted at a ratio of one tree per twenty feet of frontage. A minimum of twenty-five percent of the required trees shall be twenty-four inch box size.

c. Within common open space areas, minimum fifteen gallon sized trees and five gallon shrubs shall be planted at a ratio of one tree and two shrubs per dwelling unit.

d. Open space areas along public street frontages shall receive special landscaping treatment to provide a lush setting for both the residents of the project and the general public. The following standards shall apply to landscaping of public street frontages:

i. Special entry features shall be provided at major entrances into a project to provide a sense of identification and uniqueness.

ii. Walls, planters, and earth berms shall be provided in the front yard to add variety to the landscape and to increase privacy for the residents.

iii. No more than fifty percent of the required front yard landscaped area may be used for storm water retention purposes.

e. Foundation plantings should be utilized to complement building elevations, provide shade, and increase

privacy. A minimum of fifty percent of the building frontage facing public streets shall have foundation plantings.

f. Landscaped islands within parking areas shall be installed at least every ten consecutive parking spaces. Said islands shall be a minimum of five feet wide and contain at least one fifteen gallon sized tree.

g. Maintenance. No landscaped area shall be used for the parking of vehicles or the storage or display of materials, supplies or merchandise.

h. The maintenance of landscaping in the public right-of-way shall be the responsibility of the adjacent property owner, whether an individual, corporation, or homeowner's association.

3. Commercial and Industrial Developments.

a. General Requirements.

i. A minimum of fifteen percent of net land area of any site located in a commercial district shall be landscaped. A minimum of five percent of net land area of any site located in an industrial district shall be landscaped.

ii. Landscaping shall be provided along the street frontage between the street or sidewalk and any buildings, parking areas, loading or storage areas in accordance with the following standards:

(A) The intersection of arterial streets are a dominant feature of the urban landscape, serving as major focal points of activity in the community. Because of the importance of these intersections, additional landscaped setbacks and design features, beyond the required minimum standards, may be imposed on property at these intersections by the city at the time of rezoning and/or site plan approval. Such additional features may include wider setbacks; unique building orientation and design; and special landscape features such as fountains, walls, and screening devices.

(B) Required yards fronting on a public street in the commercial districts shall be entirely landscaped excluding driveways and walkways. In industrial districts the following landscaped setbacks shall apply to any building site:

(1) Along arterial streets, required yards shall be entirely landscaped;

(2) Along all other streets, a ten foot landscaped yard shall be required (parking and maneuvering areas shall not be permitted in the landscaped yards cited above excepting driveways and walkways).

(C) Where existing buildings or nearby parcels are built to the street property line, landscaping may be modified or located elsewhere on approval of the city manager or designee.

iii. Any part of a site not used for buildings, parking, driveways, sidewalks, etc., shall be landscaped.

iv. An automatic irrigation system shall be provided to all landscaped areas requiring water.

v. All landscaped areas adjacent to vehicular parking and access areas shall be protected by a six inch vertical concrete curbing in order to control storm water flows and minimize damage by vehicular traffic.

vi. All trees and plant material used within the city shall conform to the Arizona Department of Water Resources plant material list.

vii. All trees required by this part shall have a minimum trunk height of six feet, with a minimum one and one-half inch caliper measured four feet above the ground. Multi-trunk trees may have smaller average caliper measurements. Palms shall have a minimum trunk height of five feet. This size of tree is generally referred to as fifteen gallons in the landscaping industry.

viii. Twenty-four inch box trees shall have a minimum trunk height of eight feet with a minimum two inch caliper measured four feet above the ground. Multi-trunk trees may have smaller average caliper measurements. Palms shall have a minimum trunk height of eight feet.

b. Streetscape Standards. The following landscaping shall be required along all streets:

i. Trees with a minimum size as specified herein shall be planted at the rate of one tree per twenty feet of linear street frontage. A minimum of twenty-five percent of the required trees shall be twenty-four inch box trees.

ii. Shrubbery with a minimum size of five gallons shall be planted in appropriate numbers to complement the placement of trees, but in no case shall be less than two shrubs per twenty feet of linear street frontage.

iii. Clustering of trees and shrubbery shall be encouraged to accent focal points or landmarks and to provide variety to the streetscape. Contouring of the ground and placement of mounds and earth berms along streets shall be required.

c. Transition/Separation of Uses. Where commercial or industrial uses are located adjacent to any residential use or district, a ten foot wide landscape strip, planted with one tree every fifteen linear feet, shall be required along the common property line. Trees must be non-deciduous and may not be clustered. A six foot high (minimum) wall shall be required along the common property line.

d. Parking Lot Landscaping.

i. A minimum of five percent of the parking lot area shall be landscaped, exclusive of front yard or perimeter landscaping and street trees. Such landscaping

shall consist of parking islands located within the perimeter of the parking lot.

ii. A minimum of one tree shall be provided for every eight parking spaces, exclusive of perimeter landscaping and street trees. Trees must be planted within the parking lot.

iii. Parking islands or landscaped areas shall be installed at least every ten consecutive parking spaces; said islands shall be a minimum of five feet wide and contain a minimum of fifty square feet in area.

iv. All parking lots shall be separated from adjacent residential uses or districts by a ten foot landscaped strip planted with a minimum of one tree every fifteen linear feet and a minimum six foot high (minimum) masonry wall.

v. All parking lots shall be screened from public streets by walls or earth berms or combination thereof, constructed at least three feet above the grade of the parking lot or adjacent street, whichever is higher in elevation. Variety to the alignment and style of the walls is required. Said walls shall be decoratively designed to match the facade of any buildings and shall be constructed of slump block, brick, or masonry with a mortar wash or stucco finish.

vi. Any landscaped area used for vehicular overhang shall not be counted towards the required landscaping.

e. Ground Cover.

i. A minimum of twenty-five percent of all frontage landscaped areas shall be covered with vegetative or organic ground cover consisting of living plant materials characterized by horizontal growth which generally does not exceed eighteen inches in height.

ii. Vegetative ground cover shall be so located to accentuate landmarks or focal points on a site and to create a "lush" appearance to the landscaped area from public streets and areas.

iii. Inorganic ground cover, consisting of decomposed granite (3/4 inch), crushed rock, gravel, river run rock and/or boulders, shall be of sufficient variety in terms of color, texture, and materials to provide a pleasant and diverse appearance to the streetscape. Mounding and contouring of landscaped areas is required.

f. Retention Basins.

i. All private retention basins in commercial and industrial projects shall be landscaped. Such basins may not occupy more than fifty percent of any landscaped area fronting on a public street; except where exceptional design or shallow depths are proposed for the retention basin, the city manager or designee may permit a greater use of the frontage landscaped area.

ii. Retention basins shall be contoured and designed as an integral part of any frontage landscaping and shall not take on the appearance of a ditch. Maximum side slopes of basins shall be a four to one ratio; side slopes of six to one are preferred.

g. Maintenance.

i. All landscape materials and landscaped areas shall be maintained in accordance with the approved landscaped plan. Such landscaped areas shall be kept free of trash, debris, weeds, and dead plant material, and shall in all respects be maintained in a neat and clean fashion.

ii. All dead or removed plants shall be replaced with plants of the same variety, and in the size and quality as those removed.

iii. The maintenance of landscaping in the public right-of-way shall be the responsibility of the adjacent property owner, whether an individual, corporation, or homeowner's association.

iv. No landscaped area shall be used for the parking of vehicles or the storage or display of materials, supplies or merchandise.

h. Foundation Planting. Foundation planting is required adjacent to buildings fronting on public streets. A minimum of thirty-three percent of the building frontage shall be landscaped, with a minimum width planter area of three feet (vehicle overhang not permitted).

E. Installation Prior to Occupancy Permit. All landscaping materials and equipment as provided for on the approved final landscape plan for any residential, commercial, or industrial development, or in the case of phased development, for the particular phase, shall be installed prior to the issuance of any occupancy permit, unless a financial guarantee in the amount of one hundred fifty percent of the cost of the materials and labor is submitted to the city. Financial guarantees shall be of the types and forms as provided in Chapter 16.24 of the City Code. In the event that a cash deposit is made for the purpose of a financial guarantee, no interest shall be paid by the city unless specific arrangements are made for such interest to be paid, prior to city acceptance of the deposit. (Ord. 97-16 §22, 1997; Ord. 86-6 §8-803, 1986)

17.32.040 Dwelling unit restrictions. No cellar, garage, tent, basement with unfinished structure above, or accessory building or any mobile home or recreational vehicle outside of an approved mobile home or recreational vehicle shall at any time be used as a dwelling unit. The basement portion of a finished home may be used for normal living, eating and sleeping purposes, provided it is properly damp-proofed and has suitable fire protection and exits. (Ord. 86-6 §8-804, 1986)

17.32.050 Accessory buildings, uses and equipment.
A. An accessory building shall be considered an integral part of the principal building if it is connected to the principal building by a covered passageway.

B. Accessory buildings and garages in residential districts shall not exceed the height of the principal structure and shall not be located within a utility easement.

C. No accessory building or garage for single-family homes shall occupy more than twenty-five percent of a rear yard nor exceed six hundred square feet of floor area, except that garages which exceed the aforesaid maximum may be allowed with a conditional use permit.

D. No permit shall be issued for the construction of more than one accessory, detached, private garage structure for each dwelling.

E. No accessory building or use shall be constructed or developed on a lot prior to the time of construction of the principal building to which it is accessory, except by conditional use permit.

F. Accessory buildings in any business or industrial district may be located only to the rear of the principal building.

G. No accessory building in any business or industrial district shall exceed the height of the principal building except by conditional use permit. (Ord. 86-6 §8-805, 1986)

17.32.060 Fences. A. Permit Required. No persons, firm or corporation, except on a farm and related to farming, shall hereafter construct, or cause to be constructed or erected within the city any fence without first making an application for and securing a building permit.

B. Locations. All fences shall be located entirely upon the private property of the persons, firms or corporation constructing, or causing the construction of, such fence unless the owner of the property adjoining agrees, in writing, that such fence may be erected on the division line of the restrictive properties.

C. Construction, Maintenance and Height Measurement.

1. Construction and Maintenance. Every fence shall be constructed in a substantial, workmanlike manner and of substantial material reasonably suited for the purpose for which the fence is proposed to be used. Every fence shall be maintained in a condition of reasonable repair and shall not be allowed to become and remain in a condition of disrepair, damage, or unsightliness, or constitute a nuisance, public or private. Any such fence which is, or has become, dangerous to the public safety, health or welfare, or has become unsightly through improper maintenance or neglect is a public nuisance, and the zoning administrator shall commence proper proceedings for the abatement thereof.

b. Link, or wire fences, wherever permitted, shall be constructed in such a manner that no barbed ends shall be at the top, except in industrial districts and shall be constructed of at least eleven gauge wire or its comparable.

c. Electrical or barbed wire fences shall be prohibited, except in an I-1 district.

2. Measuring Fence Height. The height of any fence shall be calculated to the uppermost points as follows:

a. In required yards abutting a street, the height of the fence shall be the total effective height measured from the finished grade on the side nearest the street.

b. In other required yards, the height of the fence shall be the total effective height above the finished grade measured on the side nearest the abutting property.

c. On property lines the height may be measured from the finished grade of either side when the abutting property owners are in joint agreement, with such agreement submitted in writing.

D. Residential Fences.

1. In all parts of Surprise zoned residential, no fence or wall shall be erected or maintained more than six feet in height and also:

a. In R-2 and R-3 zones, no fence or wall shall be allowed in any required front yard.

b. In R1-5, R1-8, R1-18 or R1-43 zones, no fence or wall shall be allowed in any required front yard which has any supporting member measuring forty-eight inches in height, or any horizontal member or series of verti-

cal members spaced closer than four feet from one another over forty-two inches in height, or less than sixty-five percent transparent, except walls or fences twenty-four inches or less in height with a transparency of less than sixty-five percent shall be permitted. (Note: Generally chainlink fences and two-rail fences are seventy to ninety percent transparent.)

c. Any fence which exceeds thirty-six inches in height on a corner lot must maintain a minimum twenty feet corner setback, described as follows: Beginning at the intersection of the projected curbing lines of two local intersecting streets, thence a minimum of twenty feet along one curb line, thence diagonally to a point of a minimum twenty feet from the point of beginning on the other curbline, then to the point of beginning, so as not to obstruct the line of site visibility. (Note: Local streets as defined per Ordinance 86-07, Section 11-1105C(2)(a).)

2. Fences, walls or hedges which are erected in any side yard and which run parallel or approximately parallel to the front line of a building or mobile home shall be set back from the front line of the building or mobile home a minimum of five feet.

3. On corner lots in all districts except as permitted herein, no fence or planting in excess of thirty inches above the street center line grade shall be permitted within a triangular area defined as follows: beginning at the intersection of the projected curbing lines of two intersecting streets, thence forty feet along one curbline, thence diagonally to a point forty feet from the point of beginning on the other curbline, then to the point of beginning.

4. In those instances where a fence is erected as an enclosure which restricts access from the front to the rear yard, a gate, identifiable collapsible section, or other such means or recognizable ingress shall be installed, shall remain unobstructed and shall be a minimum of three feet in width. The location of such ingress points shall be positioned at any point paralleling the front lot line between the side lot property line and the principal structure.

5. In corner side yards, fences up to six feet in height may be permitted provided that no fence may be built in a corner side yard that is adjacent to a neighboring front yard.

E. Business and Industrial District Fences. Fences in all commercial and industrial districts shall not exceed ten feet in height except that boundary-line fences abutting residential districts shall not be greater than six feet in height.

F. Special Purpose Fences. Fences for special purposes and fences differing in construction, height or

length may be permitted in any district by issuance of conditional use permit approved by the planning and zoning commission. Findings shall be made that the fence is necessary to protect, buffer or improve the premises for which the fence is intended and will not detrimentally affect adjacent property.

G. Fences in all Districts. Any fence constructed so as to have only one elevation "finished," which shall be defined as not having its supporting members significantly visible, shall be erected such that the finished elevation of the fence is exposed to the adjacent property. (Ord. 88-16 §§1, 2, 1988; Ord. 87-5, 1987; Ord. 86-6 §8-806, 1986)

17.32.070 Setback and height encroachments, limitations and exceptions. The following shall be considered as permitted encroachments on setback and height requirements except as hereinafter provided:

A. In any yards: Posts; off-street, open-parking spaces; sills; pilasters; lintels, cornices; eaves; gutters; awnings; open terraces; service station pump islands; open canopies; steps; flag poles; ornamental features; open fire escapes; sidewalks; and fences, except as hereinafter amended. Also, terraces; steps; exposed ramps (wheelchair); uncovered porches; stoops; or similar features, provided they do not extend above the height of the ground floor level of the principal structure or to a distance of less than three feet from any lot line nor less than one foot from any existing or proposed access drive. Also, yard lights and nameplate signs in residential districts; trees, shrubs; plants; floodlights or other sources of light illumination, authorized lights or light standards for illuminating parking areas, loading areas or yards for safety and security reasons, provided the direct source of light is not visible from the public right-of-way or adjacent, residential property.

B. In side and rear yards: Balconies eight feet above grade may extend into the yards to within five feet of a lot line, provided said balconies do not extend over nonresidential driveways; recreational equipment, picnic tables and apparatus needed for the operation of active and passive solar-energy systems.

C. In rear yards: Laundry, drying equipment; covered but not enclosed porches, breezeways and detached outdoor livingrooms may extend twenty feet into the rear yard but not closer than ten feet from the rear lot line; apparatus needed for the operation of active and passive solar-energy systems.

D. Height. Height limitations shall not apply to church spires, belfries, cupolas and domes; monuments; chimneys and smokestacks; flag poles; pubic and private utility facilities; transmission towers or commercial and

private radio broadcasting stations; television antennae; parapet walls extending no more then four feet above the limiting height of the building except as hereinafter provided; and solar-energy collectors and equipment used for the mounting or operation of such collectors.

E. Side and Rear Setbacks-Zero Lot Line Provision. Subject to regulations contained in the Uniform Building Code and other applicable regulations, buildings may be excluded from side and rear setback requirements provided party walls are used and if the adjacent buildings are constructed as an integral unit. This primarily pertains to townhomes and condominium structures.

F. Front Setbacks Averaging. When more then twenty-five percent of the frontage on the side of a street between intersections is occupied by structures having setbacks from the street rights-of-way of greater or lesser amounts than hereinafter required, the average setback of all existing buildings between the intersections shall be maintained by all new or relocated structures. In the event a building is to be built where there is an established average setback different from that required hereinafter and there are existing buildings on one side only, the front setback of said new building needs to be no greater than that of the next adjoining existing building. In a case where a building is to be built where there is such an established average setback and there are existing buildings on both sides of the said new building, the front setback shall not be required to be greater than that which would be established by connecting a straight line between the furthest extension of the first adjacent building on each side. (Ord. 86-6 §8-807, 1986)

17.32.080 Off-street parking requirements. A. General Provisions.

1. Floor Area. The term "floor area," for the purpose of calculating the number of off-street parking spaces required, shall be determined on the basis of the exterior area dimensions of the building, structure or use multiplied by the number of floors, minus ten percent, except as may hereinafter be provided or modified.

2. Change of Use or Occupancy of Buildings. Any change of use or occupancy of any building or buildings including additions thereto requiring more parking shall not be permitted until such additional parking spaces as required by this chapter are furnished.

3. Parking Accessory to a Residential Use. Off-street parking facilities accessory to residential use shall be utilized solely for the parking of licensed and operable passenger automobiles; no more than one truck not to exceed gross capacity of twelve thousand pounds; and recreational vehicles and equipment. Under no circumstances shall required parking facilities accessory to a resi-

dential structure be used for storage of commercial vehicles or equipment or for the parking of automobiles belonging to the employees, owners, tenants or customers of business or manufacturing establishments.

4. Parking in Residential Setbacks. No motor or recreational vehicle shall be parked in any front or corner side setback except on a paved, parking surface.

B. Stall, Aisle and Driveway Design.

1. Parking dimensions: The following shall be the minimum parking space dimensions:

Angle	Width[1]			Length			Aisle Width[2]
	Standard	Handicapped	Compact[4]	Standard	Handicapped	Compact[4]	
90 degrees	9'	13'	8'	18'	18'	16'	25'
60 degrees	9'	13'	8'	18'	18'	16'	20'
45 degrees	9'	13'	8'	18'	18'	16'	15'[3]

2. Within structures. The off-street parking requirements may be furnished by providing spaces so designed within the principal building or structure attached thereto; however, unless provisions are made, no building permit shall be used to convert said parking structures into a dwelling unit or living area or other activity until other adequate provisions are made to comply with the required off-street parking provisions of this title.

3. Circulation between bays. Except in the case of single-family, two-family, townhouse, three-family and four-family dwellings, parking areas shall be designed so that circulation between parking bays occurs within the designated parking lot and does not depend upon a public street or alley. Except in the case of single-family, two-family, townhouse, three-family and four-family dwellings, parking area design which requires backing into the public street is prohibited.

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1 As measured by a line perpendicular to the stall line at a point on the outside end of the stall, except when the stall is on the inside edge of a curve, in which case the point of measurement shall be on the inside end of the stall.

2 For ninety degree parking, aisles are two-way; for sixty degree and seventy-five degree parking they are one-way only.

3 Except where needed as a fire lane in which case a twenty-foot minimum is required.

4 Unless otherwise approved all parking spaces shall be of standard width, but in no case shall compact spaces exceed thirty percent of the total required spaces.

4. Preserving off-site parking. When required, accessory off-street parking facilities are provided elsewhere than on the lot with the same ownership or control, either by deed or long-term lease, than the property occupied by such principal use, the owner of the principal use shall file a recordable document with the city and county clerk requiring the owner and his or her heirs and assigns to maintain the required number of off-street spaces during the existence of said principal use.

5. Drive access. All drive accesses shall be approved by the city engineer for width and location.

6. Drive access required. All off-street parking spaces shall have access from a drive access and not directly from the public street.

7. Distance from intersection. No drive access shall be located nearer than forty feet (in a residential district), one hundred fifty feet (in a commercial district), or one hundred fifty feet (in an industrial district) from the intersection of two public street rights-of-way.

8. Parallel parking spaces. Shall be a minimum of twenty-two feet in length.

9. Distance between drive accesses. Drive accesses to a public street except for single-family, two-family and townhouse dwellings shall not be located less than forty feet from one another as measured from inside of drive to inside of drive.

10. Number of drive accesses. Each property shall be allowed one drive access for each one hundred feet of street frontage. Single-family uses shall be limited to one drive access per property. These conditions shall apply unless otherwise granted by the planning and zoning commission.

11. Grade: The grade elevation of any parking area shall not exceed three percent.

12. Surfacing. All areas intended to be utilized for parking space and driveways shall be paved with materials suitable to control dust and drainage. Plans for paving and drainage of driveways and stalls for five or more vehicles shall be submitted to the city engineer for his/her review, and the final drainage plan shall be subject to his/her written approval.

13. Striping. Except for townhouses and single-family, two-family, three-family and four-family dwellings, all parking stalls shall be marked with painted lines not less than four inches wide.

14. Lighting. Any lighting used to illuminate an off-street parking area shall be so arranged as to reflect the light away from adjoining property, abutting residential uses and public rights-of-way and be in compliance with this title.

15. Signs. No sign shall be so located as to restrict the sight lines and orderly operation and traffic movement within any parking lot. All signs shall conform to city sign requirements.

16. Curbing. Except for townhouses and single-family, two-family, three-family and four-family dwellings, all open off-street parking areas and driveways shall have a perimeter concrete curb and gutter around the entire parking lot built according to standards provided by the city engineer.

17. Protruding vehicles. All on-site parking stalls which abut property lines shall be designed and constructed such that parked vehicles shall not protrude over property lines. Every driveway which is appurtenant to a residential structure shall provide a vehicle parking area not less than eighteen feet in length. The length of the parking area shall be measured from the front of the garage door, or from the end of the parking area if there is no garage, to the back of the adjoining sidewalk, or to the back of the adjoining curb if there is no sidewalk. If the garage door opens vertically without protruding into the parking area, the minimum length of eighteen feet shall apply. If the garage door does not open vertically, the length of the parking area shall be increased to not less than twenty feet.

C. Maintenance. It shall be the joint and separate responsibility of the lessee and owner of the principal use, uses or building to maintain in a neat and adequate manner, the parking space, accessways, striping, landscaping and required fences.

D. Use of Required Parking Areas for Parking Only. Required accessory off-street parking spaces in any district shall not be utilized for open storage, sale or rental of goods, or storage of inoperable vehicles.

E. Number of Spaces Required. The following minimum number of off-street parking spaces shall be provided and maintained by ownership, easement and/or lease for and during the life of the respective uses hereinafter set forth:

1. Residential Uses.

Dwelling Types	Off-Street Parking Spaces Required	
	With Street Parking	Without Street Parking
Single-family dwelling	2 spaces/unit	3 spaces/unit
Mobile homes	2 spaces/unit	3 spaces/unit
Two-family dwelling	2 spaces/unit	2.25 spaces/unit
Three-family dwelling	2 spaces/unit	2.25 spaces/unit
Four-family dwelling	2 spaces/unit	2.25 spaces/unit
Townhouse	2 spaces/unit	2.25 spaces/unit
Apartments	2.25 spaces/unit	2.25 spaces/unit
Boarding houses	2.25 spaces/unit	2.25 spaces/unit

2. Nonresidential uses.

Use Type	Off-Street Parking Spaces Required
Assisted living facility	.75 spaces per unit
Automobile sales	One space per 200 square feet of indoor floor area plus two spaces per 20 outdoor vehicle display spaces
Automobile service station	Two spaces per service stall but no less than four spaces
Automobile washing establishment automatic drive-through	Three spaces or one for each employee on maximum shift, in addition to stacking space
self-service	Two spaces per stall not including washing or drying spaces
Bowling alley	Four spaces per alley, plus two spaces per billiard tables, plus one space per pinball and/or electronic game machine, plus one space per each five visitor gallery seats
Church	One space per four seats based upon design capacity of main assembly hall
Community or recreation center	One space per 200 square feet of floor area
Congregate care facility	1.5 spaces per unit
Dance halls, skating rinks or similar uses	One space per 300 square feet of floor area
Court clubs, (racquetball, handball, tennis)	One space per 200 square feet of floor area plus three spaces per court
Day care centers	One space per 200 square feet of floor area.
Furniture stores over 20,000 square feet	Three spaces per 1,000 square feet of floor area

Golf courses	One space per 200 square feet of main building floor area, plus one space for every two practice tees in driving range, plus four spaces per each green in the playing area
Hospital	One space per bed
Manufacturing and industrial uses	One space per 450 square feet of floor area, plus one space for each company owned truck if not stored within the building
Medical and dental offices	Four spaces for each doctor or dentist, plus one space for each employee
Motels, hotels	One and one-tenth spaces per each guest room, plus one space per employee on maximum shift, plus spaces for accessory uses as follows:
Restaurants, bars dining rooms	one space per 60 square feet
Commercial areas	one space per each 400 square feet of floor area
Public assembly areas	one space for each five seats based upon design capacity, except that total off-street parking for public assembly may be reduced by one space for every four guest rooms.
Nursing homes	.5 spaces per bed
Offices (except medical and dental)	Minimum of four spaces and
Floor area 0—5,000 square feet	four spaces per 1,000 square feet
Floor area 5,000—20,000 square feet	three and one-half spaces per 1,000 square feet
Floor area of over 20,000 square feet	three spaces per 1,000 square feet
Outdoor sales (plant nurseries, building materials, equipment rental and similar uses)	One space per 300 square feet of sales and/or display area

Restaurants, cafes, bars and similar uses	One space per 50 square feet of indoor public floor area, plus one space per 200 square feet of outdoor serving (patio) area

Retail store and service establishments	One space per 250 square feet of floor area
Schools	
Elementary and/or junior high	One and one-half spaces for each classroom, library, lecture hall and cafeterias, plus one space per each three fixed seats in the main area of public assembly, or one space for each 21 square feet of area available for public assembly if fixed seats are not provided
Senior high	One and one-half spaces for each classroom or lecture hall, plus one space per each five students, plus one space for each nonteaching employee, plus one space per each three fixed seats in the area of public assembly, or one space per 21 square feet of area available for public assembly if fixed seats are not provided.
Business or similar school	One space for each 150 square feet of floor area
Theatre, auditorium or similar place of public assembly	One space per four seats based upon design capacity
Warehousing, storage or handling of bulk goods	One space per 1,000 square feet of floor area devoted to storage of goods, plus one space for each employee on maximum shift, plus one space for each company truck not stored inside the building, plus appropriate spaces to support accessory office or retail sales facilities, subject to the office and/or retail sales parking requirements.

F. Joint Use of Parking Facilities.

1. Up to eighty percent of the parking facilities required by this subsection for a church or for an auditorium incidental to a public or parochial school may be supplied by the off-street parking facilities by the following daytime uses: banks, business offices, retail stores, personal service shops, household equipment or furniture shops, clothing or shoe repair or service shops, manufacturing, wholesale or similar uses.

2. Other joint use of parking by adjacent commercial uses to reduce total parking spaces may be allowed with approved parking study submittal by a registered transportation engineer.

3. Conditions Required for Joint Use.

a. The building or use for which application is being made to utilize the off-street parking facilities provided by another building or use shall be located within three hundred feet of such parking facilities.

b. The applicant shall show that there is no substantial conflict in the operating hours of the two buildings or uses for which joint use of off-street parking facilities is proposed.

c. A properly drawn legal instrument, executed by the parties concerned for joint use of off-street parking facilities, duly approved as to form and manner of execution by the city attorney, shall be filed with the city clerk and recorded with the county recorder.

G. Off-Site Parking.

1. Any off-site parking which is used to meet the requirements of this title shall be a conditional use as regulated by this title and shall be subject to the conditions listed below.

2. Off-site parking shall be developed and maintained in compliance with all requirements and standards of this title.

3. Reasonable access from off-street parking facilities to the use being served shall be provided.

4. The site used for meeting the off-site parking requirements of this title shall be under the same ownership as the principal use being served, under public ownership, or shall have guaranteed permanent use by virtue of a perpetual lease filed with the city clerk and county clerk.

5. Off-site parking for multiple-family dwellings shall not be located more than two hundred feet from any normally used entrance of the principal use served.

6. Off-site parking for nonresidential uses shall not be located more than three hundred feet from the main entrance of the principal use being used.

7. Any use which depends upon off-site parking to meet the requirements of this title shall maintain ownership or prove a long term irrevocable lease agreement for parking utilization of the off-site location. (Ord. 97-16 §23, 1997; Ord. 96-06 §2, 1996; Ord. 86-6 §8-808, 1986)

17.32.090 Off-street loading. A. Location.

1. All required loading berths shall be off-street and located on the same lot as the building or use to be served.

2. Except for loading berths required for apartments, no loading berths shall be located closer than fifty feet from a residential district unless within a structure.

3. Loading berths shall not be located within the minimum front yard building setback.

4. Loading berths located at the front or at the side of buildings on a corner lot shall observe the following requirements:

a. Loading berths shall not conflict with pedestrian movement.

b. Loading berths shall not obstruct the view of the public right-of-way from off-street parking access.

c. Loading berths shall comply with all other requirements of this section.

B. Screening. Except in the case of multiple dwellings, all loading areas shall be screened and landscaped from abutting and surrounding residential uses.

C. Size. Unless otherwise specified in these zoning regulations, the first loading berth shall be at least seventy feet in length and additional berths required shall be at least thirty feet in length and all loading berths shall be at least ten feet in width and fourteen feet in height, exclusive of aisle and maneuvering space. (Ord. 86-6 §8-809, 1986)

17.32.100 Signs. All signs must conform to Chapter 15.24, city sign ordinances for all site plans, conditional uses, planned area developments and other applicable procedures addressed in this title. Any and all requirements pertaining to signs shall comply with Chapter 15.24. (Ord. 86-6 §8-810, 1986)

17.32.110 Home occupations. A. Generally. A home occupation is an accessory use of a dwelling unit, conducted entirely within the dwelling unit, carried on by one or more persons, all of whom reside within the dwelling unit, and where no persons are employed other than resident and domestic help; anywhere the use is clearly incidental and secondary to the use of the dwelling for residence purposes and does not change the character thereof or adversely affect the uses permitted in the residential district of which it is a part. There shall be no outside storage of any kind; any indoor storage, construction, alterations, or electrical or mechanical equipment used, shall not change the fire rating of the structure or the fire district in which the structure is located. The use may increase vehicular traffic flow and parking by no more than one additional vehicle at a time. It shall not cause an increase in the use of one or more utilities (water, sewer or garbage) so that the combined total use for dwelling and home occupation purposes of the one or more utilities exceeds the average for residences in the neighborhood. When a use

is a home occupation, it means that the owner, lessee, or other persons who have a legal right to the use of the dwelling unit also have the vested right to conduct the home occupation without securing special permission to do so. However, such person shall be subject to all conditions set forth in this title, such as off-street parking, and to all other permits required by the city, such as building permits and business licenses, and is encouraged to check with city officials before establishing such home occupation.

B. Purpose. It is the intent of this section to eliminate as home occupations all uses except those that conform to the standards set forth in this section. In general, a home occupation is an accessory use so located and conducted that the average neighbor, under normal circumstances, would not be aware of its existence. The standards for home occupations in this section are intended to ensure compatibility with other permitted uses and with the residential character of the neighborhood, and a clearly secondary or incidental status in relation to the residential use of the main building as the criteria for determining whether a proposed accessory use qualifies as a home occupation.

C. Necessary Conditions. Home occupations are permitted accessory uses in residential zones only so long as all the following conditions are observed:

1. Such occupation shall be conducted solely by resident occupants in their residence;

2. No more than one room or twenty-five percent of the gross area of one floor of said residence, whichever is less, shall be used for such purpose. Use of accessory buildings or garages for these purposes is prohibited,

3. No use shall require internal or external alterations or involve construction features or the use of electrical or mechanical equipment that would change the fire rating of the structure or the fire district in which the structure is located.

4. No home occupation shall cause an increase in the use of any one or more utilities (water, sewer, garbage, etc.) so that the combined total use for dwelling and home occupation purposes exceeds the average for residences in the neighborhood;

5. There shall be no outside storage of any kind related to the home occupation;

6. The use may increase vehicular traffic flow and parking by no more than one additional vehicle at a time;

7. No use shall create noise, dust, vibration, smell, smoke, glare, electrical interference, fire hazard, or any other hazard or nuisance to any greater or more frequent extent than that usually experienced in an average residential occupancy in the district in question under normal circumstances wherein no home occupation exists.

Complaints by citizens or residents may be cause for termination of the home occupation.

D. Examples of the Uses that Frequently Qualify as Home Occupations. The following are typical examples of uses which can be conducted within the limits of the restrictions established in this section and thereby qualify as home occupations. Uses which may qualify as "home occupations" are not limited to those named in this subsection (nor does listing of a use in this subsection automatically qualify as a home occupation): Accountant, architect; artist; attorney-at-law; author; consultant; dressmaking; individual stringed-instrument instruction; individual tutoring; insurance; millinery; preserving and home cooking; realtor.

E. Uses that are Prohibited. The following uses by the nature of the investment of operation have a pronounced tendency, once started, to rapidly increase beyond the limits permitted for home occupations and thereby impair the use and value of a residentially zoned area for residential purposes. Therefore, the following uses shall not be permitted as home occupations: auto repair, minor or major; barber shop; carpentry work; dance instruction; dental offices; medical offices; painting of vehicles, trailers or boats; photo developing; photo studios; private schools with organized classes; radio repair; television repair; upholstering. (Ord. 86-6 §8-811, 1986)

17.32.120 Miscellaneous performance requirements.

A. Glare and Lighting.

1. Any lighting used to illuminate an off-street parking area, sign or other structure shall be arranged so as to deflect light away from any adjoining residential zone or from the public streets. Direct or sky-reflected glare, whether from floodlights or from high temperature processes such as combustion or welding, shall not be directed into any adjoining property. The source of lights shall be hooded or controlled in some manner so as not to light adjacent property. Bare incandescent light bulbs shall not be permitted in view of adjacent property or public right-of-way. Any light or combination of lights which cause light on a public street, other than lights specifically intended for that purpose, shall not exceed one footcandle (meter reading) as measured from the center line of said street. Any light or combination of lights which cast light on residential property shall not exceed four footcandles (meter reading) as measured from said property.

2. No light which is flashing, revolving, or otherwise resembles a traffic-control signal shall be allowed in any area where it could create a hazard for passing vehicular traffic.

B. Surface Water Ponding. Natural ponding areas shall be retained as much as possible or, if necessary, enlarged or modified as directed by the city engineer to restrict the off-site runoff, subject to city subdivision requirements for storm water runoff control and Chapter 15.20, Stormwater retention.

C. Storage--Exterior Displays. All materials, supplies, merchandise or other similar matter not on display for direct sale, rental or lease to the ultimate consumer or user shall be stored within the confines of a one hundred percent opaque wall or fence not less than six feet tall. Merchandise which is offered for sale as described may be displayed beyond the confines of a building in any general commercial district, but the area occupied by such outdoor display shall not constitute a greater number of square feet than ten percent of the ground floor area of the building housing the principal use, unless such merchandise is a type customarily displayed outdoors, such as automobiles and garden supplies. No storage of any type shall be permitted within the one-half of the required front or side street setback nearest the street nor within any required interior side or rear setback.

D. Trash and Garbage Incinerators--Storage. No exterior incineration of trash or garbage is permissible. No exterior storage of trash or garbage is permissible except in an accessory building enclosed by walls and roof or in closed containers within a totally screened area.

E. Refuse Containers. It shall be the duty of the owner or developer of all new single-family residential construction and development within the city, when such development is not subject to the provisions of the Surprise subdivision ordinance with respect to refuse containers, to supply at his/her expense refuse containers which shall become the property of the city. The type of such containers shall be approved by the city engineer.

F. Public Street Frontage. Except as otherwise allowed or required by this title, no lot shall contain any building unless such lot abuts for at lest fifty feet on a pubic street or a private street approved as part of a city approved planned development.

G. Smoke, Dust and Other Particulate Matter. The emission of smoke, dust and other particulate matter shall be in compliance with the county bureau of air pollution standards as regulated by the Maricopa County health services development.

H. Bulk Storage (Liquid). All uses associated with bulk storage of all gasoline, liquid fertilizer, chemicals, flammable and similar liquids shall comply with Uniform Building and Fire Code requirements and Maricopa County regulations.

I. Water Quality, Hazardous Wastes and Wastewater. Discharge of hazardous waste, chemicals and wastewater will

be subject to Arizona Department of Health Services, Division of Environmental Health standards.

J. Odors. The emission of odors by any use shall be in compliance with city standards and regulations.

K. Noise. The emission of noise from any use shall be in compliance with city standards and regulations. (Ord. 86-6 §8-812, 1986)

17.32.130 Nonconforming uses and structures. A. Any structure or use lawfully existing upon the effective date of the ordinance codified in this title may be continued at the size and in the manner of operating existing upon such date except as hereinafter specified.

B. When a structure has been declared unsafe by the building safety department it may be placed in a safe condition unless such condition was created as described in subsection D of this section.

C. When any unlawful nonconforming use of any structure or land in any district has been changed to a conforming use, it shall not thereafter be changed to any nonconforming use.

D. Whenever a lawful nonconforming use of a building or structure has been damaged by fire, flood, explosion, earthquake, war, riot or act of God to an extent greater than sixty percent of its originally appraised value, it shall not be reconstructed, but such property shall revert to a conforming use.

E. Whenever a lawful nonconforming use of a building or structure or land is discontinued for a period of ninety days, any future uses of said building or structure or land shall be in conformity with the provisions of this title.

F. Normal maintenance of a building or other structure containing or related to a lawful nonconforming use is permitted, including necessary structural repairs provided such structural repairs do not enlarge or intensify the nonconforming use.

G. A lawful nonconforming use shall not be changed except in conformance with the use requirements of the zone in which it is located.

H. Alterations may be made to a structure or building containing lawful nonconforming residential units when they will improve the liveability thereof, provided they will not increase the number of dwelling units or enlarge or intensify the nonconforming use.

I. Existing Lots.

1. At the time of the enactment of the ordinance codified in this title, if any owner of a plot of land consisting of one or more adjacent lots in a subdivision of record does not own sufficient contiguous land to enable him/her to conform to the minimum lot size requirements or does not have sufficient lot width to conform to the minimum lot width requirements, such plot of land may neverthe-

less be used as a building site. The dimensional requirements of the district in which the piece of land is located may be reduced by the smallest amount that will permit a structure of acceptable size to be built upon the lot, such reduction to be determined by the board of adjustment.

a. In the R1-43, R1-18, R1-8 and R1-5 zones, the reductions shall permit only a single-family residence.

b. In the R-2 zone, the reduction shall permit only a duplex.

c. In the R-3 zone, the reduction shall permit only a townhouse cluster or apartment containing no more than four units.

2. No lot, even though it may consist of one or more adjacent lots in the same ownership at the time of passage of the ordinance codified in this title, shall be reduced in size so that lot width or size of yards or lot area per family or any other requirement of this title is not maintained. This section shall not apply when a portion of a lot is acquired for a public purpose. (Ord. 97-16 §24, 1997: Ord. 86-6 §8-813, 1986)

17.32.140 Manufactured home subdivisions. A. Purpose. The purpose of these regulations is to ensure quality subdivisions which are compatible with the surrounding neighborhood.

B. Manufactured Homes Prohibited. No person shall place or occupy any manufactured home anywhere in the city except in a manufactured home subdivision which has been established pursuant to this section or in a mobile home and manufactured home park which has been established pursuant to Section 17.28.080(C).

C. Development Standards.

1. Minimum size for manufactured home subdivisions shall be ten net acres;

2. Manufactured home subdivision density, yard, area, and sign requirements shall be determined by the underlying residential zone;

3. No more than one home shall be placed on any lot and no home shall be used for anything other than a single-family residential dwelling unit;

4. Homes shall be permanently oriented on a lot or parcel so that the wide side of the home faces the front lot line, except on a lot or parcel where such an orientation would not meet side yard width requirements at every location between the lot's front and rear setback lines;

5. If a permanent foundation wall is not installed, all sides of the home shall extend to meet the surrounding ground, or a facade shall be used on all sides of the home that would appear to have a foundation wall similar in appearance and kind to those used in conventional site built homes;

ing that the applicant has not shown that the conditions required for approval do exist. No application for a conditional use permit which has been denied wholly or in part shall be resubmitted for a period of six months from the date of said order of denial, except on grounds of new evidence or proof of change of conditions found to be valid by the commission.

D. Notification of Commission Action. The applicant shall be notified in writing of the action taken by the commission within seven days of its action. If the application has been granted, the permit shall be issued upon the signature of the chairman of the planning and zoning commission and the community development director, and any conditions, automatic termination date or period of review shall be stated on the permit. (Ord. 86-6 §9-905, 1986)

17.36.060 Procedure for planned area development (P.A.D.). A. Generally. Any development proposal which meets the requirements of Section 17.28.110, planned area development, shall be reviewed according to the provisions of this section. All P.A.D. applications shall be reviewed and approved by the planning and zoning commission and city council prior to any physical development on the subject property.

B. Application.

1. The applicant is encouraged to meet with appropriate city staff prior to making application for P.A.D. approval to discuss the development concept, the review and approval process, and the submittal requirements.

2. The applicant shall obtain the necessary application forms from the community development director. Application forms properly completed and accompanied by the required fee shall be submitted to the community development director. Concept plan exhibits shall accompany the application. The concept plan shall be submitted at least seven days prior to meeting with city staff.

C. Concept Plan.

1. Submittal Requirements. The concept plan shall indicate proposed land uses, general circulation patterns, property boundaries, existing land uses on adjacent properties, special site conditions or problems. A computation table showing proposed land use allocations in acres and percent of total site area shall be included on the concept plan.

D. Preliminary Development Plan.

1. Submittal Requirements. Based upon comments received regarding the concept plan, the applicant shall prepare a preliminary development plan. A preliminary development plan shall be submitted at least twenty-one days prior to the hearing by the planning and zoning com-

mission. The following information shall be submitted to the community development director:

a. Legal description of property and indication of gross area;

b. Nature of the applicant's interest in the land to be developed;

c. A generalized location map showing surrounding land use and traffic circulation patterns;

d. Site conditions: An analysis of the existing site conditions which indicates at a minimum:

i. Topographic contours with intervals of no more than two feet, to a distance of one hundred feet beyond the property boundary,

ii. Location and extent of major vegetative cover (if any),

iii. Location and extent of perennial or intermittent streams and water ponding areas,

iv. Existing drainage patterns,

v. Other information considered relevant by the applicant or city staff;

e. Proposed allocations of land use expressed as a percentage of the total area, as well as in acres. Uses to be indicated include:

i. Arterial streets,

ii. Open space (public),

iii. Open space (private),

iv. Residential (if appropriate),

v. A stratification of residential uses in terms of single-family detached units, patio homes, townhouses, garden apartments, etc.,

vi. Commercial (if appropriate),

vii. Industrial (if appropriate),

f. A land use plan at a scale not smaller than one inch equals one hundred feet, indicating land uses, acres and development densities of each land use and the most nearly equivalent zoning categories; all arterial and collector street circulation elements, pedestrian and/or bicycle circulation elements, exact perimeter locations of any/all arterial streets and major collector streets; open spaces; and recreational areas;

g. Plans indicating the approximate alignment and sizing of water lines, sanitary sewers and storm sewers (if any), as well as easements for all utilities, if necessary. Also indicated should be proposed surface drainage patterns;

h. A preliminary plat of the proposed development if land subdivision is proposed;

i. Conceptual architectural renderings indicating the elevations and exterior wall finishes of proposed buildings types;

j. Conceptual landscaping plans, indicating landscaping theme character of the development;

k. A traffic analysis report, if deemed necessary by the city;

l. Phasing plan, if development is to take more than one year.

2. Planning Commission Review and Hearing.

a. Notice of Hearing. The commission shall hold a public hearing on the preliminary development plan. A notice of the time, date, place and purpose of the hearing shall be published in the official newspaper of the city at least fifteen days prior to the date of the hearing.

A similar notice shall be mailed at least seven days before the day of the hearing to each owner of property situated wholly or partly within two hundred feet of the property to which the P.A.D. relates. The community development director shall be responsible for placing and mailing such notices. For purposes of giving mailed notice, the community development director shall require the applicant to furnish the names and addresses of all property owners within two hundred feet of the property.

b. Review. In considering applications for P.A.D. approval, the commission shall consider the following:

i. Interrelationship with the plan elements to conditions both on and off the property,

ii. Conformance to the comprehensive development guide,

iii. The impact of the plan on the existing and anticipated traffic and parking conditions,

iv. The adequacy of the plan with respect to land use,

v. Pedestrian and vehicular ingress and egress,

vi. Architectural design,

vii. Landscaping,

viii. Provisions for utilities,

ix. Site drainage,

x. Open space and/or public land dedications,

xi. Grading,

xii. Other related matters.

The commission shall consider oral or written statements from the applicant, the public, city staff or its own members. It may question the applicant and approve, disapprove or table the preliminary development plan. The application may not be tabled for more than two regular meetings of the commission.

If the commission shall determine by motion that the proposed preliminary development plan will not be detrimental to the health, safety or welfare of the community, will not cause traffic congestion or depreciate surrounding property values and, at the same time, is in harmony with

the purposes and intent of this title, the plan for the area, and the comprehensive development guide, the commission may recommend granting preliminary development plan approval, along with necessary conditions and safeguards, including provisions, as applicable, for public land dedications.

The commission shall notify the city council, in writing, of its recommendation.

3. City Council Consideration and Hearing.

a. Consideration and Hearing. The city council, after receipt of the report and recommendation of the planning and zoning commission, may consider the P.A.D. request. If requested in writing by any member of the public or the town council, the council shall hold a public hearing on the request. A notice of the tim, place and purpose of the hearing shall be published in the official newspaper of the city at least fifteen days prior to the date of the hearing.

A preliminary development plan which has been recommended for denial by the commission shall nct be reviewed by the council except upon written request by the applicant and shall require a public hearing.

b. Review and Approval. In its deliberations on the preliminary development plan, the council shall consider oral or written statements from the applicant, city staff, the public and its own members. The council's review shall encompass the same spectrum of considerations as did the commission's. The city council may approve the preliminary development plan, deny the request, or table the request. The application may not be tabled for more than two meetings in succession.

Conditions may be applied to the approval and/or periodic review of the approval may be required. Approvals, if granted, shall be for a particular development, not for a particular applicant.

c. Public Protests Against P.A.D. If there is written protest against the preliminary development plan signed by the owners of twenty percent or more of the property within one hundred fifty feet of the proposed P.A.D., the preliminary development plan shall not be approved except upon affirmative vote of three-fourths of all members of the city council. If the above protest requirements are not met, approval may be by majority vote of the membership of the city council.

d. Duration of P.A.D. Zoning. Approval of a P.A.D. rezoning request shall be conditioned upon the start of construction beginning within one year of the date of approval action taken by the city council. If, at the expiration of this period, the start of construction has not begun, the property shall revert to its former zoning classification without council or commission action.

In the case of a proposed phased development, start of construction for the first phase must commence within one year, with the remaining phases commencing according to the approved phasing plan.

The city may authorize extensions when deemed necessary.

E. Final Development Plan.

1. Approval. Final P.A.D. development plan approval and the issuance of a development permit for any portion of a P.A.D. shall occur only when:

a. A reproducible copy of the approved preliminary development plan with appropriate signatures is received.

b. The design and construction specifications for all utilities, property and street improvements have been approved by the city engineer.

c. A site plan, subject to the requirements of Section 17.36.040 of this chapter, for the specific portion of the P.A.D. in question has been submitted and has been approved by the planning and zoning commission, as in conformance with the preliminary development plan. (Upon approval of the site plan, a reproducible copy shall be submitted.)

d. Architectural elevations of the buildings, with materials lists, are submitted and approved by the planning and zoning commission.

e. A landscaping plan is submitted and approved by the planning and zoning commission.

f. A performance bond, cash escrow agreement or other acceptable instrument has been deposited with the city in an amount as set by the city council based upon the city engineer's recommendation. This financial guarantee shall be used to ensure the full completion, as specified, of:

i. Public and private streets and utilities;

ii. Landscaping; and

iii. Privately owned and maintained recreational facilities.

g. Any land dedication agreements made as part of the preliminary development plan approval are fulfilled.

2. Platting Requirements. All applicants for a planned area development permit shall be required to file with Maricopa County a final plat of said planned area development complying with all of the requirements of the subdivision ordinance of the city, except to the extent that the council may give specific permission to the effect that the specific portions of the subdivision ordinance need not be complied with. Such required plats shall contain on their face a cross-reference to the P.A.D. development plan.

F. Method of Withdrawing an Application for P.A.D. Approval. Any application for a planned area development

permit may be withdrawn by the applicant at any time prior to filing the final plat upon written notification to the community development director and/or city clerk. The P.A.D. shall be null and void upon receipt of such notice by the city.

G. Amendments to P.A.D. Approval.

1. Minor Changes. Minor changes in the location and placement of buildings may be authorized by the community development director and city engineer where unforeseen circumstances such as engineering requirements dictate such change. When in question, the community development director and the city engineer may determine whether the changes shall be classified as minor or major, or may refer the question to the planning and zoning commission, if they deem it necessary.

2. Major Changes. Major changes, such as alterations in structural types, in the shapes and arrangements of lots and blocks, in the allocation of open space or other land uses which increase density and/or intensity of the project, and all other changes which significantly affect the overall design or intent of the project shall be referred to the planning and zoning commission, after which the commission shall consider and shall either approve or deny the changes in the final development plan. If such changes are authorized, the developer shall submit a revised plan showing the authorized changes. Requirements of Section 17.36.040C and D shall apply to requests for major changes.

H. Denial of P.A.D. Approval. If an application for planned area development approval is denied at either the preliminary development plan or final development plan stage, a new application for a P.A.D. approval by the same applicant on the same site or portion of the site cannot be filed prior to ninety days after the date of denial. (Ord. 86-6 §9-906, 1986)

17.36.070 Procedure for appeals to board of adjustment. A. Application for Appeal. Any aggrieved person or any officer or department of the city affected by a decision of an administrative officer, pertaining to this title, may appeal to the board of adjustment by filing an application with the zoning administrator. The application shall state the name and address (or city office) of the applicant and the reasons for filing the appeal. The application shall be made within twenty-one days of the date of the decision which is being appealed. The zoning administrator shall then transmit to the board the complete record of the action for which the appeal is made. Appeals to the board may be made only in conjunction with an action.

B. Stay of Proceedings. An appeal to the board stays all proceedings in furtherance of the action appealed un-

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CHAPTER 30

DESIGN STANDARDS FOR SINGLE-FAMILY DISTRICTS

Sections:

17.30.010	Purpose
17.30.020	Objective
17.30.030	Design Standard Applicability
17.30.040	General Subdivision Design
17.30.050	Subdivision Lots
17.30.060	Single-Family Architecture

17.30.010 Purpose.

The purpose of the Design Standards is to promote the creation of livable neighborhoods by achieving greater diversity within new residential developments relative to general subdivision design, lot sizes and single-family architecture. The standards set objectives for the developer to meet and are not intended to restrict or impede creativity and imagination.

17.30.020 Objectives.

To insure that new residential development proposals focus attention upon design of the subdivision layout and housing product in order to achieve certain elements of diversity, both within the subdivision and from one subdivision to the next.

To insure that departures from conventional zoning standards are truly warranted by virtue of creativity, amenity and diversity.

17.30.030 Design Standard Applicability.

A. These Design Standard for single-family residential districts shall be applicable to Planned Area Developments and Single-Family Residential R1-8 and R1-5 zoning districts.

B. Given the purpose and objectives, Council may find that departure from these Design Guidelines is warranted for a given project, upon consideration of a particular instance, such as:

(1) a proposed theme or environment so unique that it would provide a new and different component to-and in fact helping to diversity-the Surprise housing stock, or

(2) a demonstrated need for low cost single-family housing, such as the designated Redevelopment Area as set forth in the Surprise Comprehensive Development

Guide, or

(3) single-family retirement housing, wherein the development proposal is consistent with the intent of the Design Standards.

B. The following criteria shall be applicable to all Planned Area Developments, Single-Family Residential R1-8 and R1-5 zoning districts:

(1) Developer shall be expected to provide reasonable plant salvage/protection of on-site indigenous plant material.

(2) Developer shall create and record a set of covenants, conditions and restrictions establishing a homeowners' association or record a maintenance district which shall be responsible for the maintenance of all landscaping in all common areas and rights-of-way.

(3) Developer shall provide for the installation of street lights with underground electric service distribution through the formation of either a Homeowner's Association or a Street Light Improvement District (S.L.I.D.).

(4) Developer shall install underground all existing electric distribution overhead transmission lines carrying 12kVA or less.

C. The following criteria is subject to all Planned Area Developments:

(1) Minimum lot width shall be forty-five (45) feet. No more than twenty-five (25) percent of the total lot yield shall have lot widths between forty-five (45) and forty-nine (49) feet. Minimum lot width for the remainder of the lots shall be fifty (50) feet or greater.

(2) Minimum interior side yard setbacks shall be five (5) feet and eight (8) feet—thirteen (13) aggregate.

17.30.040 General Subdivision Design

A. Provide arterial, collector, and local street improvements to Engineering Department standards. Right-of-way dedications shall be as follows:

Major arterial	130'
Minor arterial	110'
Major collector	80'
Minor collector	60'
Local	50'

B. Provide a curvilinear street system with safe traffic sight visibilities, particularly at

intersections.

C. Provide a number of cul-de-sacs with a diversity feature such as a landscaped island, or pedestrian access to common open space.

D. Provide a sense of neighborhood arrival through thematic entry features utilizing such elements as monument signing, special landscaping, specialty pavement, enhanced fence wall details, boulevard median, etc. (Note: all such elements must be maintained by a homeowner' association and must not impede safe traffic visibilities).

E. Provide landscaped open spaces, visible from arterial street view as well as from residential street view.

F. Design and improve retention areas to be useable and accessible, i.e. certain recreational purposes, such as basketball, volleyball, or tot lots, etc., as well as for specific site and architectural amentities such as ramadas, benches, par courses, etc. should be located at higher elevations of the retention basin thus, making it useable after a flood event.

G. Provide two (2) acres of useable open space (minimum) per every one hundred (100) homes. For residential developments which have less than 100 homes, a minimum of seven (7) percent of the total gross acreage shall be set aside for useable open space.

H. Provide a minimum of one tot-lot play area is required per every project. The developer shall provide more extensive playground equipment/active adult recreational amenities with larger scale projects with more than 100 homes. Said playground equipment/active adult recreational amenities shall be subject to Planning and Zoning Commission approval.

I. Provide a front yard landscaping package and a drip irrigation system for each home. Landscaping shall consist of a minimum of two 15 gallon trees and four 5 gallon shrubs.

J. Inorganic ground cover, specifically decomposed granite, shall be ¾ inch minus "Madison or Spanish Gold", with a two inch minimum thickness, for all arterial and collector street right-of-way landscaping areas. Other similar colors shall be subject to Planning and Zoning Commission approval. Artificially colored rock is prohibited.

K. Perimeter theme walls shall be masonry or a combination of masonry and wrought iron. Construction shall be a minimum 6" or 8" x 8" x 16" CMU masonry block with scored and split face decorative finishes. Other masonry construction specification shall be subject to Planning and Zoning Commission approval.

L. Provide staggers, architectural treatment, or other breaks to relieve the linear character of perimeter masonry block fence walls adjoining arterial streets.

17.30.050 Subdivision Lots.

A. Provide a minimum of three different lot widths (minimum 5 increments) within the same development.

B. Corner side yard setbacks that are adjacent to local streets shall be a minimum of thirteen (13) feet from the property line; twenty (20) feet adjacent to collector and arterial streets. This provides an opportunity to angle building orientation and promotes unique driveway design.

C. Minimum rear yard setbacks shall be twenty (20) feet.

D. Rear yard setbacks along all arterial streets shall be a minimum of thirty (30) feet, unless a minimum ten (10) foot landscape tract, measured from the right-of-way line to the perimeter theme wall, is provided.

E. The space in any required yard shall be open and unobstructed, except for the ordinary projections of chimney flues, outside stairways and balconies, open lattice and other architectural features, provided such features shall not project further than three (3) feet into any required yard, and provided further that in no case shall such projections be nearer than five (5) feet to the property line. Window sills, belt cornices, eaves and other architectural features which occur at least eight (8) feet above grade may encroach three (3) feet into side yards and in no case nearer than three (3) feet from the property line. Shrubs and groundcovers may be planted within any side yard.

F. Fireplaces, entertainment centers, and bay windows (including their cornices and eaves) may project into any required yard not more than three (3) feet,, provided the sum of such projections on any wall does not exceed one-third (1/3) the length of the wall and provided further that in no case shall such projections be nearer than five (5) feet to the property line.

G. Mechanical equipment, such as air conditioners, may be constructed within the rear or side yards provided that in no case shall said mechanical equipment be nearer than five (5) feet to the property line within a required side yard.

H. Stagger front yard setbacks by five (5) feet with no more than two (2) homes in a row with the same front yard setback. Minimum front yard setbacks, as measured from the property line, shall be eighteen (18) for Planned Area Developments and twenty (20) feet for R1-8 and R1-5 districts.

I. Provide different lot widths (at least five (5) feet differential) side by side in the same subdivision.

J. Driveways shall maintain a 20 length, measured from the back of sidewalk to the face of the garage.

K. Provide a mix of driveway orientations, e.g., elbow, circular or angled so that no more

than seventy (70) percent of all driveways are straight.

L. Flag lots shall be required to maintain a minimum 30 feet street frontage.

M. The maximum lot coverage shall not exceed forty-five (45) percent.

17.30.060 Single-Family Architecture.

A. Roof material for residential developments, excluding flat roofs, shall be either all tile (e.g. barrel tile or flat concrete tile) or al composition shingles. A combination of the two within the same development shall be prohibited. Wood shake shingles are prohibited.

B. Each house shall include at least a two-car garage; carports are prohibited.

C. Provide not less than six (6) house colors and three (3) roof colors.

D. Enhance rear and/or side elevations adjacent to arterial or collector streets and open spaces areas.

E. A minimum of four (4) front elevations for each house plan is required. Enhance elevations with architectural treatment on all four-sides of house. The same house plan with the same or similar front elevation shall not be placed on adjacent lots or directly across the street from one another. Similarly, the same rear elevation on adjoining homes visible from arterial street view is prohibited.

F. Emphasize distinctive architectural details in the front elevations, e.g., covered front entries, covered front porches, door and window details roof overhangs, parapet walls with cap features, etc.

G. Provide elevations which have a minimum of four (4) altering ridge lines and roof lines.

H. Incorporate a variety of quality and durable exterior materials and finishes, e.g., brick or masonry as an alternative to stucco; tile inlays (instead of wood trim and stucco pop-outs) etc.

I. De-emphasize garage fronts as the most prominent architectural feature of the dwelling front by incorporating, e.g., side access garages, "in-line" garages, L-shape floor plans, etc., into their product mix.

J. All air conditioning units/mechanical equipment shall be ground mounted and shall not be closer than five (5) feet to the property line within a required side yard.

CITY OF SURPRISE
SINGLE FAMILY RESIDENTIAL DESIGN GUIDELINES
APRIL 21, 1998

Homebuilder's/Company Name:_____

Contact Person: _____

Telephone Number: _____

Comments on the Single-Family Residential Design Guidelines:

_____

_____

_____

_____

_____

_____

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_____

Design Standards for Single-Family Residential Districts (Planned Area Development, R1-8, and R1-5)

Purpose

The purpose of the Design Standards is to begin achieving greater diversity within new residential developments relative to lot sizes, subdivision layout, and single-family architecture. The standards set objectives for the developer/home builder to meet and are not intended to restrict or impede creativity and imagination.

Lot Sizes

- Minimum lot width **within Planned Area Developments** shall be forty-five (45) feet. No more than twenty-five (25%) percent of the total lot yield shall have lot widths between forty-five (45) feet and forty-nine (49) feet. Minimum lot width for the remainder of the lots shall be fifty (50) feet or greater. ~~(applicable to Planned Area Developments only).~~

- Provide a minimum of three different lot widths (at least five foot differential) within the same development.

- Minimum interior side yard setbacks **within Planned Area Developments** shall be five (5) feet and eight (8) feet -- thirteen (13) feet aggregate. ~~(applicable to Planned Area Developments only).~~

- Corner side yard setbacks **within Planned Area Developments that are** adjacent to local streets shall be a minimum of thirteen (13) feet from the property line; twenty (20) feet adjacent to collector and arterial streets. ~~(applicable to Planned Area Developments only).~~

- Minimum rear yard setbacks shall be twenty (20) feet.

- Rear yard setbacks on all arterial streets shall be a minimum of thirty (30) feet, unless a minimum ten (10) foot landscape tract, measured from the right-of-way line to the perimeter theme wall, is provided.

- The space in any required yard shall be open and unobstructed, except for the ordinary projections of chimney flues, outside stairways and balconies, open lattice and other architectural features, provided such features shall not project further than three (3) feet into any required yard, and provided further that in no case shall such projections be nearer than five (5) feet to the property line. Window sills, belt cornices, eaves and other architectural features which occur at least eight (8) feet above grade may encroach three (3) feet into side yards and in no case nearer than three (3) feet from the property line. **Shrubs and groundcovers may be planted within any side yard.**

- Fire places, entertainment centers, and bay windows (including their cornices and eaves) may project into any required yard not more than three (3) feet, provided the sum of such projections on any wall does not exceed one-third (1/3) the length of the wall and provided further that in no case shall such projections be nearer than five (5) feet to the property line.

- Mechanical equipment, such as air conditioners, may be constructed within the rear or side yards provided that in no case shall said mechanical equipment be nearer than five (5) feet to the property line within a required side yard.

- Home builders shall stagger front yard setbacks by three (3) feet with no more than two homes in a row with the same front yard setback. Minimum front yard setbacks, as measured from the property line, shall be eighteen (18) feet for Planned Area Developments and twenty (20) feet for R1-8 and R1-5 districts. Rear yard setbacks shall not be affected by the front yard setback stagger.

- Flag lots shall be prohibited.

- Provide a forty (40%) percent maximum lot coverage.

Subdivision Layout

- Developers shall provide arterial, collector, and local street improvements to Engineering Department standards. Right-of-way dedications shall be as follows:

Major arterial	130'
Minor arterial	110'
Major collector	80'
Minor collector	60'
Local	50'

- Developers/home builders shall provide a curvilinear street system with safe traffic sight visibilities, particularly at intersections.

- Developers shall provide a number of cul-de-sacs with a diversity feature such as a landscaped island, or pedestrian access to common open space.

- Home builders shall provide unique entry features to the development featuring such elements as monument signing, special landscaping, specialty pavement, enhanced fence wall details, boulevard median, etc. (Note: all such elements must be maintained by a homeowners' association and must not impede safe traffic visibilities).

- Developers shall provide landscaped open spaces, visible from arterial street view as well as from residential street view.

- Developers shall design and improve retention areas to be useable and accessible, i.e., not inundated by 10-year storm volumes for certain recreational purposes, such as basketball, volleyball, or tot lots, etc., as well as for specific site and architectural amenities such as ramadas, benches, par courses, etc.

- Developers/home builders shall provide ~~recreational open space as follows: Two~~ two (2) acres **of useable open space** (minimum) per every one hundred (100) homes. **For residential developments which have less than 100 homes, a minimum of seven (7) percent of the total gross acreage shall be set aside for useable open space.**

- A minimum of one tot-lot play area **is required** per every project. The **home** builder shall provide more extensive playground equipment/active adult recreational amenities with larger scale projects with more than 100 homes. Said playground equipment/active adult recreational amenities shall be subject to Planning and Zoning Commission approval.

  ~~Eighty percent (80%) of the recreational open space shall be turf.~~

  ~~Twenty percent (20%) of the recreational open space shall be trees, shrubs, and other landscaping materials.~~

- Home builders shall provide a front yard landscaping package and **a drip** irrigation system for each home. Landscaping shall consist of a minimum of two 15 gallon trees and four 5 gallon shrubs.

- **Developers/home builders shall be expected to provide reasonable plant** AND Tree **salvage/protection of ~~on-site~~** EXISTING ON SITE **indigenous plant material.**

- Inorganic ground cover, specifically decomposed granite, shall be 3/4 inch minus "**Madison or Spanish** Gold", with a two inch minimum thickness, for all arterial and collector **street** right-of-way landscaping areas.

- Home builders shall create and record a set of covenants, conditions, and restrictions, establishing a homeowners' association which shall be responsible for the maintenance of all landscaping in all common areas and rights-of-way.

- ~~All~~ **If** perimeter theme walls **are masonry, they** shall be **constructed with** 6" or 8" x 8" x 16" CMU masonry block ~~construction~~ with scored and split face decorative ~~block~~ finishes.

- Provide staggers or other breaks to relieve the linear character of perimeter **masonry block** fence walls adjoining arterial streets.

- Developers shall install underground all existing electric distribution overhead transmission lines carrying 12kVA or less.

- Developers shall provide for the installation of street lights with underground electric service distribution through the formation of a Street Light Improvement District (S.L.I.D.).

Single-Family Architecture

- Roof material for **residential** developments, **excluding flat roofs,** shall be either all tile (e.g. barrel tile or flat concrete tile) or all **composition** ~~asphalt~~ shingles. A combination of the two within the same development shall be prohibited. Wood shake shingles are prohibited.

- Each house shall include at least a two-car garage; carports are prohibited.

- Home builders shall provide not less than six (6) house colors and three (3) **roof** ~~tile~~ colors.

- Home builders shall upgrade rear or side elevations along arterial or collector streets and open space areas.

- A minimum of three (3) **front** elevations for each house plan is required. The same house plan with the same or similar elevation shall not be placed on adjacent lots or directly across the street from one another.

- Home builders shall provide elevations which have altering ridge lines and roof lines.

- Home builders shall de-emphasize garage fronts as the most prominent architectural feature of the dwelling front by incorporating, e.g., side access garages, "in-line" garages, L-shape floor plans, etc., into their product mix.

- Home builders shall emphasize distinctive architectural details in the front elevations, e.g., covered front entries, covered front porches, door and window details, roof overhangs, parapet walls with cap features, etc.

- All air conditioning units/mechanical equipment shall be ground mounted and shall not be nearer than five (5) feet to the property line within a required side yard. Roof mounted air conditioning units may be permitted provided they are architecturally screened with a parapet and are perceived as an integral part of the building. Roof mounted mechanical equipment shall require approval from the City Manager or his designee.

SECTION IX

DANIEL, MANN, JOHNSON, & MENDENHALL
2777 EAST CAMELBACK ROAD, SUITE 200
PHOENIX, AZ 85016-4302
(602) 337-2777 FAX (602) 337-2620

50 YEARS

MEMORANDUM

To: Fleet Fisher Engineering
From: Stephen M. O'Brien, P.E.
RE: Royal Ranch Traffic Impact Study Update

Date: May 14, 1999
Project: Royal Ranch
Project No. 2726.01

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 24009 STEPHEN M. O'BRIEN Date Signed 5-14-99 ARIZONA, U.S.A.

PURPOSE

DMJM prepared a traffic impact study for the Royal Ranch Development in November, 1998. As we understand, the site plan for the proposed development has undergone some minor changes, including elimination of an elementary school site and adding some housing units. Typically any changes to the site plan would require that the traffic study be updated to account for these changes. However, the proposed modifications are not anticipated to significantly alter the traffic impact of the proposed site on the surrounding roadway network.

DMJM spoke with Scott Phillips with the City of Surprise's Planning Department on Friday, May 7, 1999. The City of Surprise agreed that an entirely new traffic study would not be necessary. Therefore, DMJM is submitting this technical memorandum to address the traffic issues associated with the proposed changes to the Royal Ranch site plan.

INTRODUCTION

The Royal Ranch residential development will occupy 300 acres of land bounded by Greenway Road on the north, Waddell Road on the south, Bullard Road on the west, and undeveloped land on the east. The site is presently located within Maricopa County property; however, it is within the proposed annexation area for the City of Surprise.

For the original traffic impact study, the Royal Ranch site was proposed to include 1,020 single family homes, 391 medium density residential units, and an elementary school site. The revised site plan for Royal Ranch has been modified to include 1,321 single family homes; thus, replacing the medium density housing and the elementary school site with single family homes. The internal street system has also been modified slightly to provide better access to these homes. The original site plan is shown on Figure 1. The new site plan is shown on Figure 2.

TRIP GENERATION

The trip generation rates for the two site plans were compared to determine the increase or decrease in daily and peak hour traffic that may be expected with the new site plan.

Table 1 shows the trip generation for the original site plan, as was presented in the November 1998 traffic impact study. The site was expected to generate nearly 12,421 trips per day. Table 2 shows the trip generation for the new site plan. The new site plan is expected to generate nearly 12,600 trips per day.

Table 1: Trip Generation Table for Original Royal Ranch Site Plan

Land Use	Single Family Detached Houses	Medium Density Residential	Elementary School	Total Site Generated Trips
ITE Land Use Code	210	230	520	
Size	1,020 DUs	391 DUs	600 students	
Trip Rates				
Average Daily	9.57	5.86	1.02	
AM Peak Hour	0.75	0.44	0.30	
PM Peak Hour	1.01	0.54	NA	
Total Trips				
Average Daily	9,762	2,292	612	
AM Peak Hour	765	172	180	
PM Peak Hour	1,030	212	NA	
Trip Reduction				
Interaction Percentages			40%	
Revised Trips				
Average Daily	9,762	2,292	367	12,421
AM Peak Hour	765	172	108	1,045
PM Peak Hour	1,030	212	NA	1,242

Table 2: Trip Generation for New Royal Ranch Site Plan

Land Use	Single Family Detached Houses	Difference (% Difference)
ITE Land Use Code	210	
Size	1,321 DUs	
Trip Rates		
Average Daily	9.57	
AM Peak Hour	0.75	
PM Peak Hour	1.01	
Total Trips		
Average Daily	12,642	221 trips (< 2%)
AM Peak Hour	991	- 54 trips (5%)
PM Peak Hour	1334	92 trips (7%)

As shown in Tables 1 and 2, the difference in trip generation between the two site plans is less than 2 percent for the daily trip generation. With the new site plan, the PM peak hour shows the most impact – adding 92 trips to and from the site in the peak hour. However, during the AM peak hour the site will actually generate fewer trips than the original site plan. Therefore, on average, the newest site plan for Royal Ranch will allow the site to generate approximately the same volume of traffic.

TRIP DISTRIBUTION AND ASSIGNMENT

The changes to the site plan have not significantly altered the character of the proposed Royal Ranch site. It will remain a residential development. The trip distribution assumptions in the original traffic impact study would not change under the new site plan. Since the new site plan has a even density of housing throughout the Royal Ranch site, it is anticipated that the site trips would be fairly evenly split between the five access from the site onto the arterial street network. This remains consistent with the original traffic study. No one intersection is expected to experience a significant increase in site traffic. Even during the PM peak hour where the site traffic may increase by 90 trips, this would mean that no one turning movement would increase by more than five vehicles, which is negligible.

CAPACITY ANALYSIS

The new site plan will not significantly increase the traffic volumes or turning movements at the site access points onto the arterial roadway network. The capacity analysis for the original traffic study showed that each of the main intersections operated as acceptable levels of service. The additional traffic from the site is not anticipated to degrade the operation at any of these intersections.

CONCLUSIONS

The new Royal Ranch site plan will generate approximately 220 additional trips than the original site plan. This may be considered a negligible amount. This additional traffic is not expected significantly alter the traffic impacts of the Royal Ranch site on the surrounding roadway network. The trip distribution patterns will remain the same and the capacity of the intersections will not be severely degraded. Therefore, the recommendations of the original traffic study for Royal Ranch would remain applicable under the new site plan. These recommendations included:

- Construct Acoma Drive and North-South Access Road as collector roadways with 60 feet of right-of-way. The internal local roadways may be developed within 50 feet of right-of-way. The roadway cross section dimensions are provided on Figure 11 of the Royal Ranch Traffic Impact Analysis prepared in November 1998.

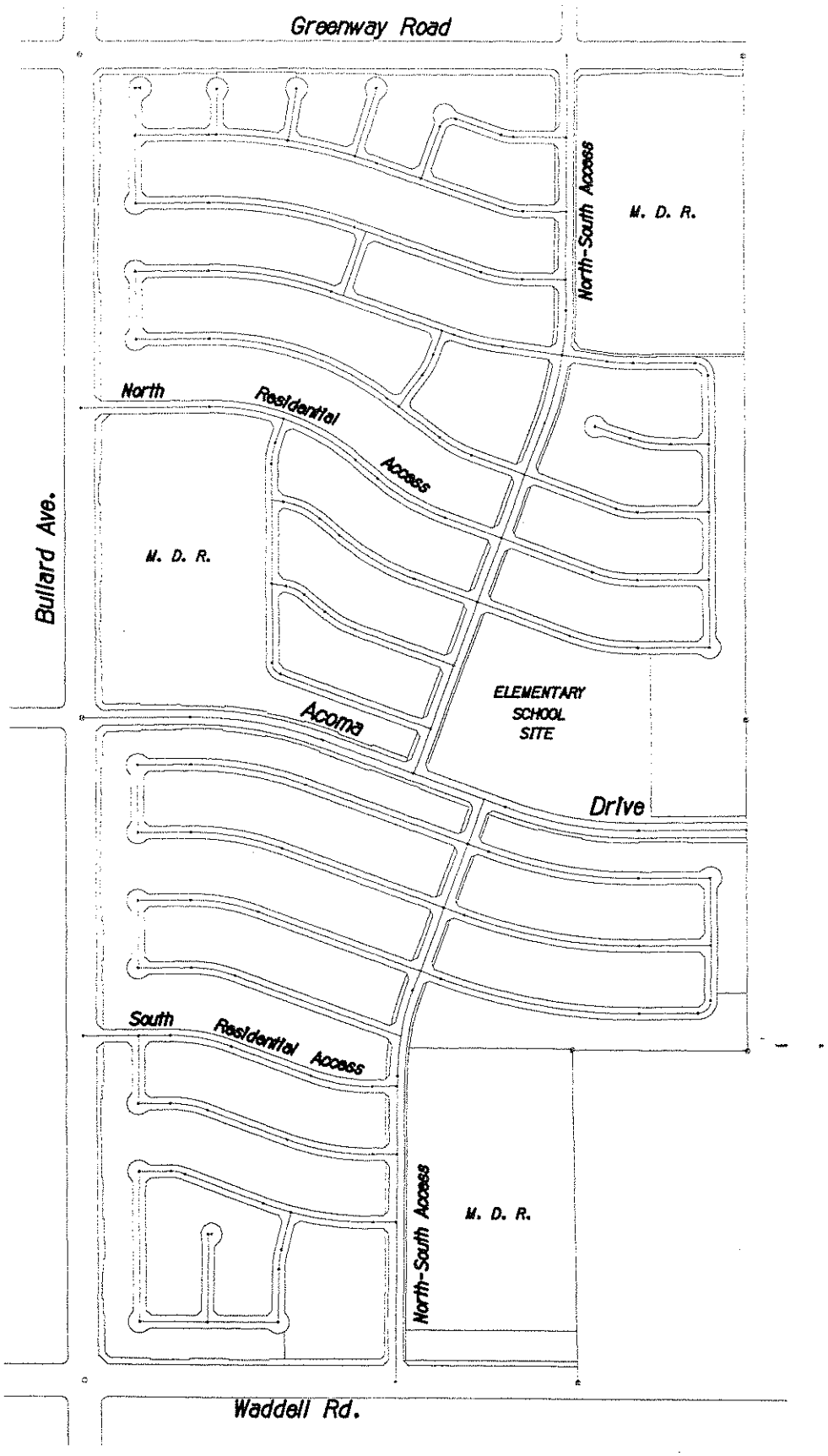
- Signalize the intersections of Greenway Road / Bullard Avenue and Waddell Road / Bullard Avenue by year 2002.

- Signalize the intersections of Acoma Drive / Bullard Avenue, North-South Access / Waddell Road, and North-South Access / Greenway Road by year 2020.

- Provide for dedicated left end right turn lanes for all approaches to the intersections of Greenway Road / Bullard Road and Waddell Road / Bullard Avenue by year 2020.

- Provide a right turn lane for the westbound approach for the intersection of North-South Access / Waddell Road, assuming Waddell Road is a four lane roadway by year 2020.

FIGURE 1

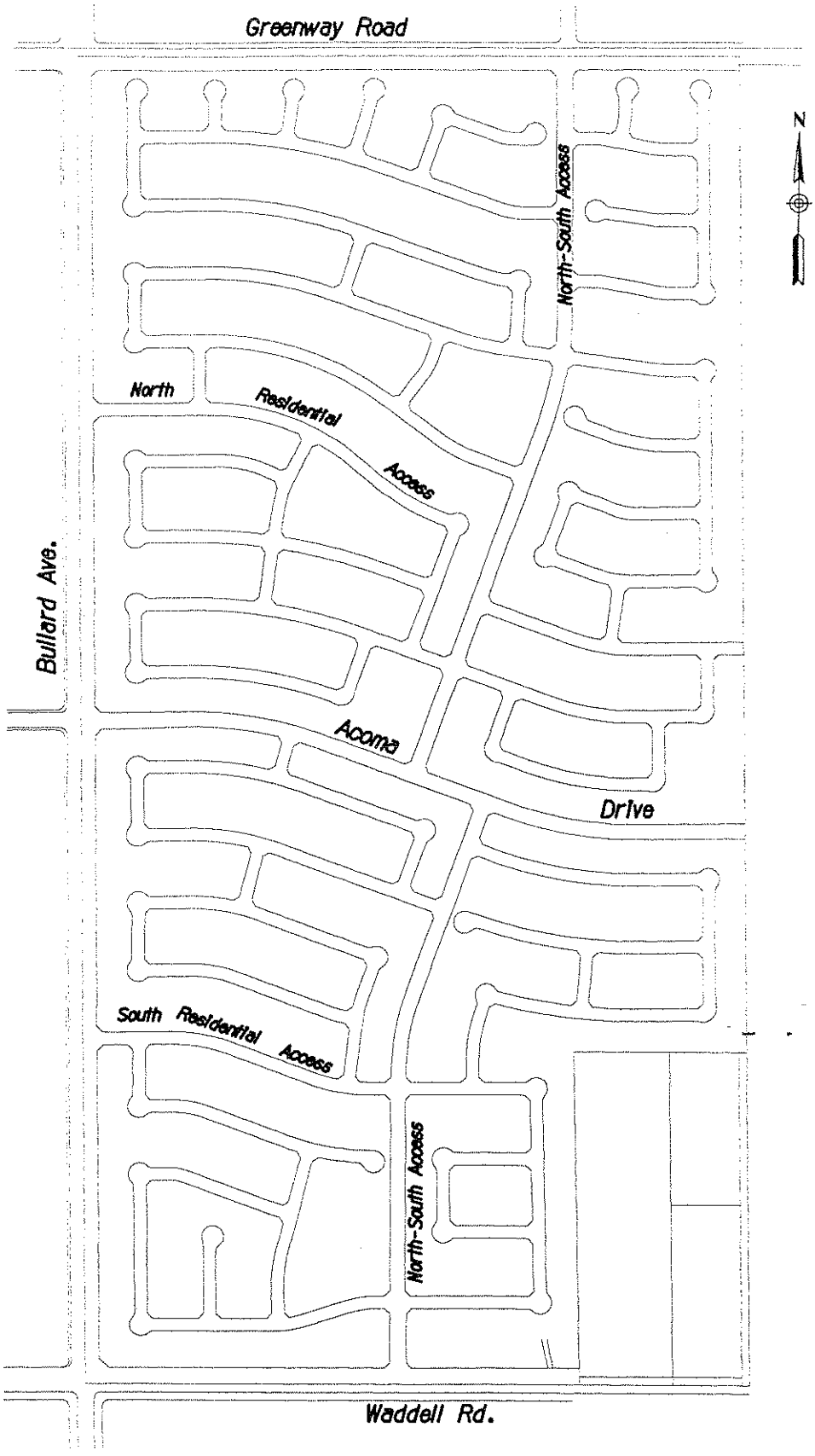


ROYAL RANCH
ORIGINAL SITE PLAN

DMJM

Design File

FIGURE 2



ROYAL RANCH
NEW SITE PLAN

DMJM

Design File

ROYAL RANCH
TRAFFIC IMPACT ANALYSIS

Prepared for:
Fleet, Fisher Engineering
4250 East Camelback Road, Suite 410K
Phoenix, Arizona 85018

Prepared by:
DMJM
2777 East Camelback Road, Suite 200
Phoenix, Arizona 85016
(602) 337-2777

November 9, 1998

ROYAL RANCH
TRAFFIC IMPACT ANALYSIS

Prepared for:
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4250 East Camelback Road, Suite 410K
Phoenix, Arizona 85018

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November 9, 1998

TABLE OF CONTENTS

INTRODUCTION 1
PURPOSE AND STUDY OBJECTIVES 1
EXISTING CONDITIONS 1
BACKGROUND TRAFFIC VOLUMES 2
PROPOSED DEVELOPMENT 5
TRIP GENERATION 5
Trip Reduction 5
Pass-by Traffic 7
TRIP DISTRIBUTION 8
TRIP ASSIGNMENT 9
Site Traffic 9
Background Traffic 9
Total Traffic 9
CAPACITY ANALYSIS 9
ROADWAY IMPROVEMENTS 17
CONCLUSIONS 18
APPENDIX

LIST OF TABLES

Table 1. Trip Generation 7
Table 2. Trip Distribution Percentages 8
Table 3. Unsignalized Capacity Analysis 16
Table 4. Signalized Intersection Capacity Analysis 17

LIST OF FIGURES

Figure 1. Vicinity Map 3
Figure 2. Background Average Daily Traffic 4
Figure 3. Royal Ranch Site Plan 6
Figure 4. AM & PM Site Traffic 10
Figure 5. Year 2002 AM & PM Peak Hour Volumes, Background Traffic Only 11
Figure 6. Year 2020 AM & PM Peak Hour Volumes, Background Traffic Only 12
Figure 7. Year 2002 AM & PM Peak Hour Volumes, Total Traffic 13
Figure 8. Year 2020 AM & PM Peak Hour Volumes, Total Traffic 14
Figure 9. Year 2002 Recommended Intersection Lane Configuration 19
Figure 10. Year 2020 Recommended Intersection Lane Configuration 20
Figure 11. Internal Streets Typical Sections 21

INTRODUCTION

Royal Ranch is a residential development proposed to occupy 300 acres of land bounded by Greenway Road on the north, Waddell Road on the south, Bullard Road on the west, and undeveloped land on the east. The site is presently located within Maricopa County property; however, it is within the proposed annexation area for the City of Surprise. The site will consist of approximately 1,020 single family homes, 391 medium density residential units, and an elementary school site. This report was prepared according to the City of Surprise guidelines on "Traffic Impact Assessments for Project Development" listed in the Comprehensive Development Guide.

PURPOSE AND STUDY OBJECTIVES

The purpose of this report is to provide a traffic impact analysis for the proposed Royal Ranch development. The primary objectives of this study are to evaluate the traffic operating conditions at the proposed intersections and the surrounding intersections with regard to level of service for the complete buildout of the development. This study will determine and recommend cross sections for the internal roadway system and any improvements to mitigate impacts to the external street network. The City of Surprise's guidelines for traffic impact studies requires analyses for a twenty-year horizon. Analysis for this study was performed for the buildout year of the site (2002) and for a twenty year horizon (2020).

EXISTING CONDITIONS

The proposed site for Royal Ranch currently consists of agricultural and undeveloped land, as are most of the neighboring parcels. The site occupies 300 acres of land (approximately 1/2 section) and is located within the City of Surprise annexation area.

Greenway Road bounds the Royal Ranch site on the north. Currently, the roadway exists as an unimproved dirt road from Reems Road to Lichfield Road. Waddell Road bounds the proposed site on the south. Waddell Road is currently a two-lane roadway. Bullard Avenue currently is an unimproved dirt roadway that borders the site on the west. The intersection of Waddell Road and Bullard Avenue is controlled by stop signs on Bullard Avenue.

According to the Surprise Comprehensive Development Plan, Greenway Road and Bullard Avenue will be constructed as minor arterials, four-lane roadways with 110 feet of right-of-way. Waddell Road is planned to be developed as a major six-lane arterial with 130 feet of right-of-way.

A residential development, Ashton Ranch, is currently being constructed on the west side of Bullard Avenue, opposite the Royal Ranch site. The Orchards residential development

is located on the northwest corner of Greenway Road and Bullard Avenue. The City of Surprise plans to develop the section north of Greenway Road as the Millennium site, which is proposed to consist of general service commercial. Figure 1 shows the Royal Ranch site and the surrounding vicinity.

BACKGROUND TRAFFIC VOLUMES

Traffic counts were not obtained as part of this study because Greenway Road and Bullard Avenue are unimproved, dirt roads. By year 2020, it is assumed that Greenway Road and Bullard Avenue will be constructed as minor arterial roadways and a complete one-mile grid system of arterial roadways will exist for the area.

The horizon years for the analyses are year 2002 (full buildout of Royal Ranch) and year 2020. Traffic volumes for year 2020 were requested from the City of Surprise engineering staff; however, MAG traffic projections for the area were not available.

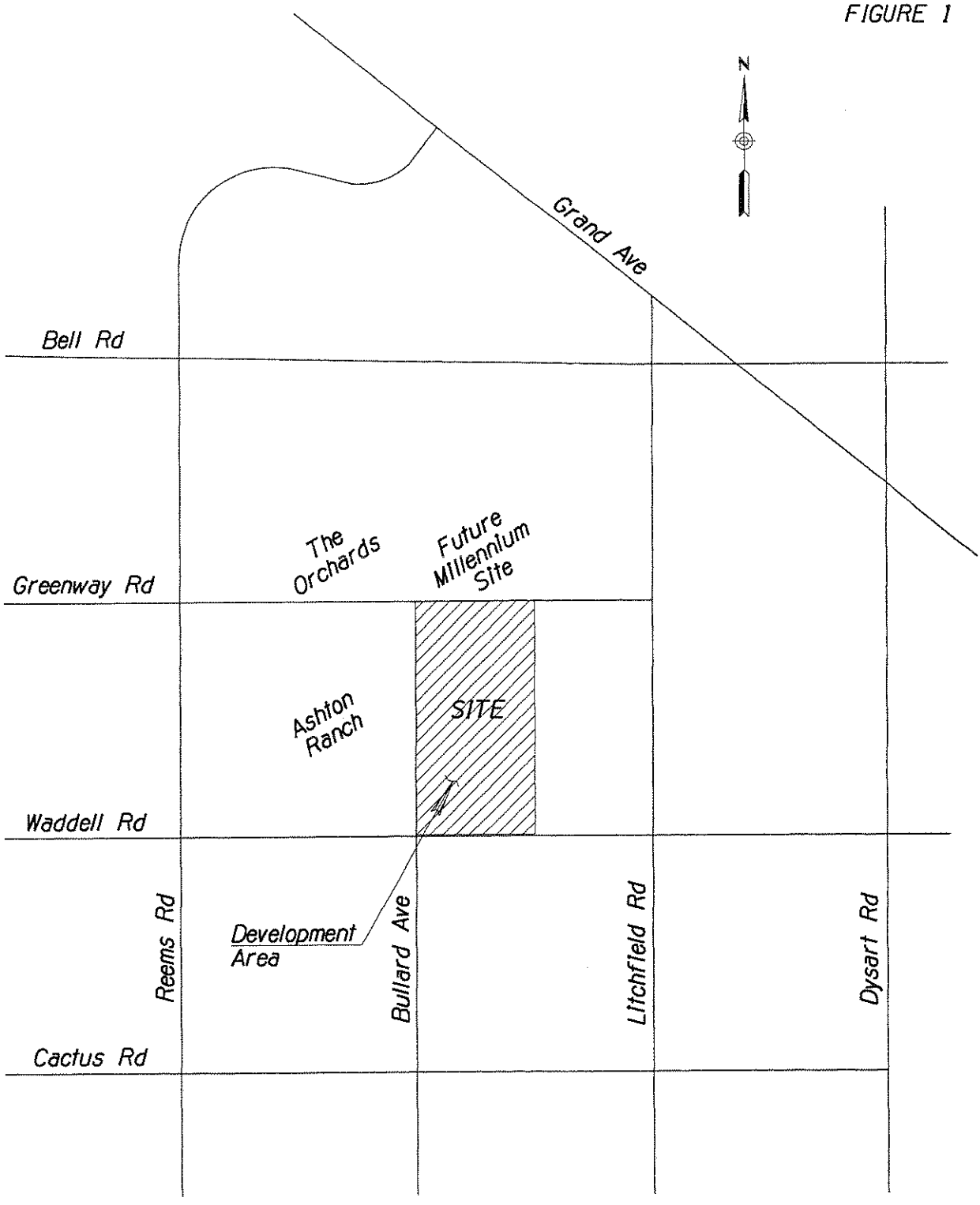
Since no current or future data were available, DMJM has assumed year 2020 average daily traffic (ADT) volumes for this report. Several traffic impact studies for adjacent developments have been recently completed. The City of Surprise did allow DMJM to review the Ashton Ranch traffic report. However, DMJM did not receive permission to use the Ashton Ranch traffic report as a reference document for this study. The ADTs that DMJM has assumed for this report were found to be close in value to the volumes presented in the Ashton Ranch report.

The Ashton Ranch development is located on the west side of Bullard Avenue between Waddell Road and Greenway Road. It will develop approximately 1,200 homes. It is assumed that the half-mile access to Royal Ranch on Bullard Avenue (Acoma Drive) will align with a half-mile access point for Ashton Ranch. It was further assumed that approximately 30 percent of all traffic to and from Ashton Ranch will use this access point.

Similarly, an access to the Millennium site, north of Greenway Road, is assumed to align with the Royal Ranch access.

The 2002 ADTs were calculated by reducing the 2020 ADTs. It was assumed that a growth rate of 10 percent per year would occur for this area between these years. The background ADTs for year 2002 and 2020 are shown in Figure 2.

FIGURE 1



ROYAL RANCH
VICINITY MAP

DMJM

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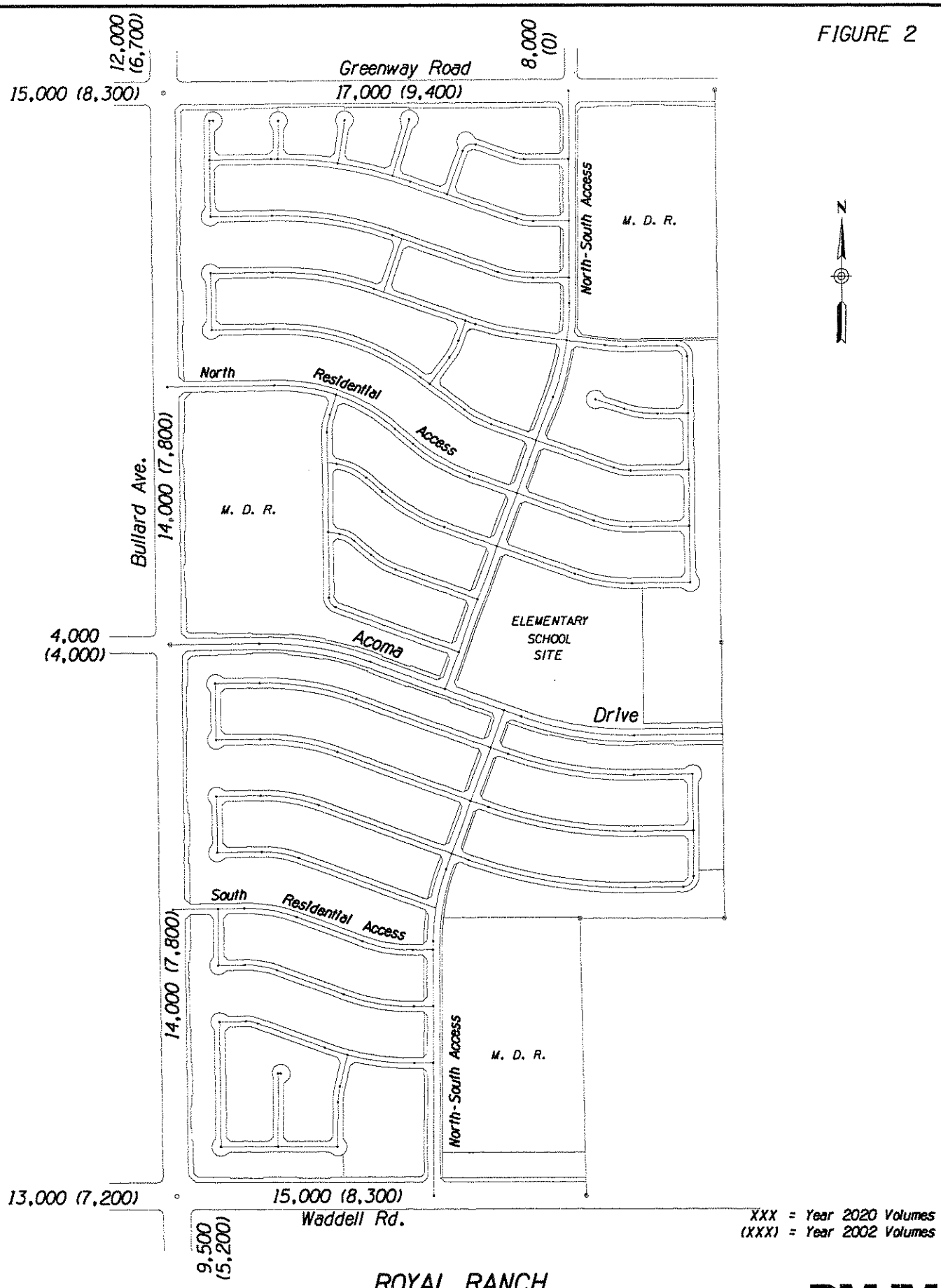
FIGURE 2



XXX = Year 2020 Volumes
(XXX) = Year 2002 Volumes

ROYAL RANCH
BACKGROUND AVERAGE DAILY TRAFFIC

DMJM

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PROPOSED DEVELOPMENT

The land uses shown on the Royal Ranch site plan include residential single family homes, medium density residential units, and an elementary school site. The site is planned to be completely built out within four years. The site plan for Royal Ranch is shown in Figure 3.

The site is proposed to have access from the surrounding street network: Greenway Road, Bullard Avenue, and Waddell Road. The on-site street network will consist of one major collector, Acoma Drive, that runs east-west through the site and intersects Bullard Avenue at the half-mile point between Greenway and Waddell Roads. This is assumed to align with a main intersection on Bullard Avenue for the Ashton Ranch development, which is directly opposite the Royal Ranch site. The residential portions of Royal Ranch will have additional east-west collector road accesses at the quarter-mile points along Bullard Avenue.

The Royal Ranch site will also be served by a north-south collector. This collector roadway will be offset at Acoma Drive to discourage cut-through traffic. At Greenway Road, it assumed that the access will align with an access to the Millennium site on the north. No development is known to have been proposed for the area south of Waddell Road. Therefore, no aligning access was assumed on Waddell Road.

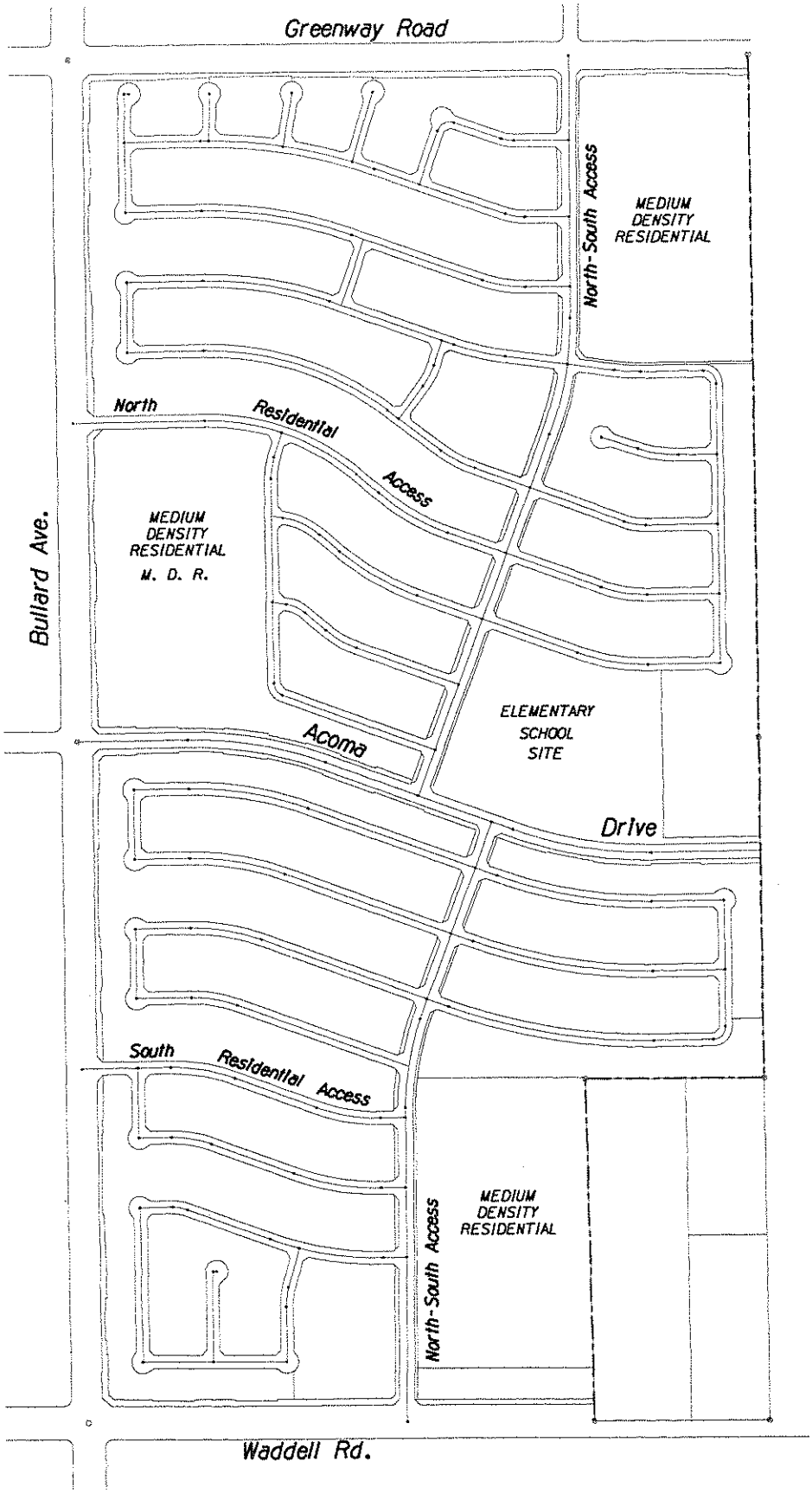
TRIP GENERATION

The average daily traffic volumes and the AM and PM peak hour volumes have been estimated by trip rates given in the Institute of Transportation Engineers (ITE) *Trip Generation, 6th Edition*. Table 1 shows the traffic generation established for this site for each proposed land use.

Trip Reduction

The location of the elementary school in relation to the rest of the Royal Ranch site makes it conducive to trip interaction. Therefore, it is assumed that some of the trips to and from the school parcel would be generated by the Royal Ranch residential development. For this study it is assumed that 40 percent of the school trips are generated by the on-site residential development. All other trips are assumed to be generated by off-site development.

FIGURE 3



ROYAL RANCH
SITE PLAN

DMJM

Pass-by Traffic

No pass-by trips were assumed for this study.

Table 1. Trip Generation

Land Use	Single Family Detached Houses	Medium Density Residential	Elementary School	Total Site Generated Trips
ITE Land Use				
Code	210	230	520	
Size	1,020 DUs	391 DUs	600 students	
Trip Rates				
Average Daily	9.57	5.86	1.02	
AM Peak Hour	0.75	0.44	0.3	
PM Peak Hour	1.01	0.54	NA	
Total Trips				
Average Daily	9,762	2,292	612	
AM Peak Hour	765	172	180	
PM Peak Hour	1,030	212	NA	
Trip Reduction Interaction Percentages			40%	
Revised trips				
Average Daily	9,762	2,292	367	12,421
AM Peak Hour	765	172	108	1,045
PM Peak Hour	1,030	212	NA	1,242
Distribution Percentages (Inbound/Outbound)				
Average Daily	50% / 50%	50% / 50%	50% / 50%	
AM Peak Hour	25% / 75%	17% / 83%	58% / 42%	
PM Peak Hour	64% / 36%	67% / 33%	NA	
Directional Trips (Inbound/Outbound)				
Average Daily	4,881 / 4,881	1,146 / 1,146	184 / 184	6,211/6,211
AM Peak Hour	192 / 573	29 / 143	63 / 45	284/ 761
PM Peak Hour	660 / 370	142 / 70	NA	802/440

Average trip rates from ITE *Trip Generation* were used to calculate the trip generation for the site. The fitted curve equation from *Trip Generation* for single family homes would result in approximately 981 fewer daily trips. Using the average trip rate is a conservative approach that may overestimate the number of trips that will be generated by the site.

TRIP DISTRIBUTION

The Royal Ranch site plan includes two basic land uses: residential and educational. Since each type has its own trip characteristics, separate trip distribution patterns are assumed for each land use, as opposed to a single trip distribution for the entire project. Table 2 summarizes the trip distribution percentages assumed for this study.

The Ashton Ranch Traffic Impact Analysis, prepared by Kimley-Horn and Associates, developed trip distribution rates. Since the Royal Ranch development is similar to the Ashton Ranch development, the trip distribution percentages are assumed to remain the same, providing consistency between the reports.

The distribution percentages were determined based on MAG socioeconomic data for the area. Residential trips were distributed according to the employment densities within ten miles of the Royal Ranch site. The school trips were distributed according to residential densities within five miles of the Royal Ranch site.

Table 2. Trip Distribution Percentages

	Land-Use	
Direction (To/From)	Residential	Elementary School
Bullard Avenue, north	7%	30%
Bullard Avenue, south	20%	6%
Greenway Road, east	25%	25%
Greenway Road, west	2%	12%
Waddell Road, east	40%	25%
Waddell Road, west	6%	2%

TRIP ASSIGNMENT

Site Traffic

The projected site traffic volumes were assigned to the surrounding roadway network using the trip distributions in Table 2. Figure 4 shows the AM and PM peak hour traffic volumes generated by the Royal Ranch development upon complete buildout. Access to the Royal Ranch site was assumed to be via one access to Greenway Road, three accesses to Bullard Avenue and one access to Waddell Road.

Background Traffic

As mentioned previously, the traffic volumes were assumed for the 2002 and 2020 background traffic for this report. The ADTs were converted to peak hour traffic volumes, assuming a peak hour to twenty four hour factor of 8 percent and 60/40 directional splits. Figures 5 and 6 show the AM and PM peak hour background traffic volumes for year 2002 and 2020, respectively.

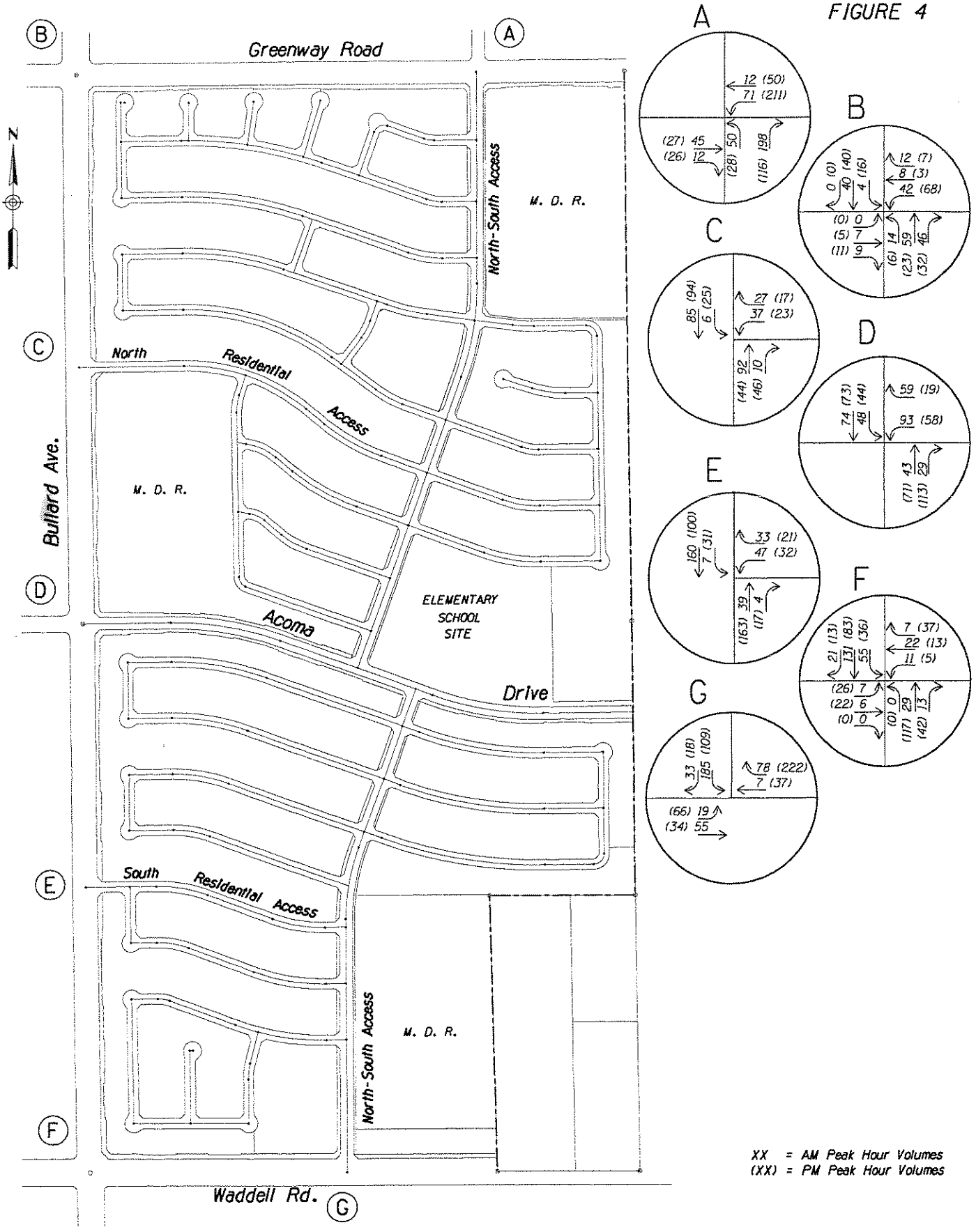
Total Traffic

To obtain total traffic, the Royal Ranch site traffic was added to the background traffic. Figures 7 and 8 show the AM and PM peak hour total traffic volumes for the Royal Ranch development for year 2002 and 2020, respectively. The total ADTs on the major roads are shown in brackets.

CAPACITY ANALYSIS

Capacity analysis was performed for all the intersections surrounding the Royal Ranch site. The analysis was performed according to the methodologies outlined in the *Highway Capacity Manual, Special Report 209, Updated 1994*, for signalized and unsignalized intersections. The Highway Capacity Software, version 2.1g for signalized intersections and version 2.4g for unsignalized intersections, was utilized to determine the operating level of service at each intersection.

FIGURE 4

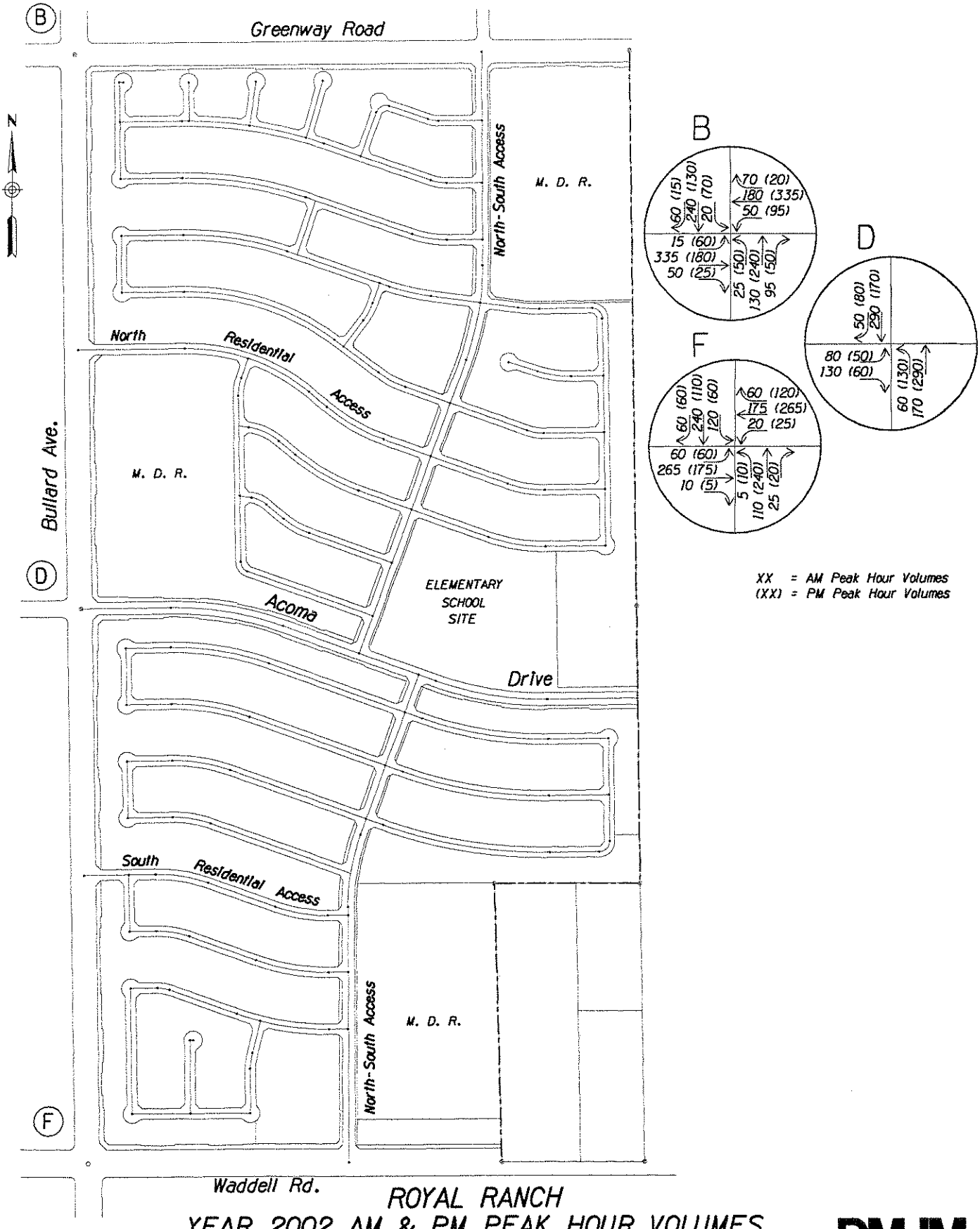


XX = AM Peak Hour Volumes
(XX) = PM Peak Hour Volumes

ROYAL RANCH
AM & PM SITE TRAFFIC

DMJM

FIGURE 5

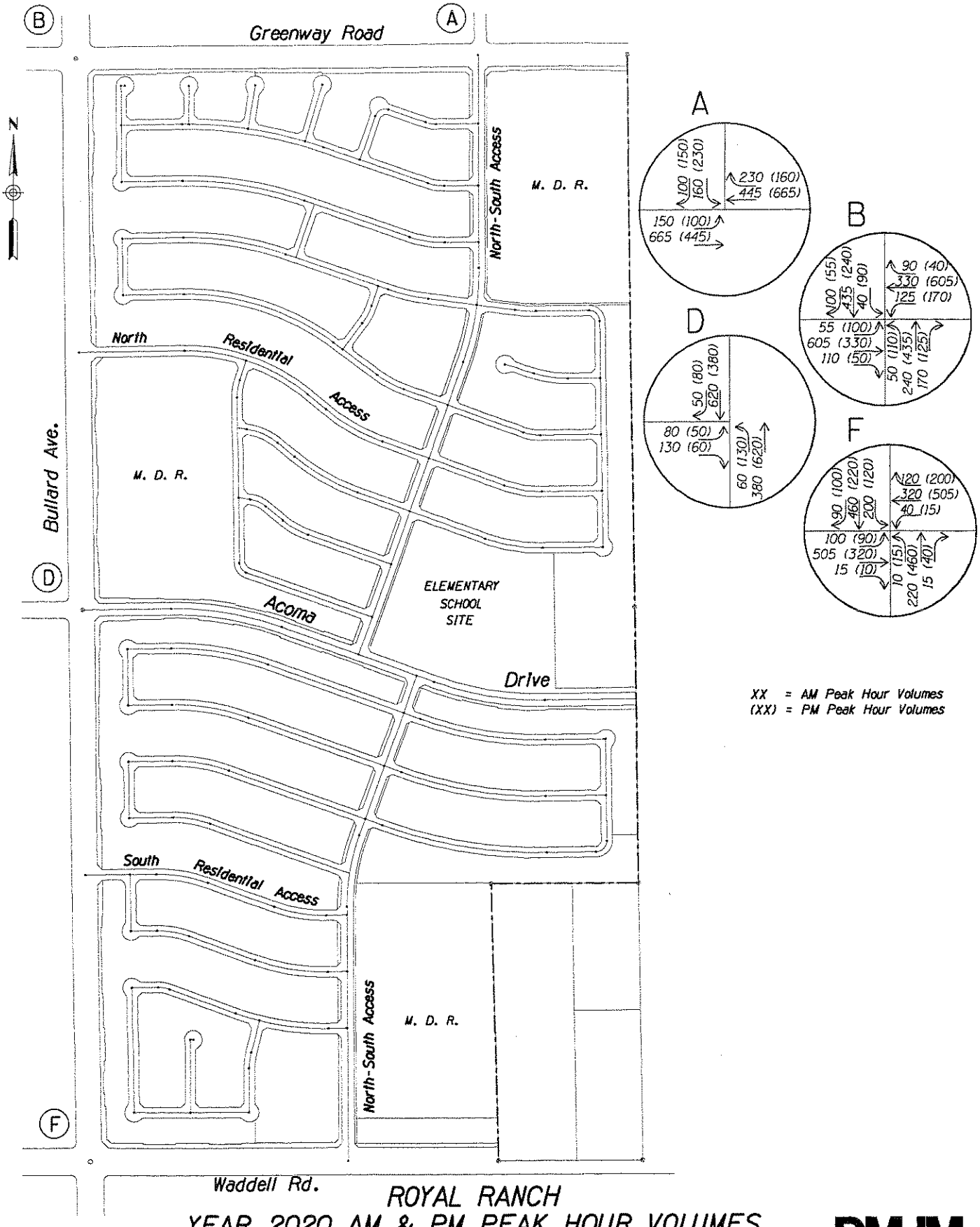


XX = AM Peak Hour Volumes
(XX) = PM Peak Hour Volumes

ROYAL RANCH
YEAR 2002 AM & PM PEAK HOUR VOLUMES
BACKGROUND TRAFFIC ONLY

DMJM

FIGURE 6

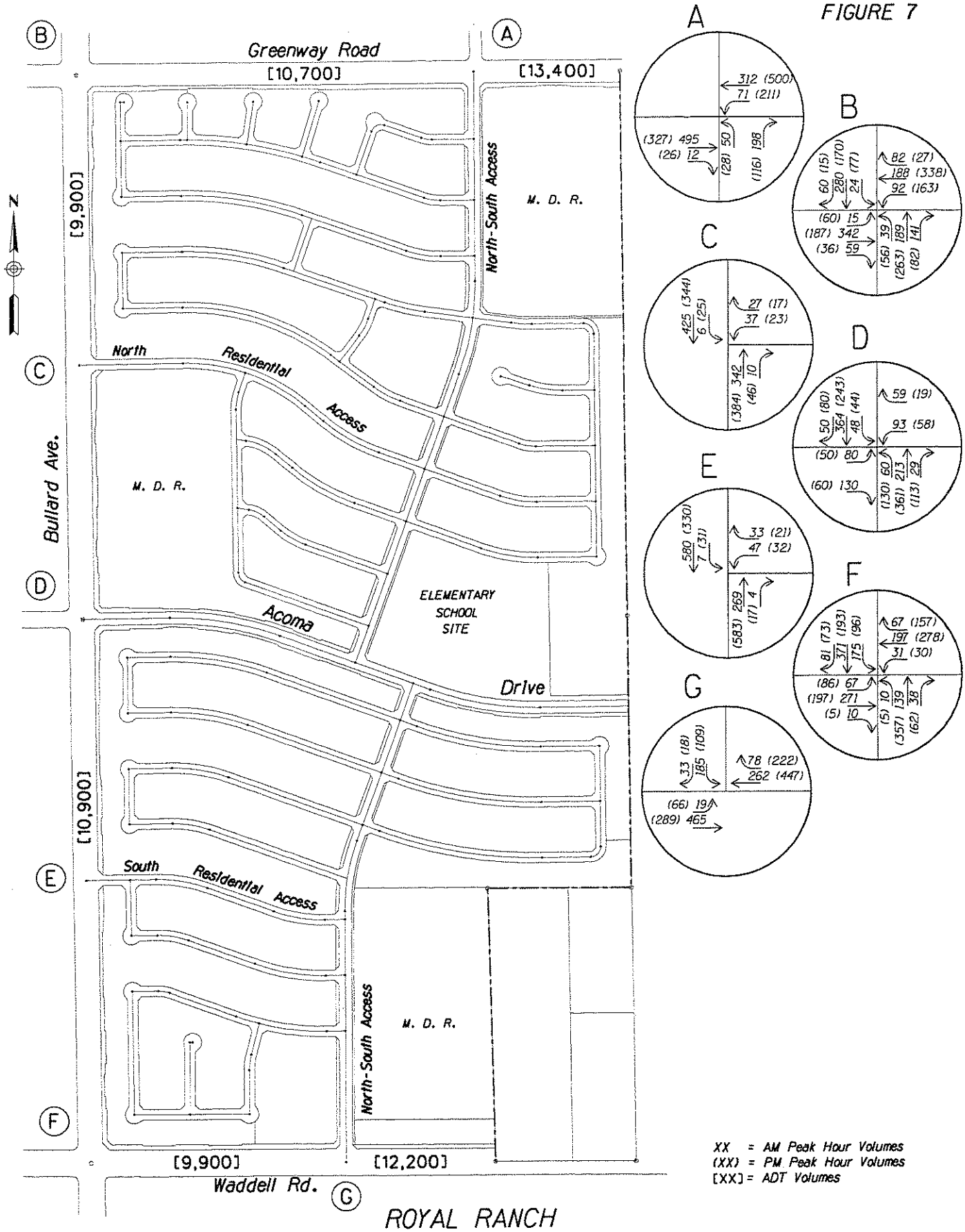


XX = AM Peak Hour Volumes
(XX) = PM Peak Hour Volumes

ROYAL RANCH
YEAR 2020 AM & PM PEAK HOUR VOLUMES
BACKGROUND TRAFFIC ONLY

DMJM

FIGURE 7

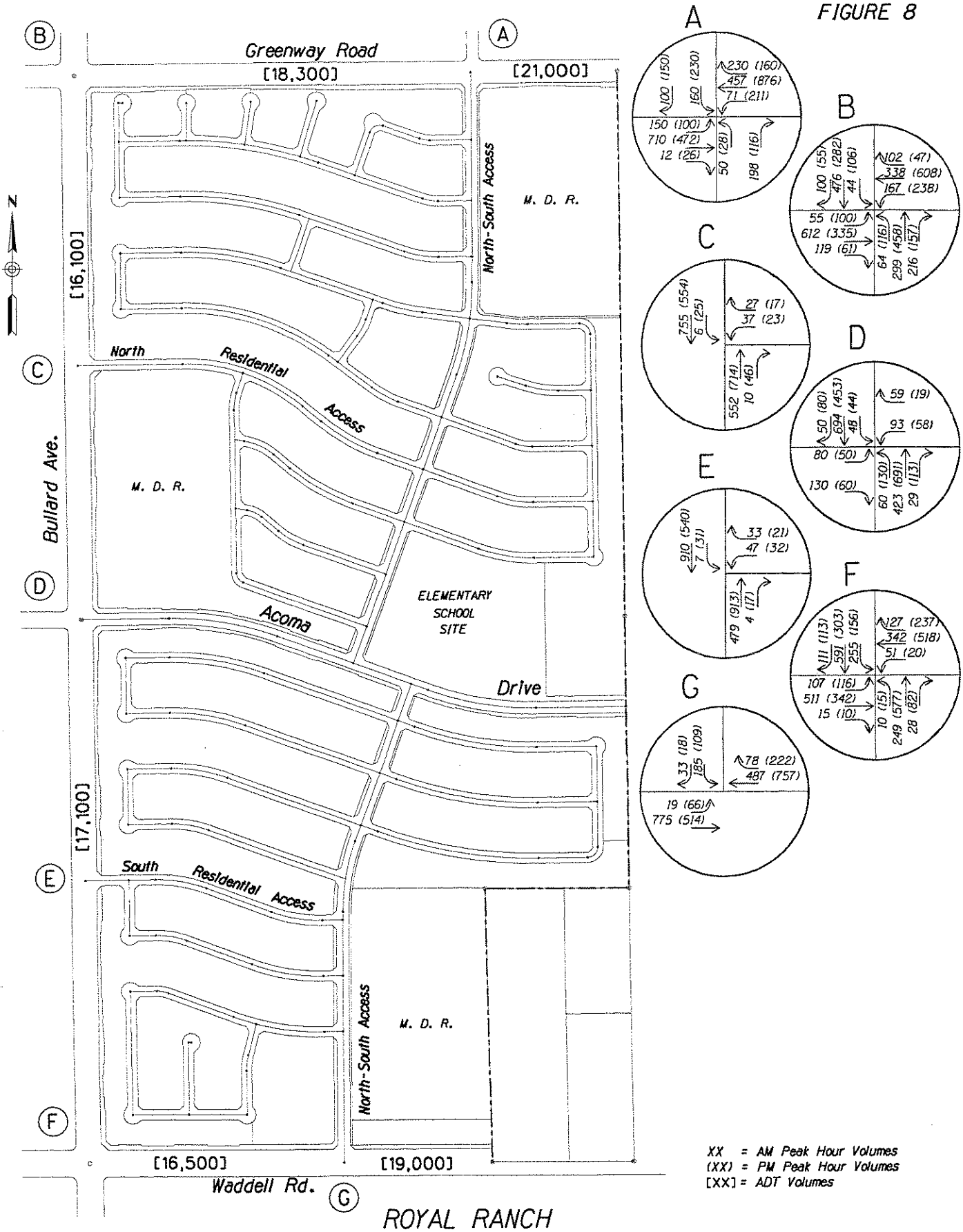


XX = AM Peak Hour Volumes
(XX) = PM Peak Hour Volumes
[XX] = ADT Volumes

ROYAL RANCH
YEAR 2002 AM & PM PEAK HOUR VOLUMES
TOTAL TRAFFIC

DMJM

FIGURE 8



XX = AM Peak Hour Volumes
(XX) = PM Peak Hour Volumes
[XX] = ADT Volumes

ROYAL RANCH
YEAR 2020 AM & PM PEAK HOUR VOLUMES
TOTAL TRAFFIC

DMJM

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions.

Initially, all site accesses were analyzed as unsignalized intersections. If any were found to operate unacceptably, then the intersection was analyzed as a signalized intersection. The intersections of Greenway Road/Bullard Avenue and Waddell Road/Bullard Avenue were assumed to be signalized.

Analyses were performed for the AM and PM peak hours for the 2002 and 2020 horizon years. For year 2002, it was assumed that the arterial roadways would be developed as two-lane roadways with dedicated left turn lanes for left turning movements. By year 2020, it was assumed that the arterial roadways would be developed as four-lane roadways, also with dedicated left turn lanes and exclusive right turn lanes where needed. Waddell Road is planned to ultimately be constructed as a six-lane arterial; however, the analysis for this study shows the projected traffic for 2020 can be accommodated in four lanes. Summary sheets for the analyses are provided in the Appendix. Table 3 shows the results of the unsignalized intersection analyses and Table 4 shows the results of the signalized intersection analyses.

Table 3. Unsignalized Capacity Analysis

Intersection / Movement	2002 AM Peak Hour LOS	2002 PM Peak Hour LOS	2020 AM Peak Hour LOS	2020 PM Peak Hour LOS
North-South Access / Greenway Road (Access A)				
NB Right Turn	B	A	-	-
NB Left Turn	C	D	-	-
WB Left Turn	A	A	-	-
North Residential Access / Bullard Avenue (Access C)				
WB Right Turn	A	A	A	A
WB Left Turn	C	C	D	D
SB Left Turn	A	A	A	B
Acoma Drive / Bullard Avenue (Access D)				
EB Right Turn	B	B	-	-
EB Left	C	C	-	-
WB Right Turn	A	B	-	-
WB Left Turn	D	D	-	-
NB Left Turn	A	A	-	-
SB Left Turn	A	A	-	-
South Residential Access / Bullard Avenue (Access E)				
WB Right Turn	A	B	A	A
WB Left Turn	C	C	E	E
SB Left Turn	A	A	A	B
North-South Access / Waddell Road (Access G)				
SB Right Turn	A	B	-	-
SB Left Turn	D	D	-	-
EB Left Turn	A	B	-	-

Table 4. Signalized Intersection Capacity Analysis

Intersection	2002 AM Peak Hour LOS	2002 PM Peak Hour LOS	2020 AM Peak Hour LOS	2020 PM Peak Hour LOS
Greenway Road / Bullard Avenue (Access B)	B	B	B	B
Waddell Road / Bullard Avenue (Access F)	B	B	B	B
North-South Access/ Greenway Road (Access A)	-	-	B	B
Acoma Drive / Bullard Avenue (Access D)	-	-	A	A
North-South Access / Waddell Road (Access G)	-	-	A	A

For year 2002 analyses, it was found that all accesses to the Royal Ranch site were found to operate at acceptable levels of service.

By year 2020, background traffic volumes are expected to increase significantly. It is also assumed that the Millennium site located north of Greenway Road, directly opposite the Royal Ranch site, would be developed by year 2020. As a result, additional signalization at the main access points to the Royal Ranch development may be required.

By year 2020, at the intersections of North-South Access/Greenway Road (Access A), Acoma Drive/Bullard Avenue (Access D), and North-South Access/Waddell Road (Access G), the left turn movement from the site onto the arterial roads will experience very poor or unacceptable levels of service if they were to operate as unsignalized intersections. Signalization North-South Access/Greenway Road, Acoma Drive/Bullard Avenue, and North-South Access/Waddell Road intersections will most likely be required by year 2020. Analysis of these intersections shows that they will operate at LOS B, A, and A, respectively, under signal control.

While Waddell Road is a four lane roadway, it is recommended that a westbound right turn lane be constructed at the North-South Access/Waddell Road intersection to accommodate a heavy PM peak hour turning volume. This lane will not likely be required when Waddell Road is widened to six lanes.

ROADWAY IMPROVEMENTS

Figures 9 and 10 shown the recommended lane configurations for the roadways surrounding the Royal Ranch site for the years 2002 and 2020, respectively.

For year 2002, it was assumed that the arterial roadways would be constructed as two lane roadways with left turn lanes. This would adequately handle the anticipated traffic volumes for 2002.

The construction of Greenway Road, Waddell Road, and Bullard Avenue as four-lane minor arterial roadways will adequately handle the anticipated 2020 traffic. Right turn lanes are recommended for the approaches of Greenway Road/Bullard Avenue intersection and Waddell Road/Bullard Avenue intersection by year 2020.

The recommended cross sections for the internal streets for Royal Ranch are shown in Figure 11. Acoma Drive is proposed to be a major collector roadway with 60 feet of right-of-way. This would provide for one lane in each direction of travel, a center left turn lane, and bike lanes in each direction. The North-South Access is proposed to be a minor collector roadway within a 60 foot right-of-way, providing for one lane in each direction of travel, a center left turn lane, and adjacent bike lanes.

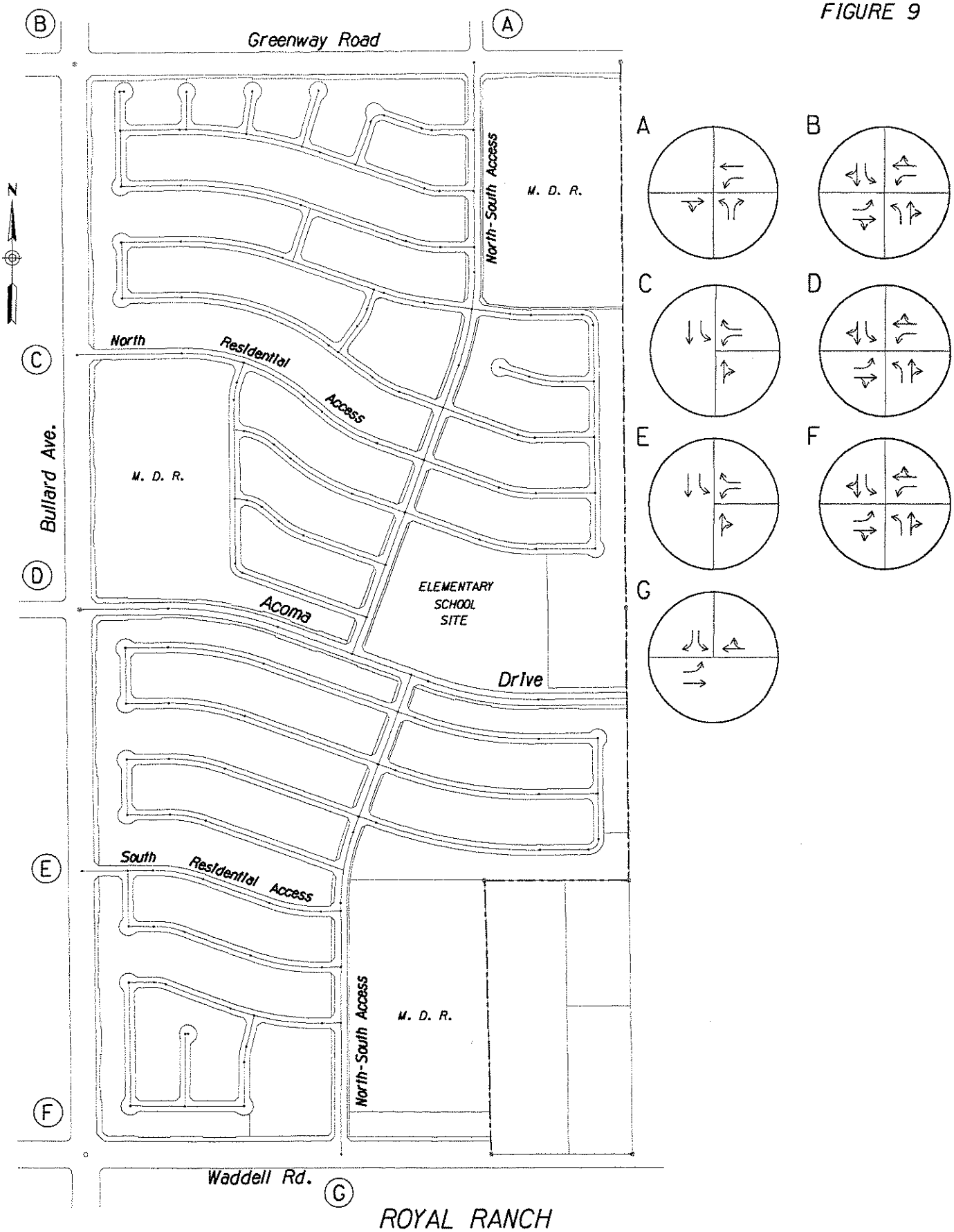
CONCLUSIONS

The proposed Royal Ranch development is anticipated to generate over 12,000 trips per day. Within the Royal Ranch site, Acoma Drive and the North-South Access were found to operate acceptably as collector roads. Acoma Drive and the North-South Access are proposed to have 60 feet of right-of-way, as recommended by the City of Surprise.

Upon buildout of Royal Ranch, it is assumed that the adjacent arterial streets will be completed as two lane roadways. For year 2002, the adjacent roadway network was found to operate at acceptable levels of service. The following mitigation measures may be required.

- Signalization of Greenway Road / Bullard Avenue intersection
- Signalization of Waddell Road / Bullard Avenue intersection.

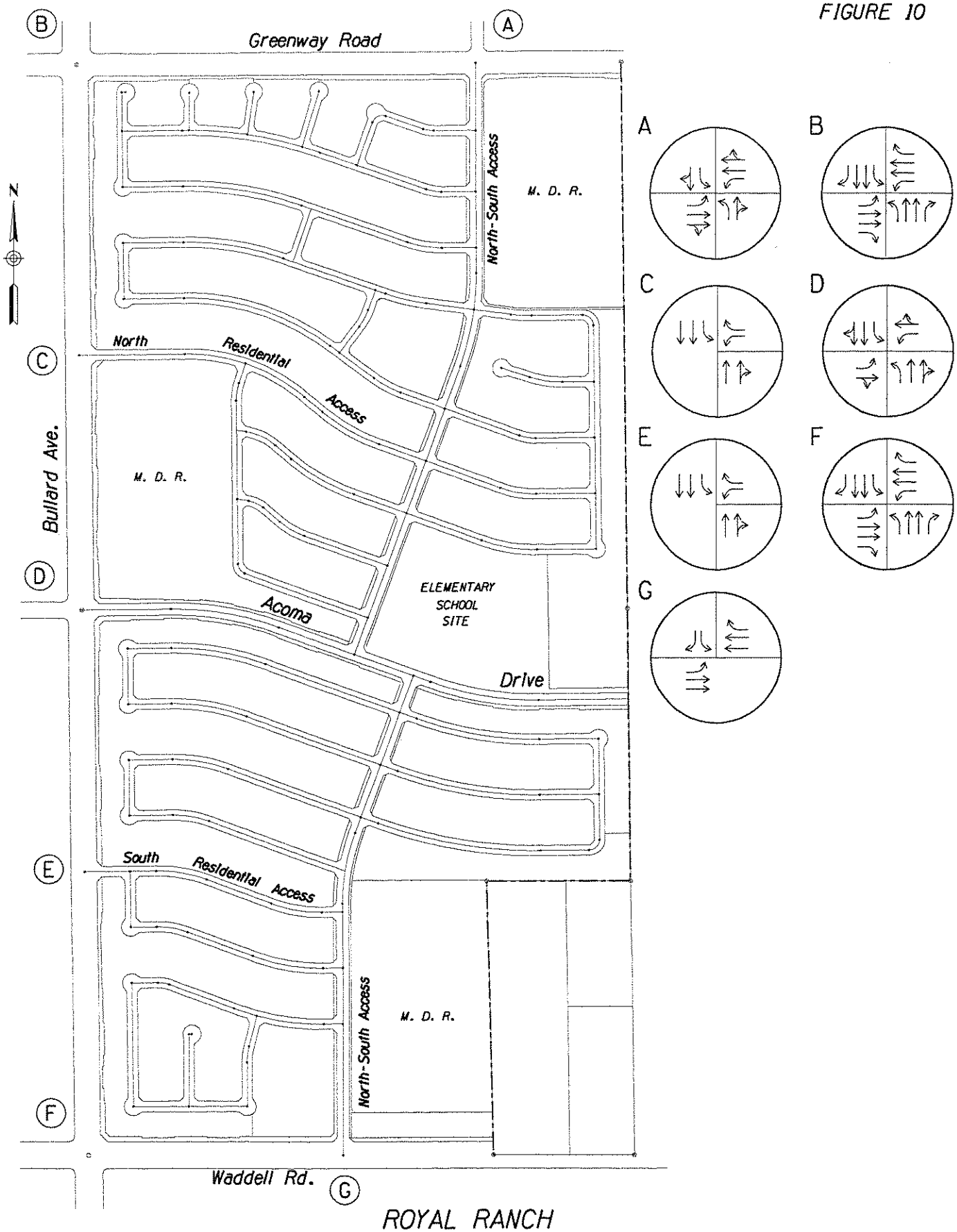
FIGURE 9



ROYAL RANCH
YEAR 2002
RECOMMENDED INTERSECTION LANE CONFIGURATION

DMJM

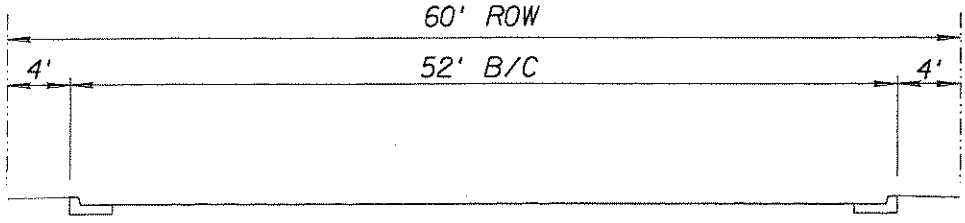
FIGURE 10



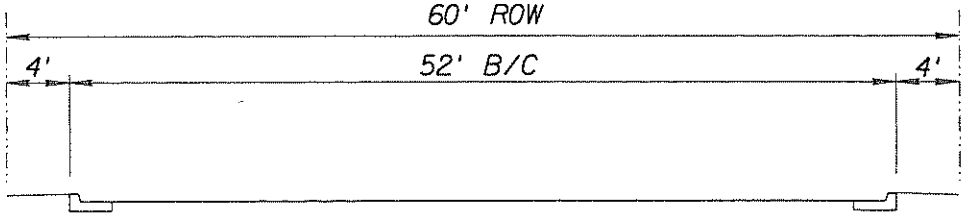
ROYAL RANCH
YEAR 2020
RECOMMENDED INTERSECTION LANE CONFIGURATION

DMJM

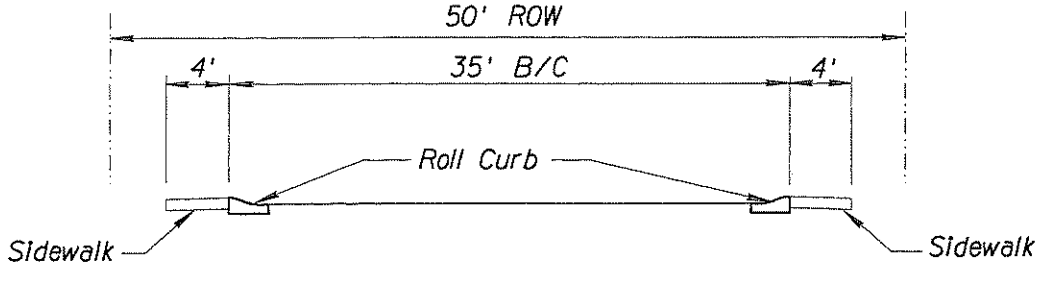
Acoma Drive



North-South Access Road



Local Roadways



INTERNAL STREETS
TYPICAL SECTIONS

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By the year 2020, it is assumed that the surrounding roadway network will consist of major and minor arterials, as planned for the future transportation system in the *Surprise Comprehensive Development Plan*. For year 2020, the adjacent roadway network was found to operate at acceptable levels of service. The following additional mitigation measures may be required.

- Signalization of the Acoma Drive / Bullard Avenue intersection.
- Signalization of the North-South Access / Waddell Road intersection.
- Signalization of the North-South Access / Greenway Road intersection.
- Dedicated left and right turn lanes for all approaches to the Greenway Road / Bullard Avenue intersection and the Waddell Road / Bullard Avenue intersection.
- A right turn lane for the westbound approach for the intersection of North-South Access / Waddell Road, assuming Waddell Road is a four lane roadway.

APPENDIX

CAPACITY ANALYSES
FOR YEAR 2002

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) N-S Road (E-W) Greenway Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		495	12	71	312		50		198			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	528	
Potential Capacity: (pcph)	748	
Movement Capacity: (pcph)	748	
Prob. of Queue-Free State:	0.69	

Step 2: LT from Major Street	WB	EB
Conflicting Flows: (vph)	534	
Potential Capacity: (pcph)	954	
Movement Capacity: (pcph)	954	
Prob. of Queue-Free State:	0.91	

Step 4: LT from Minor Street	NB	SB
Conflicting Flows: (vph)	930	
Potential Capacity: (pcph)	312	
Major LT, Minor TH Impedance Factor:	0.91	
Adjusted Impedance Factor:	0.91	
Capacity Adjustment Factor due to Impeding Movements	0.91	
Movement Capacity: (pcph)	285	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	58	285		15.8	0.8	C	8.7
NB	R	229	748		6.9	1.4	B	
WB	L	83	954		4.1	0.2	A	0.8

Intersection Delay = 2.2 sec/veh

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) N-S Road (E-W) Greenway Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	1	0	1	0	0	0
Stop/Yield			N			N						
Volumes		327	26	211	500		28		116			
PHF		.95	.95	.95	.95		.95		.95			
Grade		0			0			0				
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10			1.10		1.10			

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)	358	
Potential Capacity: (pcph)	912	
Movement Capacity: (pcph)	912	
Prob. of Queue-Free State:	0.85	
Step 2: LT from Major Street	**WB**	**EB**
Conflicting Flows: (vph)	371	
Potential Capacity: (pcph)	1141	
Movement Capacity: (pcph)	1141	
Prob. of Queue-Free State:	0.79	
Step 4: LT from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)	1106	
Potential Capacity: (pcph)	246	
Major LT, Minor TH Impedance Factor:	0.79	
Adjusted Impedance Factor:	0.79	
Capacity Adjustment Factor due to Impeding Movements	0.79	
Movement Capacity: (pcph)	193	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
NB	L	32	193		22.3	0.5	D	8.1
NB	R	134	912		4.6	0.5	A	
WB	L	244	1141		4.0	0.9	A	1.2

Intersection Delay = 1.7 sec/veh

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University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) North Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 AM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		342	10	6	425					37		27
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	366	
Potential Capacity: (pcph)	903	
Movement Capacity: (pcph)	903	
Prob. of Queue-Free State:	0.97	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	371	
Potential Capacity: (pcph)	1141	
Movement Capacity: (pcph)	1141	
Prob. of Queue-Free State:	0.99	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	818	
Potential Capacity: (pcph)	362	
Major LT, Minor TH Impedance Factor:	0.99	
Adjusted Impedance Factor:	0.99	
Capacity Adjustment Factor due to Impeding Movements	0.99	
Movement Capacity: (pcph)	360	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	43	360		11.4	0.4	C	8.3
WB R	31	903		4.1	0.0	A	
SB L	7	1141		3.2	0.0	A	0.0

Intersection Delay = 0.6 sec/veh

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Streets: (N-S) Bullard Avenue (E-W) North Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 PM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		384	46	25	344					23		17
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	428	
Potential Capacity: (pcph)	840	
Movement Capacity: (pcph)	840	
Prob. of Queue-Free State:	0.98	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	452	
Potential Capacity: (pcph)	1044	
Movement Capacity: (pcph)	1044	
Prob. of Queue-Free State:	0.97	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	816	
Potential Capacity: (pcph)	363	
Major LT, Minor TH Impedance Factor:	0.97	
Adjusted Impedance Factor:	0.97	
Capacity Adjustment Factor due to Impeding Movements	0.97	
Movement Capacity: (pcph)	353	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	26	353		11.0	0.1	C	8.2
WB	R	20	840		4.4	0.0	A	
SB	L	29	1044		3.5	0.0	A	0.2

Intersection Delay = 0.5 sec/veh

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Streets: (N-S) Bullard Avenue (E-W) Acoma Drive
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 AM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1 < 0		1	1 < 0		1	1 < 0		1	1 < 0	
Stop/Yield			N			N						
Volumes	60	213	29	48	364	50	80	10	130	93	10	59
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	240	410
Potential Capacity: (pcph)	1046	858
Movement Capacity: (pcph)	1046	858
Prob. of Queue-Free State:	0.93	0.82
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	255	436
Potential Capacity: (pcph)	1296	1062
Movement Capacity: (pcph)	1296	1062
Prob. of Queue-Free State:	0.96	0.94
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	790	778
Potential Capacity: (pcph)	420	426
Capacity Adjustment Factor due to Impeding Movements	0.89	0.89
Movement Capacity: (pcph)	376	381
Prob. of Queue-Free State:	0.97	0.97
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	837	800
Potential Capacity: (pcph)	353	371
Major LT, Minor TH Impedance Factor:	0.87	0.87
Adjusted Impedance Factor:	0.90	0.90
Capacity Adjustment Factor due to Impeding Movements	0.74	0.84
Movement Capacity: (pcph)	261	311

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	92	311		16.4	1.2	C	
EB T	12	381 >					9.6
EB R	151	858 >	786	5.8	0.9	B	
WB L	108	261		23.2	1.9	D	
WB T	12	376 >					15.4
WB R	68	1046 >	825	4.8	0.3	A	
NB L	69	1062		3.6	0.1	A	0.7
SB L	56	1296		2.9	0.0	A	0.3

Intersection Delay = 4.3 sec/veh

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) Acoma Drive
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 PM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1 <	0	1	1 <	0	1	1 <	0	1	1 <	0
Stop/Yield			N			N						
Volumes	130	361	113	44	243	80	50	10	60	58	10	19
PHF	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Grade		0			0			0			0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10			1.10			1.10	1.10	1.10	1.10	1.10	1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	440	298
Potential Capacity: (pcph)	829	978
Movement Capacity: (pcph)	829	978
Prob. of Queue-Free State:	0.97	0.93
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	499	340
Potential Capacity: (pcph)	992	1181
Movement Capacity: (pcph)	992	1181
Prob. of Queue-Free State:	0.95	0.87
Step 3: TH from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	962	980
Potential Capacity: (pcph)	341	334
Capacity Adjustment Factor due to Impeding Movements	0.83	0.83
Movement Capacity: (pcph)	282	276
Prob. of Queue-Free State:	0.96	0.96
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	958	936
Potential Capacity: (pcph)	300	309
Major LT, Minor TH Impedance Factor:	0.79	0.79
Adjusted Impedance Factor:	0.84	0.84
Capacity Adjustment Factor due to Impeding Movements	0.78	0.82
Movement Capacity: (pcph)	234	253

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
EB L	58	253		18.4	0.9	C	
EB T	12	276 >					11.0
EB R	69	978 >	710	5.7	0.4	B	
WB L	67	234		21.4	1.1	D	
WB T	12	282 >					16.9
WB R	22	829 >	492	7.9	0.1	B	
NB L	151	1181		3.5	0.4	A	0.8
SB L	51	992		3.8	0.0	A	0.5

Intersection Delay = 2.9 sec/veh

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) South Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 AM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		269	4	7	580					47		33
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	285	
Potential Capacity: (pcph)	993	
Movement Capacity: (pcph)	993	
Prob. of Queue-Free State:	0.96	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	287	
Potential Capacity: (pcph)	1251	
Movement Capacity: (pcph)	1251	
Prob. of Queue-Free State:	0.99	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	903	
Potential Capacity: (pcph)	323	
Major LT, Minor TH Impedance Factor:	0.99	
Adjusted Impedance Factor:	0.99	
Capacity Adjustment Factor due to Impeding Movements	0.99	
Movement Capacity: (pcph)	321	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	54	321		13.5	0.6	C	9.5
WB	R	39	993		3.8	0.0	A	
SB	L	8	1251		2.9	0.0	A	0.0

Intersection Delay = 0.8 sec/veh

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Streets: (N-S) Bullard Avenue (E-W) South Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 PM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	< 0	1	1	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		583	17	31	330					32		21
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	623	
Potential Capacity: (pcph)	669	
Movement Capacity: (pcph)	669	
Prob. of Queue-Free State:	0.96	

Step 2: LT from Major Street	SB	NB
Conflicting Flows: (vph)	632	
Potential Capacity: (pcph)	857	
Movement Capacity: (pcph)	857	
Prob. of Queue-Free State:	0.96	

Step 4: LT from Minor Street	WB	EB
Conflicting Flows: (vph)	1003	
Potential Capacity: (pcph)	282	
Major LT, Minor TH Impedance Factor:	0.96	
Adjusted Impedance Factor:	0.96	
Capacity Adjustment Factor due to Impeding Movements	0.96	
Movement Capacity: (pcph)	270	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	37	270		15.4	0.4	C	11.5
WB	R	24	669		5.6	0.0	B	
SB	L	36	857		4.4	0.0	A	0.4

Intersection Delay = 0.7 sec/veh

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) N-S Access Drive (E-W) Waddell Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 AM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes	19	465			262	78				185		33
PHF	.95	.95			.95	.95				.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		317
Potential Capacity: (pcph)		957
Movement Capacity: (pcph)		957
Prob. of Queue-Free State:		0.96
Step 2: LT from Major Street	**WB**	**EB**
Conflicting Flows: (vph)		358
Potential Capacity: (pcph)		1157
Movement Capacity: (pcph)		1157
Prob. of Queue-Free State:		0.98
Step 4: LT from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)		826
Potential Capacity: (pcph)		359
Major LT, Minor TH Impedance Factor:		0.98
Adjusted Impedance Factor:		0.98
Capacity Adjustment Factor due to Impeding Movements		0.98
Movement Capacity: (pcph)		352

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB	L	215	352		25.0	3.7	D	21.8
SB	R	39	957		3.9	0.0	A	
EB	L	22	1157		3.2	0.0	A	0.1

Intersection Delay = 4.6 sec/veh

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Streets: (N-S) N-S Access Drive (E-W) Waddell Road
Major Street Direction.... EW
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2002 PM Peak Hour
Two-way Stop-controlled Intersection

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	0	1	< 0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes	66	289			447	222				109		18
PHF	.95	.95			.95	.95				.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's	1.10									1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.00	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.00	3.30
Left Turn Minor Road	6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	NB	SB
Conflicting Flows: (vph)		588
Potential Capacity: (pcph)		697
Movement Capacity: (pcph)		697
Prob. of Queue-Free State:		0.97
Step 2: LT from Major Street	**WB**	**EB**
Conflicting Flows: (vph)		705
Potential Capacity: (pcph)		791
Movement Capacity: (pcph)		791
Prob. of Queue-Free State:		0.90
Step 4: LT from Minor Street	**NB**	**SB**
Conflicting Flows: (vph)		961
Potential Capacity: (pcph)		299
Major LT, Minor TH Impedance Factor:		0.90
Adjusted Impedance Factor:		0.90
Capacity Adjustment Factor due to Impeding Movements		0.90
Movement Capacity: (pcph)		270

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
SB	L	127	270		24.6	2.3	D	21.9
SB	R	21	697		5.3	0.0	B	
EB	L	76	791		5.0	0.3	B	0.9

Intersection Delay = 2.7 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2BAM.HC9
Area Type: Other 11-6-98 2002 AM
Comment: 2002 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Volumes	15	342	59	92	188	82	39	189	141	24	280	60
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*							
Thru	*							
Right	*							
Peds	*							
WB Left	*							
Thru	*							
Right	*							
Peds	*							
NB Right								
SB Right								
Green	30.0A				20.0A			
Yellow/AR	5.0				5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	468	877	0.034	0.533	4.3	A	5.5	B
	TR	1023	1918	0.413	0.533	5.6	B		
WB	L	305	572	0.318	0.533	5.3	B	5.1	B
	TR	998	1872	0.284	0.533	5.0	A		
NB	L	211	575	0.194	0.367	8.4	B	10.0	B
	TR	673	1835	0.516	0.367	10.2	B		
SB	L	220	601	0.113	0.367	8.1	B	10.0	B
	TR	700	1909	0.511	0.367	10.1	B		

Intersection Delay = 7.6 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.455

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2BPM.HC9
Area Type: Other 11-6-98 2002 PM
Comment: 2002 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Volumes	60	342	36	163	338	27	56	263	82	77	170	15
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds	*				Peds	*			
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds	*				Peds	*			
NB Right					EB Right				
SB Right					WB Right				
Green	25.0A				Green	25.0A			
Yellow/AR	5.0				Yellow/AR	5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	272	605	0.231	0.450	6.6	B	7.5	B
	TR	870	1933	0.458	0.450	7.7	B		
WB	L	260	578	0.661	0.450	12.5	B	9.1	B
	TR	873	1939	0.440	0.450	7.6	B		
NB	L	504	1121	0.117	0.450	6.2	B	7.3	B
	TR	851	1891	0.427	0.450	7.5	B		
SB	L	291	647	0.278	0.450	6.8	B	6.6	B
	TR	872	1937	0.224	0.450	6.5	B		

Intersection Delay = 7.8 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.544

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2FAM.HC9
Area Type: Other 11-6-98 2002 AM
Comment: 2002 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Volumes	67	271	10	31	197	67	10	139	38	175	371	81
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0A				Green 25.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group:	Adj Sat Flow Cap	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
	Mvmts							
EB	L	382	849	0.186	0.450	6.4	B	6.9	B
	TR	878	1950	0.337	0.450	7.0	B		
WB	L	360	801	0.092	0.450	6.1	B	6.9	B
	TR	849	1886	0.328	0.450	7.0	B		
NB	L	175	388	0.063	0.450	6.0	B	6.5	B
	TR	854	1898	0.218	0.450	6.5	B		
SB	L	518	1150	0.356	0.450	7.2	B	8.1	B
	TR	859	1908	0.554	0.450	8.4	B		

Intersection Delay = 7.3 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.446

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2FPM.HC9
Area Type: Other 11-6-98 2002 PM
Comment: 2002 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	1	< 0	1	1	< 0
Volumes	86	197	5	30	278	157	5	357	62	96	193	73
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0A				Green 25.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	191	424	0.477	0.450	8.9	B	7.3	B
	TR	879	1954	0.241	0.450	6.6	B		
WB	L	477	1060	0.067	0.450	6.0	B	8.2	B
	TR	835	1855	0.549	0.450	8.4	B		
NB	L	379	843	0.013	0.450	5.9	B	8.0	B
	TR	863	1917	0.511	0.450	8.0	B		
SB	L	208	462	0.486	0.450	8.9	B	7.5	B
	TR	846	1880	0.331	0.450	7.0	B		

Intersection Delay = 7.8 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.530

CAPACITY ANALYSES
FOR YEAR 2020

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) North Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2020 AM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		552	10	6	755					37		27
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	296	
Potential Capacity: (pcph)	980	
Movement Capacity: (pcph)	980	
Prob. of Queue-Free State:	0.97	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	592	
Potential Capacity: (pcph)	825	
Movement Capacity: (pcph)	825	
Prob. of Queue-Free State:	0.99	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	1388	
Potential Capacity: (pcph)	168	
Major LT, Minor TH Impedance Factor:	0.99	
Adjusted Impedance Factor:	0.99	
Capacity Adjustment Factor due to Impeding Movements	0.99	
Movement Capacity: (pcph)	167	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	43	167		28.9	0.9	D	18.3
WB	R	31	980		3.8	0.0	A	
SB	L	7	825		4.4	0.0	A	0.0

Intersection Delay = 0.9 sec/veh

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Streets: (N-S) Bullard Avenue (E-W) North Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2020 PM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		714	46	25	554					23		17
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	400	
Potential Capacity: (pcph)	868	
Movement Capacity: (pcph)	868	
Prob. of Queue-Free State:	0.98	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	800	
Potential Capacity: (pcph)	638	
Movement Capacity: (pcph)	638	
Prob. of Queue-Free State:	0.95	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	1385	
Potential Capacity: (pcph)	169	
Major LT, Minor TH Impedance Factor:	0.95	
Adjusted Impedance Factor:	0.95	
Capacity Adjustment Factor due to Impeding Movements	0.95	
Movement Capacity: (pcph)	161	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	26	161		26.6	0.5	D	17.1
WB R	20	868		4.2	0.0	A	
SB L	29	638		5.9	0.0	B	0.3

Intersection Delay = 0.6 sec/veh

Center For Microcomputers In Transportation
University of Florida
512 Weil Hall
Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) South Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2020 AM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		479	4	7	910					47		33
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	254	
Potential Capacity: (pcph)	1030	
Movement Capacity: (pcph)	1030	
Prob. of Queue-Free State:	0.96	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	508	
Potential Capacity: (pcph)	915	
Movement Capacity: (pcph)	915	
Prob. of Queue-Free State:	0.99	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	1471	
Potential Capacity: (pcph)	150	
Major LT, Minor TH Impedance Factor:	0.99	
Adjusted Impedance Factor:	0.99	
Capacity Adjustment Factor due to Impeding Movements	0.99	
Movement Capacity: (pcph)	149	

Intersection Performance Summary

Movement		Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB	L	54	149		37.3	1.4	E	23.4
WB	R	39	1030		3.6	0.0	A	
SB	L	8	915		4.0	0.0	A	0.0

Intersection Delay = 1.3 sec/veh

Center For Microcomputers In Transportation
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Gainesville, FL 32611-2083
Ph: (904) 392-0378

Streets: (N-S) Bullard Avenue (E-W) South Access
Major Street Direction.... NS
Length of Time Analyzed... 15 (min)
Analyst..... MSE
Date of Analysis..... 11/6/98
Other Information.....2020 PM Peak Hour
Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	< 0	1	2	0	0	0	0	1	0	1
Stop/Yield			N			N						
Volumes		913	17	31	540					32		21
PHF		.95	.95	.95	.95					.95		.95
Grade		0			0						0	
MC's (%)												
SU/RV's (%)												
CV's (%)												
PCE's				1.10						1.10		1.10

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	5.50	2.10
Right Turn Minor Road	5.50	2.60
Through Traffic Minor Road	6.50	3.30
Left Turn Minor Road	*6.50	*3.30

Worksheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	490	
Potential Capacity: (pcph)	782	
Movement Capacity: (pcph)	782	
Prob. of Queue-Free State:	0.97	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	979	
Potential Capacity: (pcph)	511	
Movement Capacity: (pcph)	511	
Prob. of Queue-Free State:	0.93	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	1571	
Potential Capacity: (pcph)	131	
Major LT, Minor TH Impedance Factor:	0.93	
Adjusted Impedance Factor:	0.93	
Capacity Adjustment Factor due to Impeding Movements	0.93	
Movement Capacity: (pcph)	122	

Intersection Performance Summary

Movement	Flow Rate (pcph)	Move Cap (pcph)	Shared Cap (pcph)	Avg. Total Delay (sec/veh)	95% Queue Length (veh)	LOS	Approach Delay (sec/veh)
WB L	37	122		41.9	1.1	E	27.2
WB R	24	782		4.7	0.0	A	
SB L	36	511		7.6	0.1	B	0.4

Intersection Delay = 1.1 sec/veh

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) N-S Access Drive
Analyst: MSE File Name: INT2AAM.HC9
Area Type: Other 11-6-98 2020 AM
Comment: 2020 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Volumes	150	710	12	71	457	230	50	25	198	160	25	100
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	35.0A				Green 15.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	287	466	0.550	0.617	6.0	B	4.0	A
	TR	2412	3912	0.331	0.617	3.6	A		
WB	L	268	434	0.280	0.617	3.6	A	3.6	A
	TR	2297	3725	0.330	0.617	3.6	A		
NB	L	368	1299	0.144	0.283	10.4	B	11.8	B
	TR	481	1699	0.486	0.283	12.2	B		
SB	L	239	845	0.702	0.283	18.4	C	15.1	C
	TR	489	1725	0.268	0.283	10.8	B		

Intersection Delay = 6.2 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.598

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) N-S Access Drive
Analyst: MSE File Name: INT2APM.HC9
Area Type: Other 11-6-98 2020 PM
Comment: 2020 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	< 0	1	2	< 0	1	1	< 0	1	1	< 0
Volumes	100	472	26	211	876	160	28	25	116	230	25	150
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	35.0A				Green 15.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	131	212	0.803	0.617	25.0	C	6.8	B
	TR	2399	3891	0.229	0.617	3.3	A		
WB	L	430	697	0.516	0.617	5.1	B	4.3	A
	TR	2362	3831	0.484	0.617	4.2	A		
NB	L	299	1057	0.097	0.283	10.2	B	10.9	B
	TR	487	1718	0.304	0.283	11.0	B		
SB	L	345	1217	0.702	0.283	16.7	C	14.4	B
	TR	484	1708	0.380	0.283	11.4	B		

Intersection Delay = 7.0 sec/veh Intersection LOS = B
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.771

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2BAM.HC9
Area Type: Other 11-6-98 2020 AM
Comment: 2020 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Volumes	55	612	119	167	338	102	64	299	216	44	475	100
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	30.0A				Green 20.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	489	917	0.119	0.533	4.5	A	5.0	A
	T	2092	3922	0.323	0.533	5.1	B		
	R	889	1667	0.141	0.533	4.6	A		
WB	L	278	521	0.633	0.533	9.6	B	6.0	B
	T	2092	3922	0.179	0.533	4.7	A		
	R	889	1667	0.120	0.533	4.5	A		
NB	L	230	626	0.292	0.367	8.9	B	8.8	B
	T	1438	3922	0.230	0.367	8.5	B		
	R	611	1667	0.371	0.367	9.2	B		
SB	L	347	946	0.133	0.367	8.2	B	8.9	B
	T	1438	3922	0.365	0.367	9.0	B		
	R	611	1667	0.172	0.367	8.3	B		

Intersection Delay = 7.0 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.527

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Greenway Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2BPM.HC9
Area Type: Other 11-6-98 2020 PM
Comment: 2020 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Volumes	100	335	61	238	608	47	116	458	157	106	280	55
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left	*	*	
Thru	*				Thru		*	
Right	*				Right		*	
Peds	*				Peds	*	*	
WB Left	*				SB Left	*	*	
Thru	*				Thru		*	
Right	*				Right		*	
Peds	*				Peds	*	*	
NB Right					EB Right			
SB Right					WB Right			
Green	28.0A				Green	6.0A	11.0A	
Yellow/AR	5.0				Yellow/AR	5.0	5.0	

Cycle Length: 60 secs Phase combination order: #1 #5 #6

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	192	385	0.545	0.500	9.1	B	6.0	B
	T	1961	3922	0.189	0.500	5.4	B		
	R	834	1667	0.077	0.500	5.0	A		
WB	L	420	840	0.598	0.500	8.6	B	6.5	B
	T	1961	3922	0.343	0.500	5.9	B		
	R	834	1667	0.059	0.500	5.0	A		
NB	L	430	1863	0.284	0.400	7.7	B	13.3	B
	T	850	3922	0.595	0.217	14.5	B		
	R	361	1667	0.457	0.217	13.9	B		
SB	L	379	1863	0.296	0.400	7.9	B	11.8	B
	T	850	3922	0.365	0.217	13.0	B		
	R	361	1667	0.161	0.217	12.3	B		

Intersection Delay = 9.3 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 9.0 sec Critical v/c(x) = 0.580

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Acoma Drive (N-S) Bullard Avenue
Analyst: MSE File Name: INT2DAM.HC9
Area Type: Other 11-6-98 2020 AM
Comment: 2020 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	2	< 0	1	2	< 0
Volumes	80	10	130	93	10	59	60	423	29	48	694	50
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	13.0A				Green 37.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	381	1523	0.221	0.250	11.6	B	12.0	B
	TR	422	1689	0.351	0.250	12.2	B		
WB	L	298	1193	0.329	0.250	12.1	B	11.8	B
	TR	428	1711	0.171	0.250	11.4	B		
NB	L	269	414	0.234	0.650	2.9	A	2.7	A
	TR	2524	3883	0.198	0.650	2.7	A		
SB	L	495	761	0.103	0.650	2.5	A	3.0	A
	TR	2523	3882	0.326	0.650	3.0	A		

Intersection Delay = 4.9 sec/veh Intersection LOS = A

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.333

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Acoma Drive (N-S) Bullard Avenue
Analyst: MSE File Name: INT2DPM.HC9
Area Type: Other 11-6-98 2020 PM
Comment: 2020 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	< 0	1	1	< 0	1	2	< 0	1	2	< 0
Volumes	50	10	60	59	10	19	130	691	113	44	453	80
Lane W (ft)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	13.0A				Green 37.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	426	1704	0.124	0.250	11.3	B	11.3	B
	TR	428	1710	0.173	0.250	11.4	B		
WB	L	380	1519	0.163	0.250	11.4	B	11.3	B
	TR	443	1771	0.070	0.250	11.1	B		
NB	L	433	666	0.316	0.650	3.1	A	3.1	A
	TR	2495	3839	0.356	0.650	3.1	A		
SB	L	228	351	0.202	0.650	2.8	A	2.8	A
	TR	2491	3833	0.236	0.650	2.8	A		

Intersection Delay = 4.0 sec/veh Intersection LOS = A

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.305

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2FAM.HC9
Area Type: Other 11-6-98 2020 AM
Comment: 2020 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Volumes	107	511	15	51	342	127	10	249	28	255	591	111
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
WB Left	*				SB Left *			
Thru	*				Thru *			
Right	*				Right *			
Peds	*				Peds *			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0A				Green 25.0A			
Yellow/AR	5.0				Yellow/AR 5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	400	889	0.282	0.450	6.8	B	6.9	B
	T	1765	3922	0.320	0.450	6.9	B		
	R	750	1667	0.021	0.450	5.9	B		
WB	L	281	624	0.192	0.450	6.5	B	6.5	B
	T	1765	3922	0.214	0.450	6.5	B		
	R	750	1667	0.179	0.450	6.4	B		
NB	L	230	512	0.048	0.450	6.0	B	6.3	B
	T	1765	3922	0.156	0.450	6.3	B		
	R	750	1667	0.039	0.450	6.0	B		
SB	L	483	1074	0.555	0.450	8.9	B	7.5	B
	T	1765	3922	0.370	0.450	7.1	B		
	R	750	1667	0.156	0.450	6.3	B		

Intersection Delay = 6.9 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.437

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) Bullard Avenue
Analyst: MSE File Name: INT2FPM.HC9
Area Type: Other 11-6-98 2020 PM
Comment: 2020 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Volumes	116	342	10	20	518	237	15	577	82	156	303	113
Lane W (ft)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
RTOR Vols			0			0			0			0
Lost Time	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	*				NB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds	*				Peds	*			
WB Left	*				SB Left	*			
Thru	*				Thru	*			
Right	*				Right	*			
Peds	*				Peds	*			
NB Right					EB Right				
SB Right					WB Right				
Green	25.0A				Green	25.0A			
Yellow/AR	5.0				Yellow/AR	5.0			

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Mvmts	Group: Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	277	616	0.440	0.450	8.1	B	6.9	B
	T	1765	3922	0.214	0.450	6.5	B		
	R	750	1667	0.015	0.450	5.9	B		
WB	L	400	889	0.052	0.450	6.0	B	6.9	B
	T	1765	3922	0.324	0.450	6.9	B		
	R	750	1667	0.332	0.450	7.0	B		
NB	L	434	964	0.037	0.450	6.0	B	6.9	B
	T	1765	3922	0.361	0.450	7.1	B		
	R	750	1667	0.115	0.450	6.2	B		
SB	L	240	533	0.684	0.450	13.8	B	8.3	B
	T	1765	3922	0.190	0.450	6.4	B		
	R	750	1667	0.159	0.450	6.3	B		

Intersection Delay = 7.2 sec/veh Intersection LOS = B

Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.562

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) N-S Access Drive
Analyst: MSE File Name: INT2GAM.HC9
Area Type: Other 11-6-98 2020 AM
Comment: 2020 AM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	0	2	< 0	0	0	0	1	0	1
Volumes	19	775			487	78				185		33
Lane W (ft)	12.0	12.0			12.0					12.0		12.0
RTOR Vols			0			0						0
Lost Time	3.00	3.00			3.00	3.00				3.00		3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left			
Thru	*				Thru			
Right					Right			
Peds	*				Peds	*		
WB Left					SB Left	*		
Thru	*				Thru			
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	35.0A				Green	15.0A		
Yellow/AR	5.0				Yellow/AR	5.0		

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	377	611	0.053	0.617	2.9	A	3.7	A
	T	2419	3922	0.354	0.617	3.7	A		
WB	TR	2369	3841	0.264	0.617	3.4	A	3.4	A
SB	L	528	1863	0.369	0.283	11.3	B	11.1	B
	R	472	1667	0.074	0.283	10.2	B		

Intersection Delay = 4.6 sec/veh Intersection LOS = A
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.359

HCM: SIGNALIZED INTERSECTION SUMMARY Version 2.4g 11-09-1998
Center For Microcomputers In Transportation

Streets: (E-W) Waddell Road (N-S) N-S Access Drive
Analyst: MSE File Name: INT2GPM.HC9
Area Type: Other 11-6-98 2020 PM
Comment: 2020 PM Peak Hour

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	2	0	0	2	0	0	0	0	1	0	1
Volumes	66	514			757	222				109		18
Lane W (ft)	12.0	12.0			12.0					12.0		12.0
RTOR Vols			0			0						0
Lost Time	3.00	3.00			3.00	3.00				3.00		3.00

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	*				NB Left			
Thru	*				Thru			
Right					Right			
Peds	*				Peds	*		
WB Left					SB Left	*		
Thru	*				Thru			
Right	*				Right	*		
Peds	*				Peds	*		
NB Right					EB Right			
SB Right					WB Right			
Green	34.0A				Green	16.0A		
Yellow/AR	5.0				Yellow/AR	5.0		

Cycle Length: 60 secs Phase combination order: #1 #5

Intersection Performance Summary

	Lane Group: Mvmts	Cap	Adj Sat Flow	v/c Ratio	g/C Ratio	Delay	LOS	Approach: Delay	LOS
EB	L	131	218	0.528	0.600	7.6	B	4.1	A
	T	2353	3922	0.241	0.600	3.6	A		
WB	TR	2273	3788	0.477	0.600	4.5	A	4.5	A
SB	L	559	1863	0.206	0.300	10.1	B	10.1	B
	R	500	1667	0.038	0.300	9.6	B		

Intersection Delay = 4.7 sec/veh Intersection LOS = A
Lost Time/Cycle, L = 6.0 sec Critical v/c(x) = 0.420

SECTION X

Drainage Report for Preliminary PAD

~ ROYAL RANCH ~

Prepared for:

Fleet-Fisher Engineering
4250 East Camelback Road, Suite 410-K
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Prepared by:

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Tempe, Arizona 85282
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Revised
May 1999

Premier Project No. 9814

Table of Contents

1 INTRODUCTION 1

2 WATERSHED DESCRIPTION 3

2.1 Land Surface 3

2.2 Hydrology 3

3 PROJECT SITE DESCRIPTION 6

3.1 Existing Conditions 6

3.1.1 On-site Land Surface 6

3.1.2 On-site Hydrology 9

3.2 Proposed Conditions 13

3.2.1 Concept Plan 13

3.2.2 Site Grading 13

3.2.3 Hydrology References 16

3.2.4 Storm Water System 17

3.2.5 Retention Basins 18

List of Figures

Figure 1: Site Location 2

Figure 2: Watershed 5

Figure 3: East Edge of Site (looking south) 6

Figure 4: Project Site Topo 7

Figure 5: Soils 8

Figure 6: HEC-1 Basins 11

Figure 7: Existing Peak Storm Discharges 12

Figure 8: Proposed Concept Land Use 14

Figure 9: Proposed Drainage Basins 15

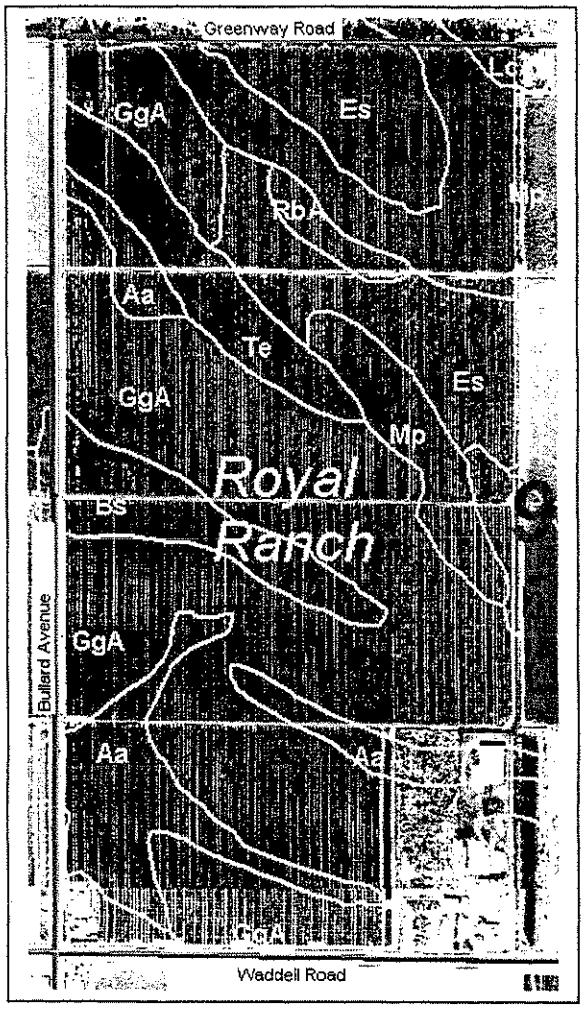
List of Tables

Table 1: Drainage Basin Summary 16

Table 2: Retention Basin Calcs 19

1 INTRODUCTION

Royal Ranch (RR) is a 300 acre proposed planned area development (PAD) composed of single-family homes and accompanying retention and landscape areas. It is located in the City of Surprise about 4 miles west of the Agua Fria River. The site is located in Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. It is bordered on the north by Greenway Road, on the south by Waddell Road and on the west by Bullard Avenue (see Figure 1).



The purpose of this study was to evaluate and present the existing watershed conditions (site included), the proposed on-site conditions and the on-site storm water collection and retention systems.

Specific objectives of this study are:

- Characterize the existing off-site and on-site land use and storm water runoff conditions,
- Characterize the storm water runoff for the proposed site conditions, and determine runoff volumes to be retained,
- Describe the storm water conveyance systems and retention facilities.

Sources of information for this study include the City of Surprise, Flood Control District of Maricopa County (FCDMC), Natural Resource Conservation Service (NRCS), U. S. Geological Survey, Landiscor (aerial photos) and site visits.

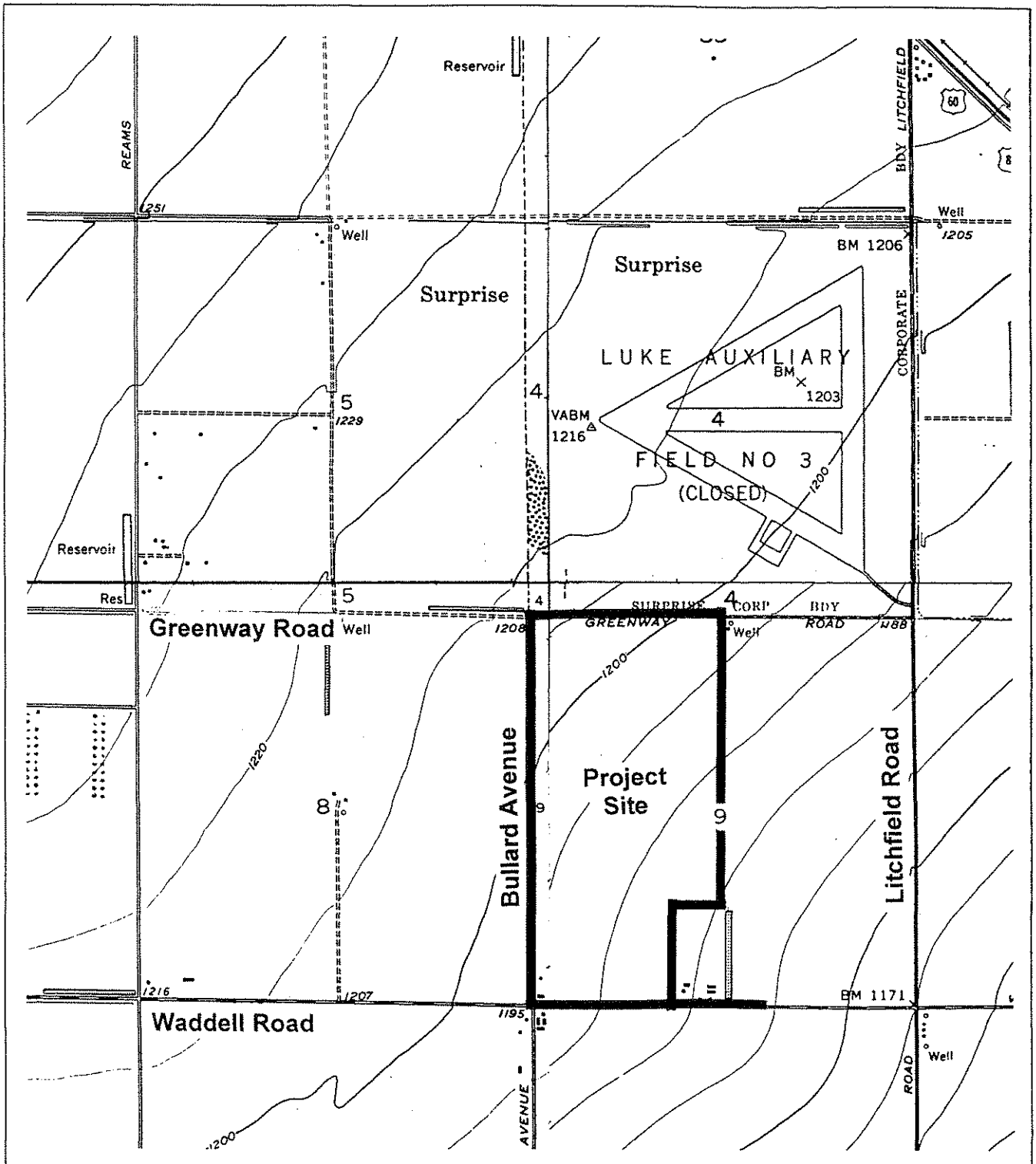


Figure 1

Royal Ranch

Project Location

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2 WATERSHED DESCRIPTION

2.1 Land Surface

The contributing watershed, including the project site, is approximately 17 square miles (see Figure 2, numbering refers to the sub-basin identifications used in the hydrologic model). The watershed is bordered (moving clockwise from the north) by the following:

- on the north by Grand Avenue,
- on the west by Reems Road from Beardsley Road to Bell Road,
- Bell Road from Reems Road to Bullard Avenue,
- Bullard Avenue from Bell Road to Greenway Road,
- Greenway Road (along north edge of site) from Bullard Avenue to west edge of site,
- West edge of site from Greenway Road to Waddell Road,
- the south edge of the watershed is along Waddell Road, and,
- the west edge is determined by McMicken Dam.

McMicken Dam retains the runoff from the White Tank Mountains (to the west of the watershed), preventing the flow from entering into the watershed.

The area is undergoing rapid development. The current land use is a combination of developed (residential and commercial) and undeveloped (desert and agricultural) areas.

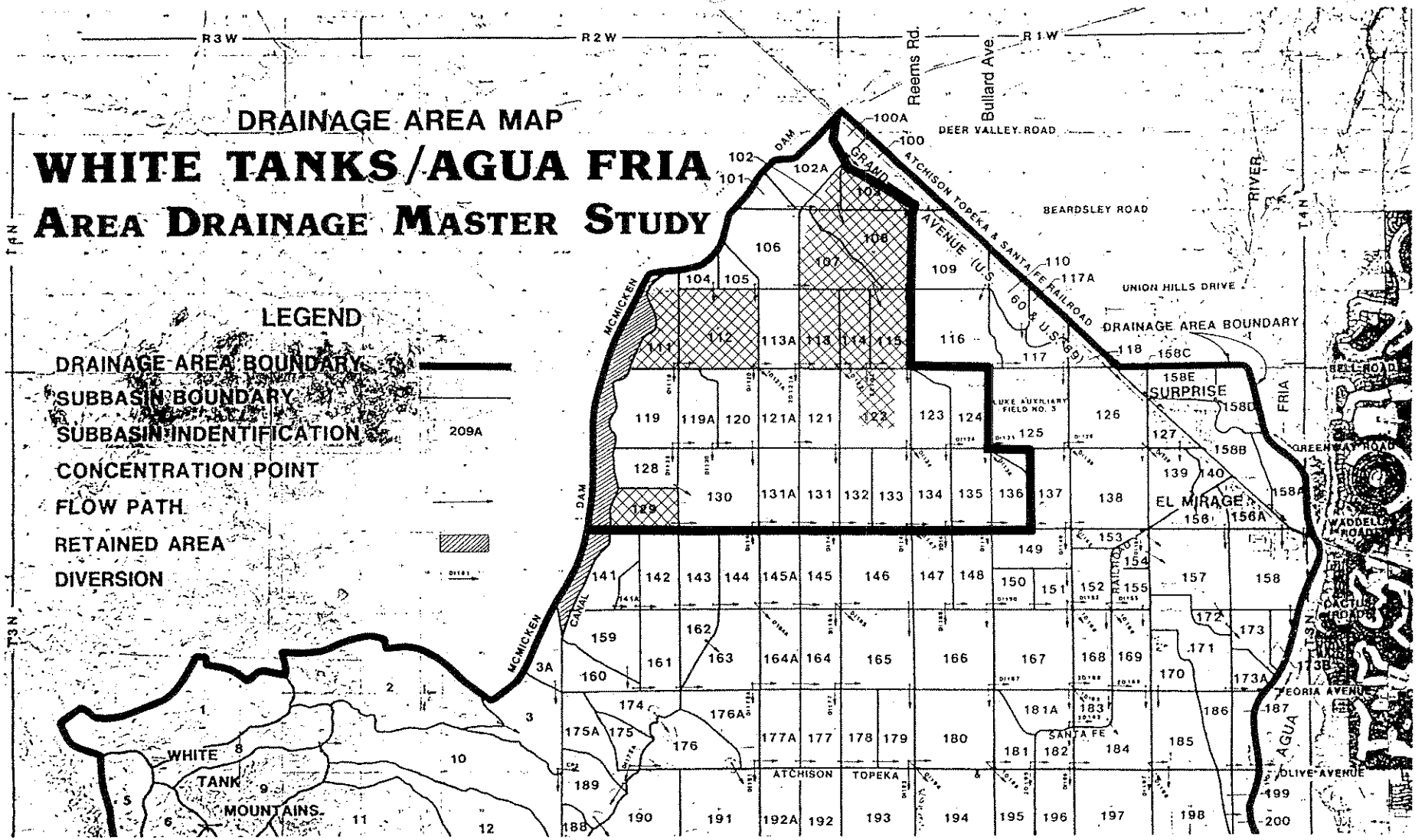
The land slopes gently to the southeast with an average gradient of approximately 0.56 percent. There is very little relief within the watershed. Elevations range from 1334 feet near McMicken Dam to 1175 feet at the project site. The majority of the watershed has been land-leveled for agriculture. Many of the natural washes have been obliterated. Storm runoff is predominantly conveyed as sheetflow, being directed by surface gradients, roads and irrigation channels. Site reviews indicate that the roads and street intersections (especially those constructed for development) tend to funnel the sheetflow drainage, forming concentrated flows.

The vegetation in the developed areas is a combination of landscaping with lawns, shrubs or desert vegetation. In the undeveloped areas, the vegetation is either natural sonoran desert or, cultivated fields. The canopy for the fields varies between bare soil or crops with a very high vegetative cover (80 percent or more).

2.2 Hydrology

The climate for the area is typical of the lower sonoran deserts with high-intensity, short-duration rainfall in the summer (typical of thunderstorms) and lower-intensity but longer duration rainfall in the winter.

The peak discharges values for the 100-year storm event were determined in the FCDMC *White Tanks/Agua Fria Area Drainage Master Study* (WTADMS), completed in 1994, using the U. S. Army Corps of Engineer's (COE) computer model, HEC-1. Specific discharges at the project site will be discussed later. The WTADMS hydrologic model was put together utilizing procedures and criteria presented in the document *Hydrologic Design Manual for Maricopa County, Arizona*, dated April 1990. This document was produced by the Flood Control District of Maricopa County. Due to the size of the area being studied (220 square miles), the 24-hour storm was used which in this watershed has an average point rainfall depth of 4.03 inches. Details of the study can be found in the Technical Data Notebook, Part A located at the FCDMC.



PREMIER

Figure 2
Royal Ranch
Watershed

3 PROJECT SITE DESCRIPTION

3.1 Existing Conditions

3.1.1 On-site Land Surface

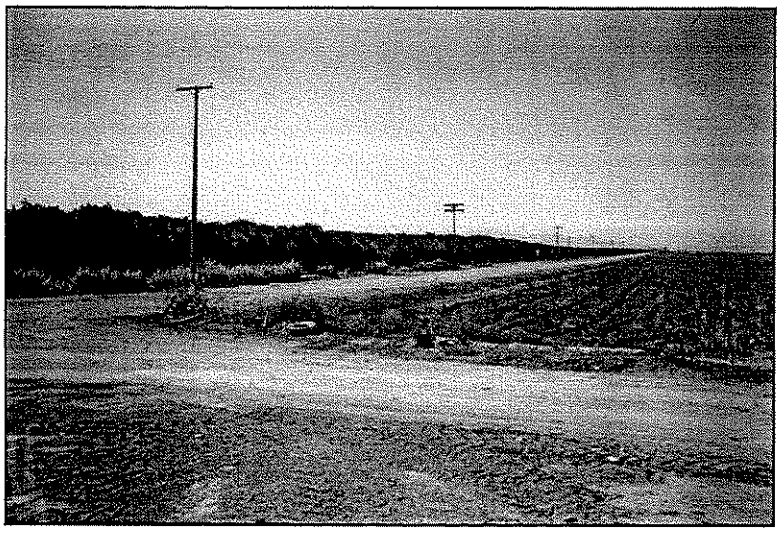
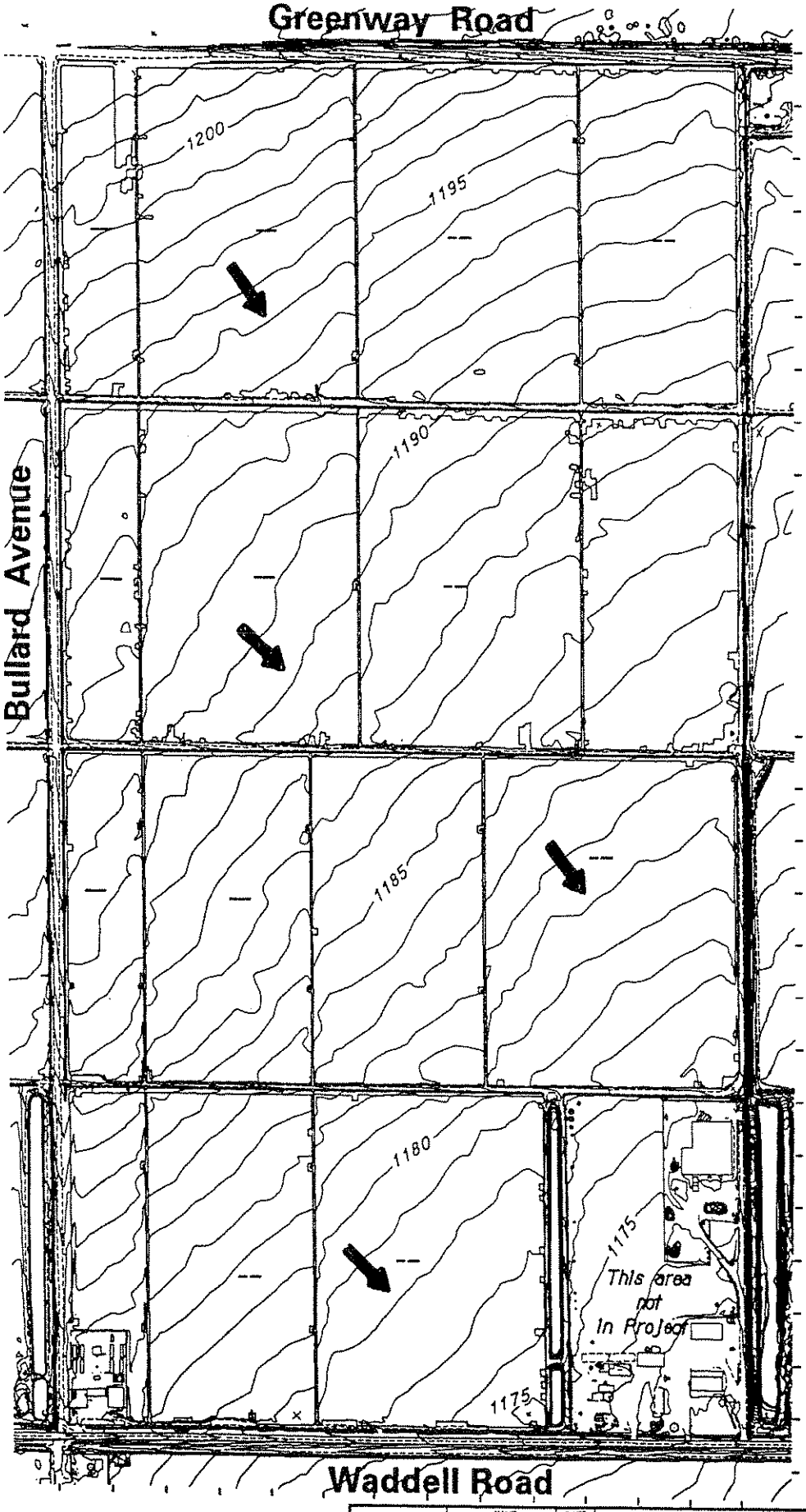


Figure 3: East Edge of Site (looking south)

As mentioned above, the site area is about 300 acres and occupies most of the west half of section 9 (there is a 20-acre parcel in the southeast corner of the west half that is not part of this site). The entire site is currently a production citrus grove with a vegetation cover of around 90 percent (see Figure 3). It is surrounded by agricultural fields to the east, south and west. To the north is an abandoned air field. This project site is currently zoned Rural-43. There are not any major washes, channels or rivers in the near vicinity that could cause flooding in the site.

The site is fairly flat, sloping to southeast at a gradient of about 0.6 percent (see Figure 4). Elevations range from 1204 feet at the northwest corner to 1175 feet at the southeast corner. The site is divided into 4 sections by east-west trending roads and irrigation ditches. In the southeast corner of the site is a 1200-foot long, 10-foot deep irrigation storage pond (which will be removed during development).

Based on boundaries and descriptions of the surface soils (the upper six inches, approximately) found in the NRCS document *Soil Survey of Maricopa County, Arizona, Central Part*, the soils are approximately 95 percent sandy loam/loam and 5 percent clay loam (see Figure 5). The sandy loam/loams were determined to have a moderate permeability rate which makes them good for retention basins but the flat surface gradients and lack of defined watercourses cause these areas to be subject to shallow-sheetflow flooding. The clay loam soils (Te) have a moderately slow permeability rate which makes them a poor choice for retention basins but the consolation is that there is very little area of this soil. All the soils have only a slight erosion potential.



N

200 100 0 200 400
Scale in feet

Note
Elevation in Feet
Contour Interval = one foot

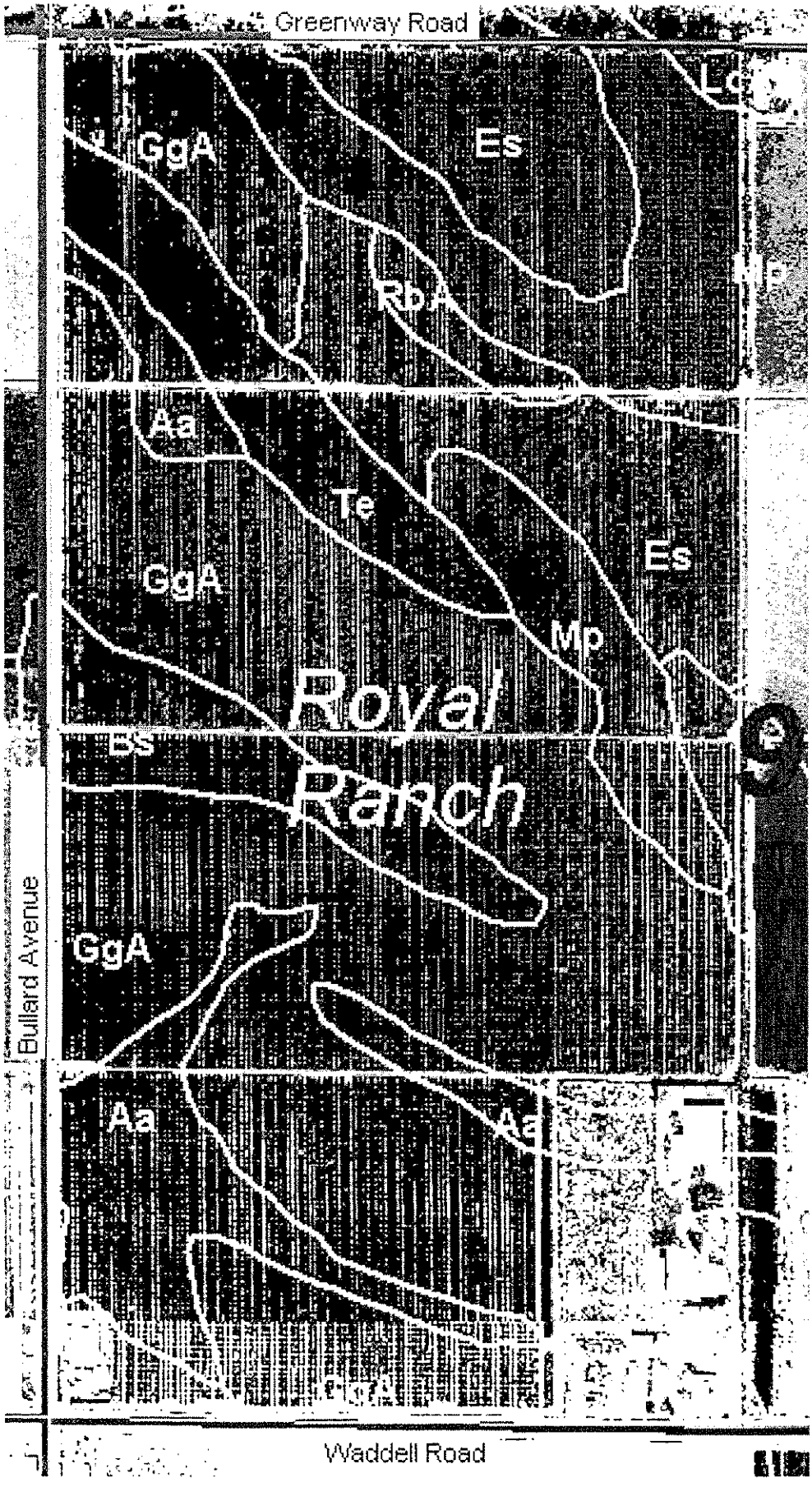
	NAME	DATE
DESIGN	N. Allen	7/16/98
DRAWN	J. Carrillo	7/16/98
CHECKED	J. Holzmeister	7/16/98

PREMIER

SITE TOPO

ROYAL RANCH

FIGURE 4



N

Soil Textures:

Aa: Loam
Bs: Sandy Loam
Es: Loam
Ge: Sandy Loam
GgA: Loam
LcA: Loam
Ma: Sandy Loam
Mp: Loam
RbA: Sandy Loam
Te: Clay Loam

Soil textures from *Soil Survey of Maricopa County, Arizona, Central Part,* SCS

0 300 600
Approx. Scale, Feet

Figure 5
Royal Ranch Soils

PREMIER

3.1.2 On-site Hydrology

The source for the existing-condition hydrology is the HEC-1 model created for the *White Tanks/Agua Fria Area Drainage Master Study* discussed earlier. For this project, a copy of the model was made and the basins not contributing flow to the project site were removed.

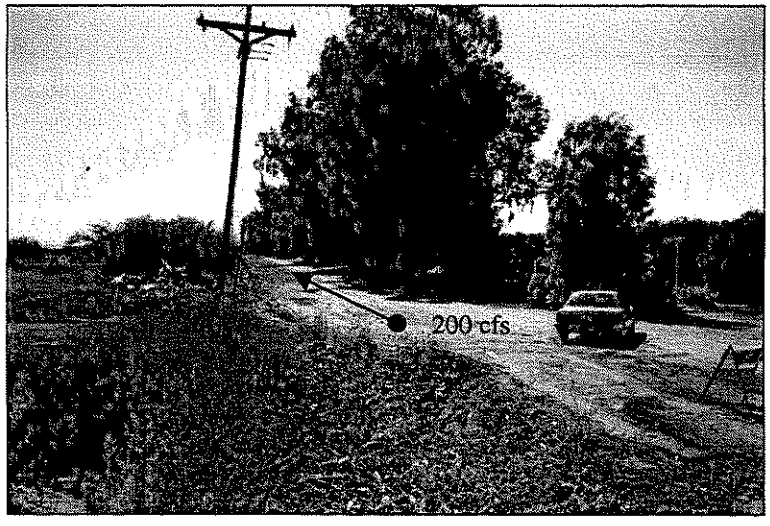
In the original model, the basin boundary for the site was trapezoidal (see basin 136, Figure 6), not rectangular as it is in the proposed condition. To be able to compare existing-condition and proposed-condition flows and to reflect the proposed-condition basin boundaries, the triangular section of basin 137 north of basin 136 was transferred to basin 136. The HEC-1 parameters for basins 136 and 137 where then adjusted as follows (see Appendix A):

- Basin area: 0.04 square miles transferred from 137 to 136,
- Green-Ampt rainfall losses: these were not modified since the transferred basin area was a small percentage (less than 10-percent) of the areas of either 136 or 137 and also the soil texture of the triangular area was similar to the overall soil texture of either basin,
- Unit hydrograph: the alignment of the longest flowpath for basin 136 did not change but the path for basin 137 was shortened. After calculating new flowpath characteristics for basin 137, the incremental unit-hydrograph discharges for both basins were recalculated using the FCDMC program *MCUHP2*.

The adjusted parameters were entered into the HEC-1 input file and the model was rerun. The resulting peak discharges are shown in Figure 7. The output from the model can be found in Appendix A.

At the southeast corner of basin 124, 665 cfs concentrates and then is distributed three ways:

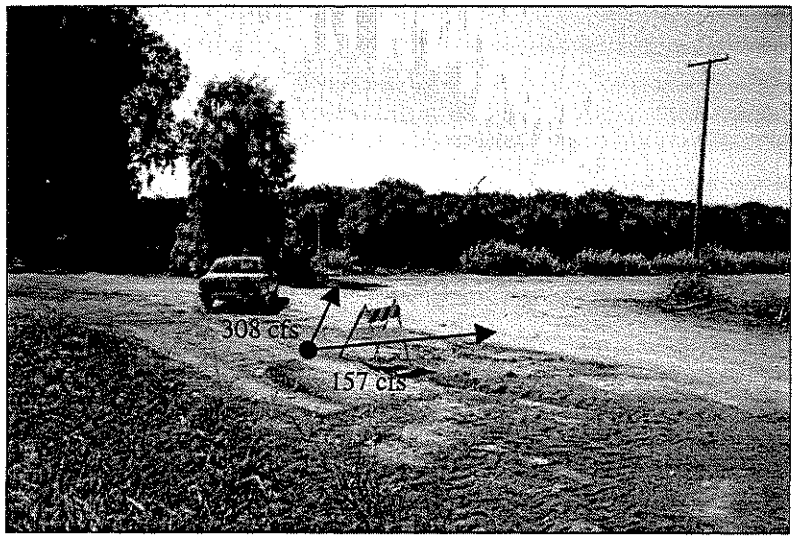
- 200 cfs to the east along Greenway Road (the north edge of the site),
- 308 cfs to the southeast (into the site), and,
- 157 cfs to the south along Bullard Avenue (the west edge of the site).



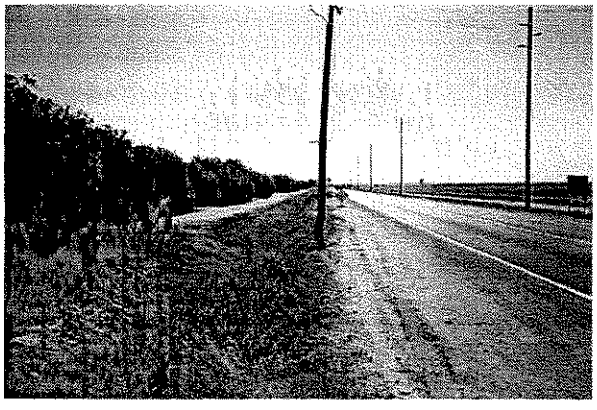
A: Looking east (along Greenway Road)

Photo A shows the view from standing in basin 124 and looking east along Greenway Road. Greenway Road cross-slopes down to the north forming a 2.5-foot deep ditch along its north edge with an estimated capacity of 210 cfs (calculations in Appendix B), enough to carry the distributed flow.

Photo B shows the view from basin 124 and looking southeast into the site. Bullard Avenue travels off to the right. The 308 cfs entering the site passes over the dirt roads and is conveyed on-site as sheetflow. The last portion, the 157 cfs, flows over Greenway Road and continues south along the west edge of Bullard Avenue. Most of this latter flow will be conveyed as sheetflow in the field to the west of Bullard Avenue.



B: Looking southeast



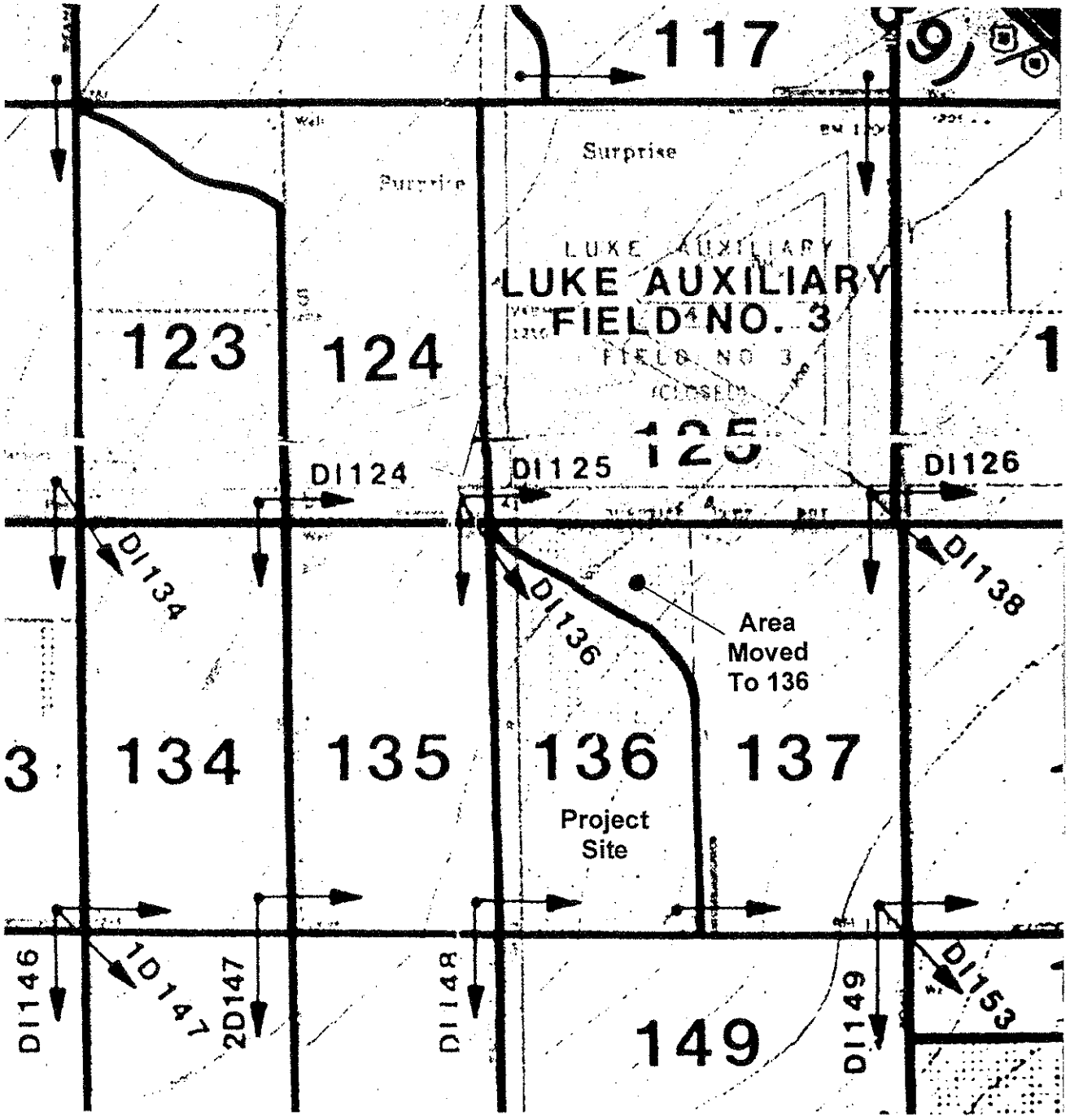
C: North edge of Waddell Road, looking east

D: South edge of Waddell Road, looking east

At the southeast corner of basin 135, the model shows that the combined off-site flow is 970 cfs from which 798 cfs is diverted into the south edge of the site. This discharge flows east along Waddell Road. Since the ditch along the north side of the road is not very large (photo C, top width approximately 8 feet and depth approximately 2 feet), it is anticipated that a portion of this flow will overtop Waddell Road and be conveyed in the larger channel along the south edge of the road (photo D, top width approximately 30 feet and depth approximately 1.5 feet).

The HEC-1 model calculates that 342 cfs will be generated within the project area and that this discharge, combined with the flows from basins 124 and 135 will result in 932 cfs leaving the site from its southeast corner flowing east along Waddell Road.

The current FEMA Flood Insurance Rate Maps (FIRM, No's 04013C1585 & 04013C1605) indicate that the site is located in a flood hazard zone X. Zone X is defined as "Areas of 500-year flood; areas of 100-year floods with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from 100-year flood".



Note:
Basin 136 is project site.

0 1000 2000
Approx. Scale, Feet

N

Figure 6
Royal Ranch
HEC-1 Basins

PREMIER

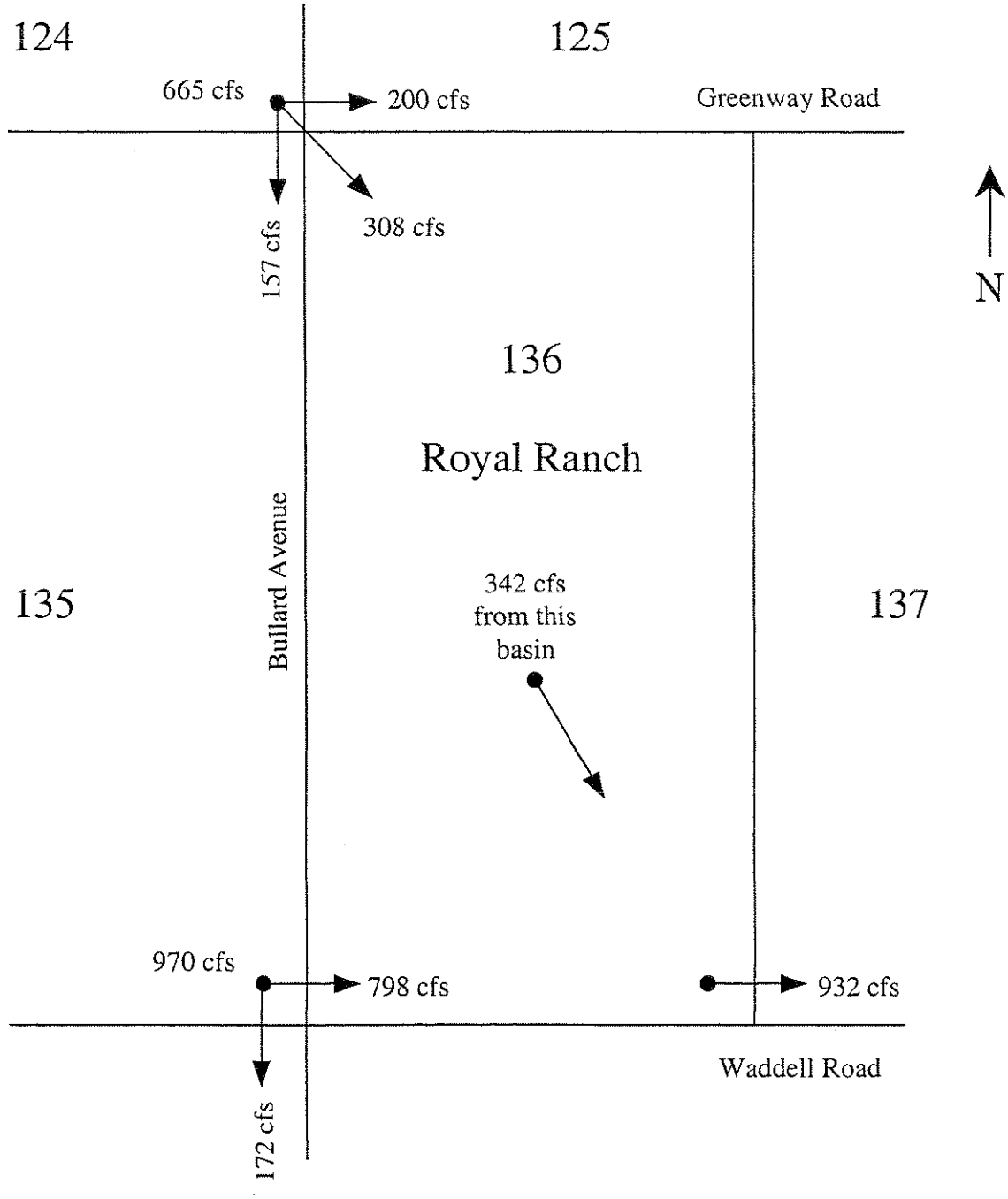


Figure 7

Royal Ranch

100-Year Peak Storm Discharges – Existing Condition

PREMIER

3.2 Proposed Conditions

3.2.1 Concept Plan

As mentioned earlier, Royal Ranch will be a 300 acre PAD composed of single-family homes and accompanying retention and landscape areas (see Figure 8).

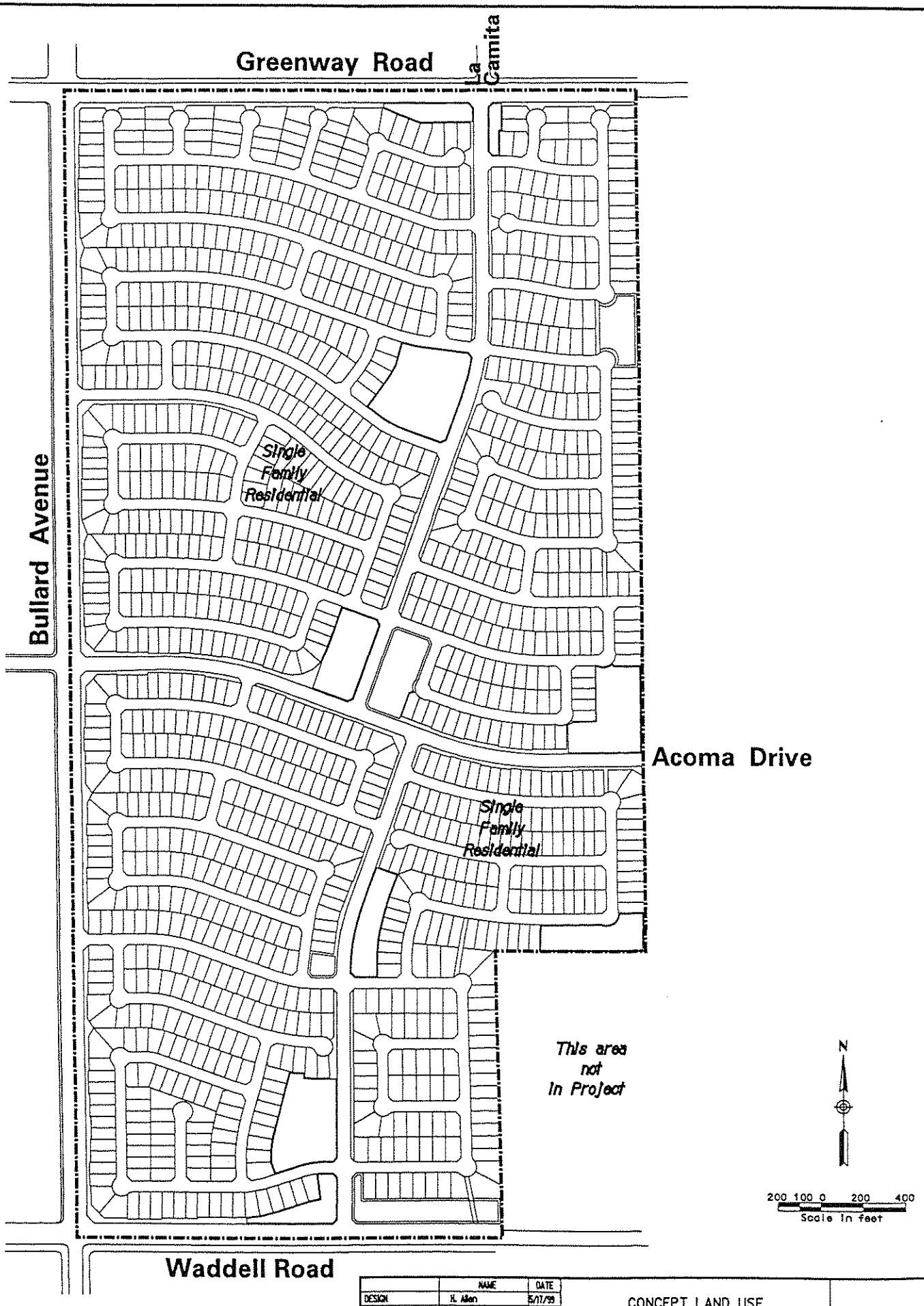
The residential lot sizes will range from 5,200 to 6,400 square feet. East-west trending streets will have segments angled parallel to the fall-line of the land surface to maximize the ability of the street section to convey storm flows.

The site will be divided into a number of drainage basins. A preliminary basin layout is shown in Figure 9. Each drainage basin will have its own retention basin(s) and will be graded to act independently of adjacent basins. The retention basins are identified by capital letters (S, W, H etc). The drainage basins are identified by the retention basin(s) they include. The break-down is as described in Table 1 (calculations in Appendix C). Where more than one retention basin serves a drainage basin, equilizer pipes may be used to connect the retention basins.

The site is proposed to be developed in two phases starting from the south and working north. The dividing line for the phases is Acoma Drive. This arrangement will allow the citrus production to continue in the areas not being developed. The drainage facilities (channels, storm drains, retention basins, etc.) within a phase will be designed to handle the drainage needs for that phase.

3.2.2 Site Grading

Each drainage basin will be graded to route storm water runoff to its respective retention basin(s). The general direction of flow will continue to be to the southeast. Channels used to convey storm flows will be designed with side-slopes and profile gradients that will minimize erosion or sedimentation for the design storm.



	NAME	DATE
DESIGN	K. Allen	5/17/99
DRAWN	J. Carlile	5/17/99
CHECKED	J. Holzmeister	5/17/99

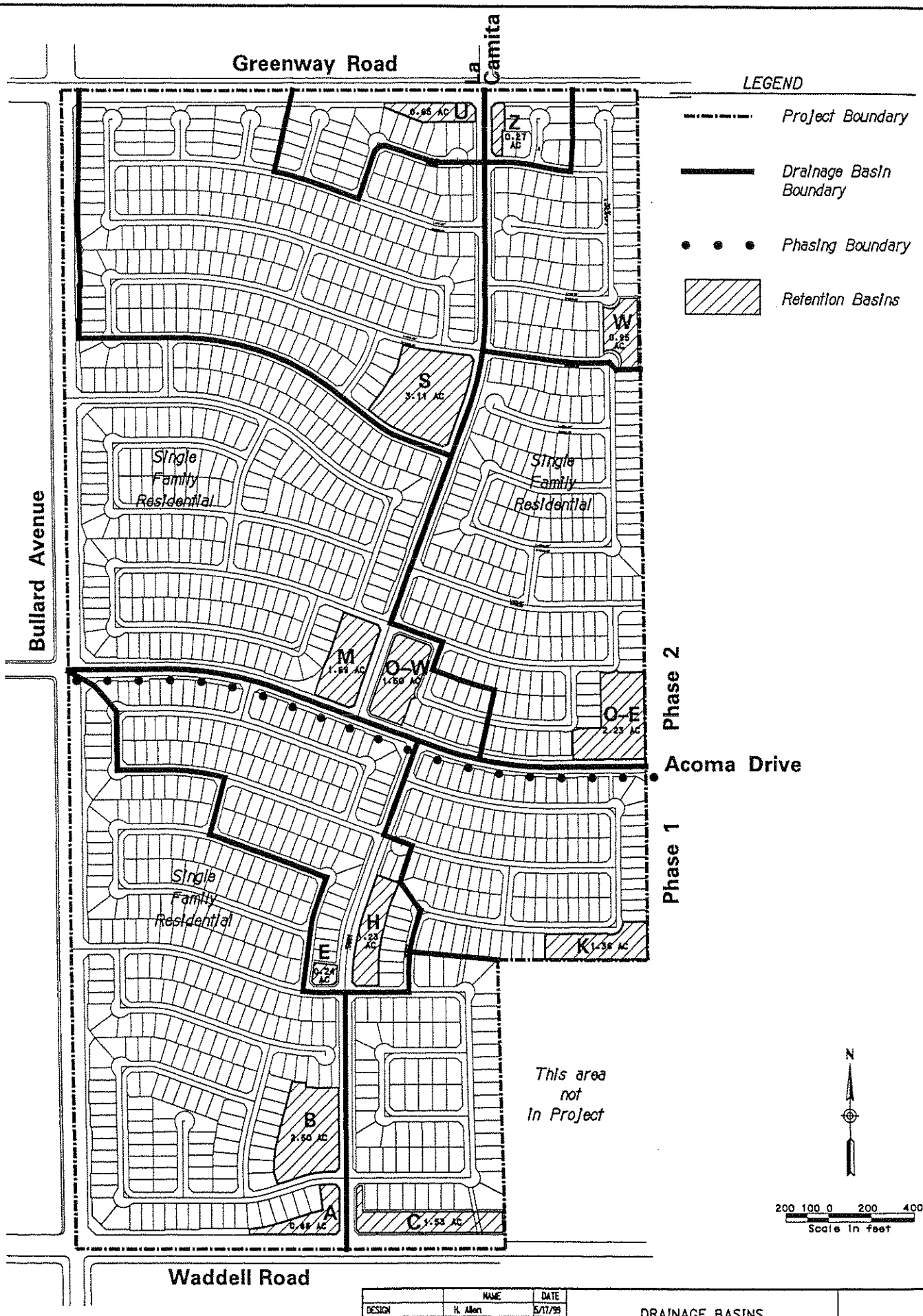
PREMIER

CONCEPT LAND USE

ROYAL RANCH

FIGURE 8

Plotted By: JMC 17 MAY 99 09:22:59 w:\9814\cadd\newfig8.dgn



	NAME	DATE
DESIGN	H. Allen	5/17/99
DRAWN	J. Carlile	5/17/99
CHECKED	J. Holzmeister	5/17/99

PREMIER

DRAINAGE BASINS

ROYAL RANCH

FIGURE 9

Plotted By: JMC 17 MAY 99 09:22:24 w:\9814\cadd\newfig9.dgn

Table 1: Drainage Basin Summary

Phase	Drainage Basin		Retention Basin	
	ID	**Area, acres**	**ID**	**Area, acres**
1	U	7.6	U	0.65
	S	48.0	S	3.11
	Z	3.1	Z	0.27
	W	16.9	W	0.95
	M, O-W	59.5	M	1.69
			O-W	1.50
	O-E	38.0	O-E	2.23
	Total	173.1		10.4
2	E-H	25.4	E	0.24
			H	1.23
	K	22.8	K	1.36
	B-A	56.9	B	2.50
			A	0.86
	C	20.7	C	1.53
	Total	125.8		7.7
Grand Total		298.9		18.1
Note: basin areas include ½ of adjacent street				

3.2.3 Hydrology References

The hydrology for the proposed site was evaluated based on procedures and criteria set forth in the following documents:

- Drainage Design Manual for Maricopa County, Arizona, Vol. 1, Hydrology,
- Surprise Comprehensive Development Guide, City of Surprise, Arizona, and,
- HEC-1 Flood Hydrograph Package User's Manual, September 1990, COE.

3.2.4 Storm Water System

3.2.4.1 Offsite

The City of Surprise requires that the historical offsite discharge contributing to the site be incorporated into the master drainage plan for the site. Offsite flows entering the site will be collected and conveyed through the site in their own separate system. There are two points where the WTADMS model shows offsite flows entering the site (see Figure 7):

- Northwest corner of the site, at the intersection of Greenway Road and Bullard Avenue, and,
- Southwest corner of the site, at the intersection of Waddell Road and Bullard Avenue.

The historic flows at these points, based on the 1994 WTADMS model, are 308 cfs and 798 cfs, respectively. It will not be prudent, though, to design for these flows at this point since the watershed conditions have changed significantly since 1994 and these changes may greatly reduce the offsite discharges (as confirmed in conversations with FCDMC and City of Surprise staff). Two changes are the current construction of the Sun City Grand development (north of Bell Road and west of Reems Road) and the Ashton Ranch development (just west of Royal Ranch). These sites were designed with criteria that include retaining a portion of the 100-year storm. This retention will result in a decrease of storm flows leaving the properties. Another modification is the proposed channel along the west side of Reems Road from Bell Road down to Northern Avenue. This channel will intercept runoff west of Reems Road and convey it south to the Dysart Drain.

The Sun City Grand hydrology has recently been approved by FEMA and is being incorporated into the WTADMS HEC-1 model by the FCDMC. Also, the proposal to construct the Reems Road channel is being considered by the FCDMC. Since the WTADMS model is being revised, it is recommended that the offsite hydrology be re-evaluated during the final design process. This will result in the best available data being utilized for the project. This submittal reflects the existing WTADMS model.

Due to the offsite flows being reduced, it is anticipated that these discharges may be conveyed around the project site along Bullard Avenue and Waddell Road within the landscaped areas located between the edge of roadway and property fences. The landscaped areas would need to be graded to form a continuous channel. It is recommended that developments east of Royal Ranch similarly grade the landscaped areas adjacent to Waddell Road so that a continuous channel may be formed to convey storm flows eastward. The Area Drainage Master Plan for the Dysart Drain Watershed shows a channel running adjacent to Waddell Road from Reems Road to Dysart Road. It is possible that a fully engineered channel may not be necessary but that a continuous channel graded into the landscaped areas along Waddell Road may be sufficient. The feasibility of this latter channel should be evaluated with the discharges from the updated WTADMS model.

Also, the effect of the construction of Bullard Avenue and Greenway Road on the distribution of offsite flows (possibly causing more flow to go east or south along the roads) will need to be evaluated.

3.2.4.2 On-site

On-site flows within each drainage basin will be collected and directed to its retention basins. Typically, runoff from the individual properties will drain into and be carried within the street section. Wherever the accumulated discharge from the 10-year storm is not able to be conveyed between the street curbs, the excess storm flows will be diverted out of the street and either into an open channel, retention basin or a subsurface system. Subsurface systems will only be used when at-surface systems are not practical. Street sections will be designed such that the peak flows from a fifty-year storm shall be carried within the cross-section right-of-way, between buildings. For the 100-year storm, finish-floor elevations shall be set one foot above the 100-year storm water surface elevation and a minimum of 14 inches above the low outfall of the site. All surface flows within a drainage basin will end up in the basin's retention areas. The retention basins within a drainage basin will be designed so that cumulatively they will contain the storm-water volume produced by the basin for the 100-year, 1-hour storm and then drain this volume within 36-hours. The retention basins will also be constructed with emergency spillways to allow flows in excess of the basin's capacity to be outlet to adjacent streets.

3.2.5 Retention Basins

The City of Surprise requires all water from a 100-year, 1-hour storm falling within a development to be retained within the boundaries of the development. Also, the water depth in the basin shall not exceed three feet and the basin shall drain within 36 hours. Data and calculations supporting the following discussion can be found in Appendix C. The preliminary locations of the retention basins are shown in Figure 9.

The required volume to be stored for each basin was calculated using procedures found in the FCDMC hydrology manual. The equation used was:

$$\text{Volume, } V = C\,(P/12)\,A$$

where,

V = calculated volume in acre-feet,

C = runoff coefficient. C = 0.65 for single-family residential from Table 3.2

P = 100-year, 1-hour rainfall depth in inches = 2.5 inches, obtained from Figure 3.2, Rainfall Intensity-Duration-Frequency for the Phoenix Metro Area,

A = drainage area in acres.

Using the above data and procedures, runoff volumes were calculated for each drainage basin. Minimum surface areas required for the retention basins were then determined based on a maximum average ponded depth of about 2.8 feet, 4:1 (horizontal:vertical) side slopes and 0.5 feet of freeboard. Results of the calculations are shown in Table 2.

The retention basins will be drained primarily by dry wells within 36 hours. Although some runoff will infiltrate directly into the soil through the basin bottom, this loss was considered to be zero for these calculations. The assumed percolation rate of 0.8 cfs per dry well was obtained from the Surprise Comprehensive Development Guide. The number of dry wells needed for each retention basin was determined using the following equation:

Wells = V * 43560 / (T * 3600 * 0.8) = 15.1 * V/T

where,

V = calculated volume in acre-feet,

43560 = number of square feet in one acre,

T = basin drain time in hours = 36 hours,

3600 = number of seconds in one hour,

0.8 = percolation rate per well, cfs/well.

Results of the calculations are shown in Table 2.

The estimated dry well depth is 100 feet (from conversations with McGuckin Drilling).

Table 2: Retention Basin Calcs

Phase	Drainage Basin	Runoff Coefficient, C	Drainage Basin Area, ft^2	Drainage Basin Area, acres	Runoff Volume, ac-ft	Basin Depth, ft	Basin Bottom Width/ Length, feet	Required Basin Surface Area, acres	Available Basin Surface Area, acres	No. of Dry Wells to Drain Basin Basin
1	U	0.65	332383	7.6	1.03	2.80	115.1	0.46	0.65	1
	S	0.65	2089906	48.0	6.50	2.80	306.5	2.54	3.11	3
	Z	0.65	135902	3.1	0.42	2.80	69.1	0.21	0.27	1
	W	0.65	738248	16.9	2.30	2.80	177.4	0.95	0.95	1
	M, O-W	0.65	2591892	59.5	8.06	2.80	342.7	3.13	3.19	3
	O-E	0.65	1653442	38.0	5.14	2.80	271.4	2.04	2.23	2
	Total			173.1	23.4			9.3	10.4	11
2	E-H	0.65	1105490	25.4	3.44	2.80	219.8	1.39	1.47	1
	K	0.65	991390	22.8	3.08	2.80	207.5	1.26	1.36	1
	B-A	0.65	2480477	56.9	7.71	2.80	335.0	3.00	3.36	3
	C	0.65	901368	20.7	2.80	2.80	197.3	1.15	1.53	1
	Total			125.8	17.0			6.8	7.7	6
	Grand Total			298.9	40.5			16.1	18.1	17

Currently, there is proposed to be slightly more retention basin area available than what is required:

Phase	Retention Area Available, acres	Retention Area Required, acres
1	10.4	9.3
2	7.7	6.8

Based on the calculations shown in Table 2, there will need to be 17 dry wells within the project site in order to drain the retention basins within 36 hours.

APPENDIX

A:

HEC-1: Existing Condition

(File: RR1.OUT)

PREMIER
ENGINEERING CORPORATION

SHEET NO 1 OF 1
JOB NUMBER

TITLE Royal Ranch
SUBJECT HEC-1 input for S-Graph
MADE BY H. Allen DATE 08Jul98 CHECKED BY DATE

Basin 136

- increased area to 0.5 mi^2 by taking 0.04 mi^2 area from basin 137 since basin 136 will be a half-section when developed
- since the additional area did not affect the flowpath, L, Lca, S & K_n were not revised
- since the basin area was changed by less than 10%, the Grecn-Ampt parameters were not revised.

Basin 137

- decrease area by 0.04 mi^2, giving area to 136.
- new flowpath characteristics (based on USGS topo)

$L = 6450'/5280 = 1.22$ miles
$L_{ca} = 2800'/5280 = 0.51$ "
$\Delta Elev = 1197 - 1171 = 26'$
$S = (26/1.22) = 21.3$ ft/mi
$K_n = 0.12$ (unchanged)
Basin Lag (using equation used in the ADMS)

$$Lag = 20(K_n)(1.2)(L \cdot L_{ca}/S^{1/2})^{0.38}$$
$$= 20(0.12)(1.2)\left[(1.22)(0.51)/\sqrt{21.3}\right]^{0.38}$$
$$= 1.345 \text{ hours}$$
$$= 80.69 \text{ minutes}$$

```
ID ROYAL RANCH - Basin 136 S-Graph for A=0.5 mi^2
ID
IT     5                    300
IO     3
KK
KM BASIN 136
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=       1.1  Lca=        .5   S=   27.8  Kn= .120  LAG=  75.4
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA    .50
IN     15
KM RAINFALL DEPTH OF 4.03 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
KM AN AREAL REDUCTION COEFFICIENT OF 1.000 WAS USED
PB 4.030
KM THE FOLLOWING PC RECORD USED A 24-HOUR SCS TYPE II RAINFALL
PC  .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
PC  .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
PC  .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
PC  .110    .115    .120    .126    .135    .142    .150    .158    .166    .175
PC  .184    .195    .208    .224    .243    .266    .318    .479    .678    .716
PC  .743    .764    .781    .795    .808    .818    .828    .837    .844    .851
PC  .858    .865    .871    .877    .883    .889    .895    .900    .905    .910
PC  .915    .919    .923    .927    .931    .935    .939    .943    .947    .951
PC  .954    .957    .960    .963    .966    .969    .972    .975    .978    .981
PC  .984    .987    .990    .993    .996    .999   1.000
LG   .50     .00    3.67     .42     .00
UI   22.     22.     22.     49.     79.     95.    109.    122.    132.    146.
UI  163.    180.    215.    264.    291.    247.    216.    194.    178.    160.
UI  143.    130.    114.    105.     86.     64.     44.     39.     37.     37.
UI   26.     22.     22.     18.      7.      7.      7.      7.      7.      7.
UI    7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
ZZ
```

```
ID ROYAL RANCH - Basin 137 S-Graph for area = 0.5 mi^2
ID
IT     5                      300
IO     3
KK
KM BASIN 137
KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM  L=      1.2  Lca=       .5   S=   21.3  Kn= .120  LAG=  80.7
KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA    .50
IN     15
KM RAINFALL DEPTH OF 4.03 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
KM AN AREAL REDUCTION COEFFICIENT OF 1.000 WAS USED
PB 4.030
KM THE FOLLOWING PC RECORD USED A 24-HOUR SCS TYPE II RAINFALL
PC  .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
PC  .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
PC  .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
PC  .110    .115    .120    .126    .135    .142    .150    .158    .166    .175
PC  .184    .195    .208    .224    .243    .266    .318    .479    .678    .716
PC  .743    .764    .781    .795    .808    .818    .828    .837    .844    .851
PC  .858    .865    .871    .877    .883    .889    .895    .900    .905    .910
PC  .915    .919    .923    .927    .931    .935    .939    .943    .947    .951
PC  .954    .957    .960    .963    .966    .969    .972    .975    .978    .981
PC  .984    .987    .990    .993    .996    .999   1.000
LG   .50     .00    4.62     .36     .00
UI   21.     21.     21.     35.     70.     83.     98.    108.    118.    128.
UI  141.    157.    172.    206.    250.    273.    233.    205.    185.    170.
UI  156.    139.    127.    114.    103.     92.     74.     60.     37.     37.
UI   35.     34.     26.     21.     21.     21.      8.      6.      6.      6.
UI    6.      6.      6.      6.      6.      6.      6.      6.      0.      0.
UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
ZZ
```

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUL   1997               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15JUL98  TIME  16:14:33   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*         609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC14PRINT

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        ROYAL RANCH
   2          ID
   3          ID        ORIGINAL HEC-1 FILE:
   4          ID        FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
   5          ID        100-YEAR, 24-HOUR STORM                              WTADMS.24
   6          ID
   7          ID        WHITE TANKS ADMS EDITED FOR ROYAL RANCH MASTERPLAN
   8          ID        PREMIER ENGINEERING CORP.,  July 1998
   9          ID
  10          ID        BASIN ARRANGEMENT:
  11          ID
  12          ID           ------------------------  Bell Road
  13          ID           |          |           |
  14          ID         ^ |   124    |    125    |
  15          ID         N |          |           |
  16          ID           ------------------------  Greenway Road
  17          ID           |          |    136    |
  18          ID           |   135    |   Royal   |   137   |
  19          ID           |          |   Ranch   |         |
  20          ID           ------------------------  Waddell Road
  21          ID                      ^           ^
  22          ID                Bullard       Litchfield
  23          ID                Avenue          Road
  24          ID
              *DIAGRAM
              *
              *  NOTES:
              *  WT2RR.DAT      This file is the WTADMS.dat file with basins that don't
              *                 contribute flow to Royal Ranch removed.
              *
              *  RR1.DAT        This is WT2RR.DAT specifically modified for Royal Ranch:
              *                 1) Transfered 0.04 mi^2 area from basin 137 to 136 since 136
              *                    will be a half section.
              *                 2) Since there was less than a 10% adjustment in area, the
              *                    Green-Ampt parameters were not modified.
              *                 3) Input new S-Graph based on revised areas for basins 136
              *                    and 137 and revised flowpath for basin 137.
              *
              *
  25          IT       5                    300
  26          IO       5
  27          IN      15
  28          JD    4.03    .001
  29          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
  30          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
  31          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
  32          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
  33          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
  34          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
  35          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
  36          PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
  37          PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
  38          PC    .983    .986    .989    .992    .995    .998   1.00   1.000   1.000   1.000
  39          JD   3.99      10
  40          JD   3.83      50
```


1674-PRINT

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  41          JD    3.76     100
  42          JD    3.70     200
              *

  43          KK     101
  44          KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 101.
  45          BA    .16
  46          LG    .35     .32    3.61     .26     .00
  47          UI    22.     76.    121.    165.    258.    205.    150.    106.     54.     34.
  48          UI    22.      7.      7.      7.      0.      0.      0.      0.      0.      0.
  49          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

  50          KK    102A
  51          KM        RUNOFF HYDROGRAPH FROM SUB-SUBIN 102.
  52          BA    .51
  53          LG    .40     .20    6.05     .21     .00
  54          UI    40.     43.    142.    190.    228.    270.    327.    453.    484.    378.
  55          UI   319.    263.    218.    176.    114.     71.     66.     44.     40.     15.
  56          UI    12.     12.     12.     12.     12.      0.      0.      0.      0.      0.
  57          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

  58          KK   CP101
  59          KM        ADD HYDROGRAPHS AT CP101
  60          HC       2     .67

  61          KK    R101
  62          KM        ROUTE FLOW FROM CP101 TO CP102.
  63          RS       2              -1       0
  64          RC    .025    .022    .022    2750   .0062
  65          RX    1000    1001    1030    1085    1120    1138    1139    1140
  66          RY    1319    1319    1318    1316    1316    1317    1317    1317
              *

  67          KK     102
  68          KM        RUNOFF FROM SUB-BASIN 102
  69          BA    .10
  70          LG    .50     .00    6.05     .29     .00
  71          UI    10.     21.     44.     57.     70.     97.    122.     94.     75.     59.
  72          UI    45.     26.     17.     13.     10.      3.      3.      3.      3.      3.
  73          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  74          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *

  75          KK   CP102
  76          KM        ADD HYDROGRAPHS AT CP102.
  77          HC       2     .77
              *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  78      KK    R102
  79      KM        ROUTE FLOW FROM CP102 TO CP108
  80      RS     36              -1       0
  81      RC   .075    .075    .075     702   .0054
  82      RX  1000    1001    1120    1700    2030    2630    3070    3270
  83      RY  1289    1289    1288    1286    1286    1288    1290    1292
          *

  84      KK     108
  85      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 108.
  86      BA    .79
  87      LG    .44     .12    5.53     .25     .00
  88      UI   31.     31.     31.     32.    101.    115.    136.    151.    167.    178.
  89      UI  194.    213.    233.    257.    304.    366.    406.    353.    310.    281.
  90      UI  259.    240.    217.    197.    181.    163.    148.    132.    108.     88.
  91      UI   56.     54.     52.     51.     45.     31.     31.     31.     24.      9.
  92      UI    9.      9.      9.      9.      9.      9.      9.      9.      9.      9.
  93      UI    9.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  94      UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
          *

  95      KK   1I108
  96      KM        ADD HYDROGRAPHS AT CP108.
  97      HC      2    1.56

  98      KK     103
  99      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 103.
 100      BA    .37
 101      LG    .46     .09    4.33     .29     .00
 102      UI   19.     19.     20.     64.     79.     93.    105.    116.    131.    148.
 103      UI  175.    222.    248.    206.    178.    159.    143.    125.    111.     97.
 104      UI   84.     64.     45.     34.     32.     32.     19.     19.     19.      6.
 105      UI    6.      6.      6.      6.      6.      6.      6.      6.      0.      0.
 106      UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 107      KK    R103
 108      KM        ROUTE FLOW FROM CP103 TO CP108.
 109      RS     4               -1       0
 110      RC    .08    .022    .035    5380   .0041
 111      RX  1000    1050    1080    1095    1130    1150    1300    1830
 112      RY  1285    1284    1282    1280    1280    1282    1284    1286

 113      KK   CP108
 114      KM        ADD HYDROGRAPHS AT CP108.
 115      HC      2    1.93

 116      KK    R108
 117      KM        ROUTE FLOW FROM CP108 TO CP115.
 118      RS     7               -1       0
 119      RC   .035    .035    .075    5382   .0037
 120      RX  1000    1001    1002    1030    1100    1370    1900    2290
 121      RY  1259    1259    1259    1258    1258    1260    1262    1264
```

```
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 122        KK     106
 123        KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 106.
 124        BA     .77
 125        LG     .35     .29    6.63     .16     .00
 126        UI     68.    109.    267.    353.    425.    523.    727.    830.    634.    523.
 127        UI    422.    338.    237.    132.    114.     77.     65.     21.     21.     21.
 128        UI     21.     21.      0.      0.      0.      0.      0.      0.      0.      0.
 129        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 130        KK    R106
 131        KM        ROUTE FLOW FROM CP106 TO CP107
 132        RS       3              -1       0
 133        RC    .075     .03     .03    5382    .039
 134        RX    1000    1430    1860    1890    1940    1960    1969    1970
 135        RY    1292    1291    1290  1289.5  1289.5    1290  1290.5  1290.5

 136        KK     107
 137        KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 107.
 138        BA     .60
 139        LG     .46     .08    5.65     .29     .00
 140        UI     26.     26.     26.     53.     91.    109.    125.    141.    152.    167.
 141        UI    186.    203.    238.    291.    340.    308.    266.    238.    216.    199.
 142        UI    177.    160.    143.    129.    114.     90.     71.     46.     46.     43.
 143        UI     43.     27.     26.     26.     19.      8.      8.      8.      8.      8.
 144        UI      8.      8.      8.      8.      8.      8.      0.      0.      0.      0.
 145        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 146        KK   CP107
 147        KM        ADD HYDROGRAPHS AT CP107.
 148        HC       2    1.37

 149        KK    R107
 150        KM        ROUTE FLOW FROM CP107 TO CP115
 151        RS       6              -1       0
 152        RC    .035    .035    .075    6240   .0048
 153        RX    1000    1001    1002    1030    1100    1370    1900    2290
 154        RY    1259    1259    1259    1258    1258    1260    1262    1264

 155        KK     115
 156        KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 115.
 157        BA     .49
 158        LG     .50     .00    7.04     .24     .00
 159        UI     22.     22.     22.     45.     76.     91.    104.    117.    126.    138.
 160        UI    155.    170.    200.    245.    284.    247.    215.    192.    176.    161.
 161        UI    142.    129.    115.    103.     90.     69.     52.     38.     37.     35.
 162        UI     31.     22.     22.     22.     10.      7.      7.      7.      7.      7.
 163        UI      7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
 164        UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  165     KK   1I115
  166     KM        ADD HYDROGRAPHS AT CP115.
  167     HC      2    1.86

  168     KK   2I115
  169     KM        ADD HYDROGRAPHS AT CP115.
  170     HC      2    3.79

  171     KK    111
  172     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 111.
  173     BA    .50
  174     LG    .40     .21    5.55     .22     .00
  175     UI    32.     32.     78.    129.    160.    184.    211.    246.    304.    406.
  176     UI   374.    307.    266.    230.    196.    167.    139.     99.     58.     55.
  177     UI    50.     32.     32.     15.     10.     10.     10.     10.     10.     10.
  178     UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  179     UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  180     KK    D111
  181     KM        DIVERT TO CP119 FROM CP111
  182     DT   DI119
  183     DI      0      32     109     228     389     599     858    1170    1539    1967
  184     DQ      0      11      39      83     145     228     333     462     617     799

  185     KK    R111
  186     KM        ROUTE REMAINDER FROM CP111 TO CP112
  187     RS      9              -1       0
  188     RC   .075    .035    .035    5280   .0040
  189     RX   1000    1570    2040    2370    2440    2468    2469    2470
  190     RY   1312    1310    1308    1306    1306    1307    1307    1307

  191     KK     104
  192     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 104
  193     BA    .15
  194     LG    .35     .31    4.93     .23     .00
  195     UI    26.    101.    151.    242.    249.    169.    112.     50.     31.     14.
  196     UI     7.      7.      0.      0.      0.      0.      0.      0.      0.      0.
  197     UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  198     KK    R104
  199     KM        ROUTE FLOW FROM CP104 TO CP112
  200     RS     53              -1       0
  201     RC   .075    .075    .075    6552   .0056
  202     RX   1000    1001    1230    1270    1750    2000    2380    2650
  203     RY   1321    1321    1320    1318    1318    1319    1318    1320

  204     KK     112
  205     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 112
  206     BA    .97
  207     LG    .50     .00    3.65     .50     .00
  208     UI    35.     35.     35.     35.     92.    123.    142.    165.    179.    193.
  209     UI   207.    224.    245.    266.    290.    340.    400.    464.    424.    371.
  210     UI   335.    308.    286.    267.    243.    220.    206.    185.    170.    155.
  211     UI   131.    101.     77.     62.     61.     58.     58.     45.     35.     35.
```


HEC4PRINT

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 212      UI     35.     28.     11.     11.     11.     11.     11.     11.     11.     11.
 213      UI     11.     11.     11.     11.     11.      0.      0.      0.      0.      0.
 214      UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 215      KK   1I112
 216      KM        ADD HYDROGRAPHS AT CP112.
 217      HC        2    1.12

 218      KK   2I112
 219      KM        ADD HYDROGRAPHS AT CP112.
 220      HC        2    1.62

 221      KK    105
 222      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 105
 223      BA    .21
 224      LG    .35     .27    7.68     .10     .00
 225      UI    32.    129.    195.    295.    362.    246.    171.     88.     50.     28.
 226      UI    10.     10.     10.      0.      0.      0.      0.      0.      0.      0.
 227      UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 228      KK    R105
 229      KM        ROUTE FLOW FROM CP105 TO CP112
 230      RS        3              -1       0
 231      RC   .022    .022     .03    5220   .0044
 232      RX  1000    1001    1010    1020    1040    1050    1099    1100
 233      RY  1303    1303    1303    1302    1302    1304    1305    1305

 234      KK   CP112
 235      KM        ADD HYDROGRAPHS AT CP112.
 236      HC        2    1.83

 237      KK    D112
 238      KM        DIVERT TO CP120 FROM CP112
 239      DT   DI120
 240      DI       0      48     165     355     625     981    1434    1990
 241      DQ       0      16      55     118     208     327     478     663

 242      KK    D112
 243      KM        DIVERT TO CP121A FROM CP112
 244      DT   1D121A
 245      DI       0      32     110     237     417     654     956    1327
 246      DQ       0      16      55     118     208     327     478     663

 247      KK    R112
 248      KM        ROUTE REMAINDER FROM CP112 TO CP113A
 249      RS        6              -1       0
 250      RC   .075    .035    .035    2640   .0023
 251      RX  1000    1490    1830    2600    2770    2788    2789    2790
 252      RY  1290    1288    1286    1284    1284    1285    1285    1285
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

253       KK   113A
254       KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 113A
255       BA    .50
256       LG    .50     .00    7.93     .15     .00
257       UI   22.     22.     22.     42.     75.     89.    103.    115.    125.    137.
258       UI  152.    167.    192.    238.    276.    260.    224.    199.    181.    167.
259       UI  149.    134.    121.    108.     98.     79.     62.     40.     38.     36.
260       UI   35.     26.     22.     22.     20.      7.      7.      7.      7.      7.
261       UI    7.      7.      7.      7.      7.      7.      0.      0.      0.      0.
262       UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

263       KK  CP113A
264       KM       ADD HYDROGRAPHS AT CP113A
265       HC       2    2.33

266       KK   D113A
267       KM       DIVERT TO CP121A FROM CP113A
268       DT  2D121A
269       DI       0      26      67     134     232     278     399     561     799    1106
270       DQ       0       0       0       0       0       4      22      58     120     211

271       KK   R113A
272       KM       ROUTE REMAINDER FROM CP113A TO CP113
273       RS      25              -1       0
274       RC    .075    .035    .035    5280   .0032
275       RX   1000    1080    2620    2725    2735    2798    2799    2800
276       RY   1278    1277    1277    1276    1276    1277    1277    1277

277       KK     113
278       KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 113
279       BA    .50
280       LG    .50     .00    8.54     .11     .00
281       UI   22.     22.     22.     49.     79.     95.    108.    122.    132.    145.
282       UI  162.    178.    213.    261.    291.    248.    216.    195.    178.    161.
283       UI  143.    131.    114.    105.     88.     65.     46.     39.     37.     37.
284       UI   27.     22.     22.     20.      7.      7.      7.      7.      7.      7.
285       UI    7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
286       UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

287       KK   CP113
288       KM       ADD HYDROGRAPHS AT CP113.
289       HC       2    2.83

290       KK    D113
291       KM       DIVERT TO CP122 FROM CP113
292       DT   1D122
293       DI       0      79     257     523     872    1307    1829
294       DQ       0      63     205     416     692    1033    1422
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  295     KK    R113
  296     KM        ROUTE REMAINDER FROM CP113 TO CP114
  297     RS       6              -1       0
  298     RC    .075     .04     .04    2100    .0038
  299     RX    1000    1020    1100    1850    2030    2048    2049    2050
  300     RY    1266    1264    1262    1260    1260    1261    1261    1261

  301     KK     114
  302     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 114
  303     BA     .38
  304     LG     .50     .00    8.35     .13     .00
  305     UI     17.     17.     17.     41.     62.     75.     86.     95.    104.    115.
  306     UI    129.    144.    177.    215.    216.    183.    161.    146.    133.    118.
  307     UI    106.     95.     85.     74.     58.     44.     31.     30.     28.     25.
  308     UI     17.     17.     17.      6.      5.      5.      5.      5.      5.      5.
  309     UI      5.      5.      5.      5.      0.      0.      0.      0.      0.      0.
  310     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  311     KK   CP114
  312     KM        ADD HYDROGRAPHS AT CP114.
  313     HC       2    3.21

  314     KK    D114
  315     KM        DIVERT TO CP122 FROM CP114
  316     DT   2D122
  317     DI       0      17      54      80     333     952    2066
  318     DQ       0       0       0       0      70     438    1217

  319     KK    R114
  320     KM        ROUTE REMAINDER FROM CP114 TO CP115
  321     RS       2              -1       0
  322     RC     .06    .022     .35    2652    .0034
  323     RX    1000    1380    1790    1800    1840    1850    1899    1900
  324     RY    1258    1256    1254    1250    1250    1252    1253    1253

  325     KK   CP115
  326     KM        ADD HYDROGRAPHS AT CP115.
  327     HC       2     7.0

  328     KK    R115
  329     KM        ROUTE FLOWS FROM CP115 TO CP122
  330     RS       6              -1       0
  331     RC    .035    .035    .075    5280    .0038
  332     RX    1000    1001    1002    1015    1035    1360    1920    2460
  333     RY    1239    1239    1239    1238    1238    1240    1241    1242

  334     KK    D113
  335     KM        RETURN DIVERT AT CP113
  336     DR   1D122
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  337     KK    R113
  338     KM        ROUTE FLOW FROM CP113 TO CP122
  339     RS      36              -1       0
  340     RC     .08     .08     .08     7488    .0049
  341     RX    1000    1001    1610     1820    1990    2010    3059    3060
  342     RY    1248    1248    1246     1245    1245    1246    1248    1248

  343     KK    D114
  344     KM        RETURN DIVERT AT CP114
  345     DR   2D122

  346     KK    R114
  347     KM        ROUTE FLOW FROM CP114 TO CP122
  348     RS      45              -1       0
  349     RC    .075    .075    .075     6240    .0046
  350     RX    1000    1001    1610     1820    1990    2010    3059    3060
  351     RY    1248    1248    1246     1245    1245    1246    1248    1248

  352     KK     122
  353     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 122
  354     BA     .89
  355     LG     .50     .00    5.83      .32     .00
  356     UI     32.     32.     32.      32.     87.     114.    132.    153.    166.    179.
  357     UI    193.    207.    229.     247.    272.     319.    378.    428.    385.    338.
  358     UI    306.    281.    262.     243.    220.     201.    188.    167.    155.    138.
  359     UI    114.     93.     63.      57.     56.      53.     53.     36.     32.     32.
  360     UI     32.     20.     10.      10.     10.      10.     10.     10.     10.     10.
  361     UI     10.     10.     10.      10.     10.       0.      0.      0.      0.      0.
  362     UI      0.      0.      0.       0.      0.       0.      0.      0.      0.      0.

  363     KK   11122
  364     KM        ADD HYDROGRAPHS AT CP122
  365     HC       3     4.1

  366     KK   CP122
  367     KM        ADD HYDROGRAPHS AT CP122
  368     HC       2    7.89

  369     KK    D122
  370     KM        DIVERT TO CP134 FROM CP122
  371     DT   DI134
  372     DI      0       6      32       56      117     259     471     757    1120    1562
  373     DI   2087
  374     DQ      0       0       0        0      115     249     446     706    1030    1418
  375     DQ   1873

  376     KK    R122
  377     KM        ROUTE REMAINDER FROM CP122 TO CP133
  378     RS      15              -1       0
  379     RC     .05     .05    .075     5280    .004
  380     RX    1000    1001    1002     1015    1235    1600    2030    2220
  381     RY    1219    1219    1219     1218    1218    1220    1222    1224
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  382     KK    D111
  383     KM        RETURN DIVERT AT CP111
  384     DR   DI119

  385     KK    R111
  386     KM        ROUTE FLOWS FROM CP111 TO CP119
  387     RS      10              -1       0
  388     RC    .035    .035    .075    5250   .0034
  389     RX    1000    1001    1002    1025    1100    1320    1540    1730
  390     RY    1301    1301    1301    1300    1300    1302    1304    1306

  391     KK     119
  392     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 119
  393     BA     .86
  394     LG     .50     .00    5.56     .31     .00
  395     UI     36.     36.     36.     58.    120.    142.    168.    185.    202.    218.
  396     UI    241.    267.    292.    350.    424.    469.    404.    355.    319.    293.
  397     UI    270.    241.    219.    197.    178.    161.    131.    103.     68.     63.
  398     UI     60.     59.     47.     36.     36.     36.     16.     11.     11.     11.
  399     UI     11.     11.     11.     11.     11.     11.     11.     11.      0.      0.
  400     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  401     KK   CP119
  402     KM        ADD HYDROGRAPHS AT CP119
  403     HC       2    1.36

  404     KK    D119
  405     KM        DIVERT TO CP128 FROM CP119
  406     DT   DI128
  407     DI       0      42     139     286     485     739    1052    1425
  408     DQ       0      25      81     167     283     429     607     819

  409     KK    R119
  410     KM        ROUTE REMAINDER FROM CP119 TO CP119A
  411     RS       6              -1       0
  412     RC    .075    .035    .035    2640   .0015
  413     RX    1000    1001    1450    1800    1820    1838    1839    1840
  414     RY    1292    1292    1290    1288    1288    1289    1289    1289

  415     KK    119A
  416     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 119A
  417     BA     .47
  418     LG     .50     .00    6.91     .20     .00
  419     UI     19.     19.     19.     29.     64.     75.     90.     98.    107.    116.
  420     UI    128.    142.    154.    181.    219.    254.    226.    197.    177.    162.
  421     UI    150.    134.    121.    111.     98.     91.     77.     59.     46.     34.
  422     UI     33.     32.     31.     19.     19.     19.     16.      6.      6.      6.
  423     UI      6.      6.      6.      6.      6.      6.      6.      6.      6.      0.
  424     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  425     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

INTERA

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  426     KK  CP119A
  427     KM        ADD HYDROGRAPHS AT CP119A
  428     HC       2    1.83

  429     KK   D119A
  430     KM         DIVERT TO CP130 FROM CP119A
  431     DT   DI130
  432     DI       0       13       46      100      177      281      413      577      774     1007
  433     DI    1279     1600     1978
  434     DQ       0        0        0        0        0        0        0        0        0        0
  435     DQ       0        9       31

  436     KK   R119A
  437     KM         ROUTE REMAINDER FROM CP119A TO CP120
  438     RS       2                -1        0
  439     RC    .035     .035     .035     2300    .0096
  440     RX    1000     1001     1002     1180     1200     1213     1214     1215
  441     RY    1278     1278     1278     1276     1276     1277     1277     1277

  442     KK     120
  443     KM         RUNOFF HYDROGRAPH FROM SUB-BASIN 120
  444     BA    .54
  445     LG    .50      .00     7.23      .19      .00
  446     UI   21.      21.      21.      23.      69.      79.      94.     105.     115.     123.
  447     UI  134.     148.     161.     179.     212.     257.     277.     239.     211.     191.
  448     UI  176.     164.     147.     133.     124.     109.     101.      88.      70.      57.
  449     UI   37.      37.      35.      35.      28.      21.      21.      21.      13.       6.
  450     UI    6.       6.       6.       6.       6.       6.       6.       6.       6.       6.
  451     UI    6.       0.       0.       0.       0.       0.       0.       0.       0.       0.
  452     UI    0.       0.       0.       0.       0.       0.       0.       0.       0.       0.

  453     KK   1I120
  454     KM        ADD HYDROGRAPHS AT CP120
  455     HC       2    2.37

  456     KK    D112
  457     KM         RETURN DIVERT AT CP112
  458     DR   DI120

  459     KK    R112
  460     KM         ROUTE FLOW FROM CP112 TO CP120
  461     RS       8                -1        0
  462     RC    .035     .035     .075     5270    .0044
  463     RX    1000     1001     1002     1020     1040     1340     1820     2030
  464     RY    1281     1281     1281     1280     1280     1282     1284     1286

  465     KK   CP120
  466     KM        ADD HYDROGRAPHS AT CP120.
  467     HC       2    4.20
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  468     KK    R120
  469     KM        ROUTE FLOWS FROM CP120 TO CP130
  470     RS       5              -1         0
  471     RC     .03     .03     .06     5280    .0032
  472     RX    1000    1001    1002     1020    1040    1090    1520    1830
  473     RY    1261    1261    1261     1260    1260    1262    1264    1266

  474     KK    D119
  475     KM        RETURN DIVERT AT CP119
  476     DR   DI128

  477     KK    R119
  478     KM        ROUTE FLOW CP119 TO CP128
  479     RS       4              -1         0
  480     RC    .035    .035     .06     2640    .0015
  481     RX    1000    1001    1002     1010    1045    1085    1460    1710
  482     RY    1287    1287    1287     1286    1286    1288    1290    1292

  483     KK     128
  484     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 128
  485     BA    .41
  486     LG    .50     .00    3.59      .47     .00
  487     UI    22.     22.     25.      73.     90.    106.    120.    133.    151.    170.
  488     UI   206.    264.    270.     223.    195.    175.    155.    136.    119.    105.
  489     UI    89.     64.     41.      38.     36.     29.     22.     22.     14.      7.
  490     UI     7.      7.      7.       7.      7.      7.      7.      7.      0.      0.
  491     UI     0.      0.      0.       0.      0.      0.      0.      0.      0.      0.

  492     KK   CP128
  493     KM        ADD HYDROGRAPHS AT CP128
  494     HC       2    1.77

  495     KK    R128
  496     KM        ROUTE FLOW FROM CP128 TO CP130
  497     RS      38              -1         0
  498     RC    .075    .075    .075     6240    .0062
  499     RX    1000    1400    1770     2240    3260    3468    3469    3470
  500     RY    1272    1270    1268     1266    1266    1267    1267    1267

  501     KK   D119A
  502     KM        RETURN DIVERT AT CP119A
  503     DR   DI130

  504     KK   R119A
  505     KM        ROUTE FLOW FROM CP119A TO CP130
  506     RS       5              -1         0
  507     RC     .08     .08     .08     6318    .0062
  508     RX    1000    1400    1770     2240    3260    3468    3469    3470
  509     RY    1272    1270    1268     1266    1266    1267    1267    1267
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  510     KK     130
  511     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 130
  512     BA    1.00
  513     LG     .50     .00    5.01     .28     .00
  514     UI     37.     37.     37.     37.    108.    133.    156.    177.    194.    210.
  515     UI    225.    244.    269.    289.    327.    397.    453.    482.    418.    371.
  516     UI    338.    312.    291.    264.    241.    221.    202.    184.    170.    142.
  517     UI    108.     85.     66.     65.     61.     61.     46.     37.     37.     37.
  518     UI     25.     11.     11.     11.     11.     11.     11.     11.     11.     11.
  519     UI     11.     11.     11.     11.      0.      0.      0.      0.      0.      0.
  520     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  521     KK   1I130
  522     KM        ADD HYDROGRAPHS AT CP130
  523     HC      3    3.24

  524     KK     129
  525     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 129
  526     BA     .43
  527     LG     .42     .05    4.24     .48    4.00
  528     UI     28.     28.     72.    116.    143.    164.    189.    222.    287.    360.
  529     UI    312.    259.    226.    192.    164.    139.    109.     71.     50.     47.
  530     UI     36.     28.     23.      9.      9.      9.      9.      9.      9.      9.
  531     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  532     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  533     KK    R129
  534     KM        ROUTE FLOW FROM CP129 TO CP130
  535     RS       9              -1       0
  536     RC    .075     .04     .04    5280    .006
  537     RX    1000    1250    1450    2070    2080    2098    2099    2100
  538     RY    1270    1268    1266    1264    1264    1265    1265    1265

  539     KK   CP130
  540     KM        ADD HYDROGRAPHS AT CP130.
  541     HC      3    5.54

  542     KK    D130
  543     KM        DIVERT TO CP144 FROM CP130
  544     DT   DI144
  545     DI       0      37     124     257     440     743    1487    2233    3928    6436
  546     DQ       0       0       0       0       0     196     657    1133    2198    3747

  547     KK    R130
  548     KM        ROUTE REMAINDER FROM CP130 TO CP131A
  549     RS       8              -1
  550     RC    .075     .04     .04    2640   .0057
  551     RX    1000    1001    1640    2050    2290    2328    2329    2330
  552     RY    1234    1234    1232    1230    1230    1231    1231    1231
```


HEC14PRINT

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

553       KK   131A
554       KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 131A
555       BA    .49
556       LG    .50     .00    5.47     .34     .00
557       UI   22.     22.     22.     48.     77.     93.    106.    119.    129.    142.
558       UI  159.    175.    208.    256.    285.    243.    212.    191.    174.    158.
559       UI  141.    128.    112.    103.     86.     64.     45.     39.     36.     36.
560       UI   27.     22.     22.     19.      7.      7.      7.      7.      7.      7.
561       UI    7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
562       UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

563       KK  CP131A
564       KM       ADD HYDROGRAPHS AT CP131A
565       HC       2    6.03

566       KK   R131A
567       KM       ROUTE REMAINDER FROM CP131A TO R131
568       RS       8              -1
569       RC    .075     .04     .04    2640   .0051
570       RX    1000    1001    1640    2050    2290    2328    2329    2330
571       RY    1234    1234    1232    1230    1230    1231    1231    1231

572       KK    131
573       KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 131
574       BA    .49
575       LG    .50     .00    5.47     .34     .00
576       UI   22.     22.     22.     49.     78.     94.    107.    120.    130.    143.
577       UI  161.    177.    212.    261.    285.    241.    211.    190.    174.    157.
578       UI  140.    127.    111.    103.     83.     63.     42.     39.     36.     36.
579       UI   25.     22.     22.     17.      7.      7.      7.      7.      7.      7.
580       UI    7.      7.      7.      7.      0.      0.      0.      0.      0.      0.
581       UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

582       KK   1I131
583       KM       ADD HYDROGRAPHS AT CP131
584       HC       2    6.52

585       KK    D112
586       KM       RETURN DIVERT AT CP112
587       DR  1D121A

588       KK    R112
589       KM       ROUTE FLOW FROM CP112 TO CP121A
590       RS       6              -1       0
591       RC    .05    .022     .05    6700   .0034
592       RX    1000    1180    1205    1225    1295    1320    1345    1670
593       RY    1265    1264    1262    1260    1260    1262    1264    1265

594       KK    121A
595       KM       RUNOFF HYDROGRAPH FROM SUB-BASIN 121A
596       BA    .50
597       LG    .46     .09    4.03     .57     .00
598       UI   26.     26.     30.     89.    109.    129.    146.    161.    183.    205.
599       UI  248.    317.    331.    274.    238.    214.    190.    166.    147.    129.
```


1G74-PRINT

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 600      UI    109.     80.     52.     46.     43.     37.     26.     26.     19.      8.
 601      UI      8.      8.      8.      8.      8.      8.      8.      8.      0.      0.
 602      UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 603      KK  1I121A
 604      KM        ADD HYDROGRAPHS AT CP121A
 605      HC       2    2.33

 606      KK   D113A
 607      KM         RETURN DIVERT AT CP113A
 608      DR  2D121A

 609      KK   R113A
 610      KM         ROUTE FLOW FROM CP113A TO CP121A
 611      RS       6              -1       0
 612      RC     .05     .025     .05    5280   .0047
 613      RX    1000     1001    1002    1020    1170    1200    1290    1500
 614      RY    1278     1278    1278    1276    1276    1278    1279    1280

 615      KK  CP121A
 616      KM        ADD HYDROGRAPHS AT CP121A
 617      HC       2    2.83

 618      KK   R121A
 619      KM         ROUTE FLOW FROM CP121A TO CP121
 620      RS       2              -1       0
 621      RC    .035     .035     .035    2640   .0096
 622      RX    1000     1001    1002    1180    1200    1213    1214    1215
 623      RY    1278     1278    1278    1276    1276    1277    1277    1277

 624      KK     121
 625      KM         RUNOFF HYDROGRAPH FROM SUB-BASIN 121
 626      BA     .50
 627      LG     .46      .09    4.03     .57     .00
 628      UI     26.      26.     31.     90.    110.    130.    147.    163.    185.    209.
 629      UI    253.     325.    328.    272.    237.    213.    189.    165.    145.    127.
 630      UI    107.      77.     49.     46.     44.     35.     26.     26.     16.      8.
 631      UI      8.      8.      8.      8.      8.      8.      8.      0.      0.      0.
 632      UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 633      KK   CP121
 634      KM        ADD HYDROGRAPHS AT CP121
 635      HC       2    3.33

 636      KK    R121
 637      KM         ROUTE FLOW FROM CP121 TO CP131
 638      RS       7              -1       0
 639      RC    .035     .035     .075    5280   .0055
 640      RX    1000     1001    1002    1050    1115    1450    1910    1570
 641      RY    1239     1239    1239    1238    1238    1239    1240    1242
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  642     KK   CP131
  643     KM        ADD HYDROGRAPHS AT CP131.
  644     HC      2    8.52

  645     KK    D131
  646     KM        DIVERT TO CP145 FROM CP131
  647     DT   DI145
  648     DI       0      60     608    1900    3801    6042    9665
  649     DQ       0      39     491    1546    2353    4171    6841

  650     KK    R131
  651     KM        ROUTE REMAINDER FROM CP131 TO CP132
  652     RS       4              -1       0
  653     RC    .075    .035    .035    2150   .0028
  654     RX    1000    1370    1760    2150    2165    2173    2174    2175
  655     RY    1224    1222    1220    1218    1218    1219    1219    1219

  656     KK     132
  657     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 132
  658     BA    .41
  659     LG    .50     .00    4.15     .57     .00
  660     UI     19      19      19      49      70      86      98     108     118     132
  661     UI    147     169     212     248     223     191     170     155     140     124
  662     UI    112      98      89      70      55      34      34      32      30      19
  663     UI     19      19       8       6       6       6       6       6       6       6
  664     UI      6       6       0       0       0       0       0       0       0       0
  665     UI      0       0       0       0       0       0       0       0       0       0

  666     KK   CP132
  667     KM        ADD HYDROGRAPHS AT CP132
  668     HC      2    8.93

  669     KK    R132
  670     KM        ROUTE FLOW FROM CP132 TO CP133
  671     RS       5              -1       0
  672     RC     .08     .04     .04    2640    .003
  673     RX    1000    1400    1670    2050    2230    2258    2259    2260
  674     RY    1218    1216    1214    1212    1212    1213    1213    1213

  675     KK     133
  676     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 133
  677     BA    .49
  678     LG    .50     .00    3.62     .46     .00
  679     UI    22.     22.     22.     48.     77.     93.    106.    119.    129.    142.
  680     UI   159.    175.    208.    256.    285.    243.    212.    191.    174.    158.
  681     UI   141.    128.    112.    103.     86.     64.     45.     39.     36.     36.
  682     UI    27.     22.     22.     19.      7.      7.      7.      7.      7.      7.
  683     UI     7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
  684     UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  685     KK   1I133
  686     KM        ADD HYDROGRAPHS AT CP133
  687     HC      2    9.42

  688     KK   CP133
  689     KM        ADD HYDROGRAPHS AT CP133
  690     HC      2   14.48

  691     KK    D133
  692     KM        DIVERT TO CP146 FROM CP133
  693     DT   DI146
  694     DI       0      80     341    1081    2600    4587    7337
  695     DQ       0      32     136     432    1040    1835    2935

  696     KK    D133
  697     KM        DIVERT TO CP147 FROM CP133
  698     DT   1D147
  699     DI       0      48     205     649    1560    2752    4402
  700     DQ       0      16      68     216     520     917    1467

  701     KK    R133
  702     KM        ROUTE REMAINDER FROM CP133 TO CP134
  703     RS       4              -1       0
  704     RC     .06    .035    .035    2640   .0049
  705     RX   1000    1340    1600    1815    1860    1888    1889    1890
  706     RY   1206    1204    1202    1200    1200    1203    1203    1203

  707     KK    D122
  708     KM        RETURN DIVERT AT   CP122
  709     DR   DI134

  710     KK    R122
  711     KM        ROUTE FLOW FROM CP122 TO CP134
  712     RS       8              -1       0
  713     RC     .04     .04    .075    6700   .0051
  714     RX   1000    1001    1002    1045    1150    1570    1960    2350
  715     RY   1209    1209    1209    1208    1208    1210    1212    1214

  716     KK     134
  717     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 134
  718     BA    .50
  719     LG    .50     .00    3.67     .46     .00
  720     UI   22.     22.     22.     49.     79.     95.    108.    122.    132.    145.
  721     UI  162.    178.    213.    261.    291.    248.    216.    195.    178.    161.
  722     UI  143.    131.    114.    105.     88.     65.     46.     39.     37.     37.
  723     UI   27.     22.     22.     20.      7.      7.      7.      7.      7.      7.
  724     UI    7.      7.      7.      7.      7.      0.      0.      0.      0.      0.
  725     UI    0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 726      KK   1I134
 727      KM        ADD HYDROGRAPHS AT CP134
 728      HC      2    8.39

 729      KK    123
 730      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 123
 731      BA    .44
 732      LG    .50     .00    6.21     .30     .00
 733      UI   20.     20.     20.      51.     74.     90.    103.    114.    124.    138.
 734      UI  155.    175.    222.     259.    243.    208.    184.    167.    152.    134.
 735      UI  121.    107.     97.      81.     60.     41.     36.     34.     33.     23.
 736      UI   20.     20.     13.       6.      6.      6.      6.      6.      6.      6.
 737      UI    6.      6.      6.       0.      0.      0.      0.      0.      0.      0.
 738      UI    0.      0.      0.       0.      0.      0.      0.      0.      0.      0.

 739      KK    D123
 740      KM        DIVERT TO CP124 FROM CP123
 741      DT   DI124
 742      DI      0      94     177      293     448     683    1014    1440    1964    2593
 743      DQ      0      94     177      293     448     448     448     448     448     448

 744      KK    R123
 745      KM        ROUTE REMAINDER FROM CP123 TO CP134
 746      RS      6              -1       0
 747      RC    .04     .04     .075    5280   .0038
 748      RX  1000    1001    1002     1045    1150    1570    1960    2350
 749      RY  1209    1209    1209     1208    1208    1210    1212    1214

 750      KK   2I134
 751      KM        ADD HYDROGRAPHS AT CP134
 752      HC      2    8.83

 753      KK   CP134
 754      KM        ADD HYDROGRAPHS AT CP134
 755      HC      2   15.42

 756      KK    D134
 757      KM        DIVERT TO CP147 FROM CP134
 758      DT   2D147
 759      DI      0      26     162      614    1050    2192    3494    6483   10967
 760      DQ      0       0      62      352     697    1575    2539    4742    8027

 761      KK    R134
 762      KM        ROUTE REMAINDER FROM CP134 TO CP135
 763      RS      2              -1       0
 764      RC    .06     .03     .03     2640   .0045
 765      RX  1000    1490    1950     2015    2040    2048    2049    2050
 766      RY  1194    1192    1190     1188    1188    1189    1189    1189
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  767     KK    D123
  768     KM        RETURN DIVERT AT CP123
  769     DR   DI124

  770     KK    R123
  771     KM        ROUTE FLOW FROM CP123 TO CP124
  772     RS       4              -1       0
  773     RC    .075    .035    .035    2640   .0038
  774     RX    1000    1350    1690    2040    2130    2148    2149    2150
  775     RY    1216    1214    1212    1210    1210    1211    1211    1211

  776     KK     124
  777     KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 124
  778     BA     .57
  779     LG     .50     .00    6.41     .29     .00
  780     UI     20.     20.     20.     20.     50.     70.     80.     94.    102.    111.
  781     UI    118.    128.    138.    152.    163.    188.    228.    254.    257.    223.
  782     UI    201.    183.    170.    159.    146.    133.    122.    112.    102.     95.
  783     UI     82.     66.     57.     36.     36.     34.     33.     33.     21.     20.
  784     UI     20.     20.     12.      6.      6.      6.      6.      6.      6.      6.
  785     UI      6.      6.      6.      6.      6.      6.      0.      0.      0.      0.
  786     UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  787     KK   CP124
  788     KM        ADD HYDROGRAPHS AT CP124
  789     HC       2    1.01

  790     KK    D124
  791     KM        DIVERT TO CP136 FROM CP124
  792     DT   DI136
  793     DI       0      42      84     232     605    1435    2923
  794     DQ       0      25      51     128     292     519     798

  795     KK    D124
  796     KM        DIVERT TO CP125 FROM CP124
  797     DT   DI125
  798     DI       0      17      33     104     313     916    2125
  799     DQ       0      17      33      82     189     341     534

  800     KK    R124
  801     KM        ROUTE REMAINDER FROM CP124 TO CP135
  802     RS      10              -1       0
  803     RC    .035    .035    .075    5280   .0042
  804     RX    1000    1001    1002    1020    1070    1360    1800    2190
  805     RY    1195    1195    1195    1194    1194    1196    1198    1200

  806     KK   1I135
  807     KM        ADD HYDROGRAPHS AT CP135
  808     HC       2   15.63
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 809      KK     135
 810      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 135
 811      BA     .49
 812      LG     .50      .00    3.58     .44     .00
 813      UI     21.      21.     21.     35.     69.     82.     97.    106.    117.    126.
 814      UI    139.     154.    170.    203.    249.    267.    228.    200.    181.    167.
 815      UI    153.     136.    124.    112.    100.     89.     72.     57.     36.     36.
 816      UI     34.      34.     24.     21.     21.     20.      6.      6.      6.      6.
 817      UI      6.       6.      6.      6.      6.      6.      6.      6.      0.      0.
 818      UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.

 819      KK   CP135
 820      KM        ADD HYDROGRAPHS AT CP135
 821      HC       2   16.48

 822      KK    D135
 823      KM        DIVERT TO CP148 FROM CP135
 824      DT   DI148
 825      DI       0      24     136     323     849    1809    2524    4155    6589    8820
 826      DQ       0       0       0      21     135     427     747    1477    2566    3013

 827      KK    R135
 828      KM        ROUTE REMAINDER FROM CP135 TO CP136
 829      RS       4              -1       0
 830      RC    .075    .035    .035    2640   .0038
 831      RX    1000    1430    1790    2250    2275    2298    2299    2300
 832      RY    1182    1180    1178    1176    1176    1177    1177    1177
          *

 833      KK    D124
 834      KM        RETURN DIVERT AT CP124
 835      DR   DI136
          *

 836      KK    R124
 837      KM        ROUTE FLOW FROM CP124 TO CP136
 838      RS      50              -1       0
 839      RC     .07     .07     .07    6084   .0053
 840      RX    1000    1001    1002    1260    2160    2448    2449    2450
 841      RY    1193    1193    1193    1192    1192    1193    1193    1193
          *

 842      KK     136
 843      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 136
 844      KM    Basin S-Graph modified from original ADMS;0.04 mi^2 moved to 136 from 137.
 845      BA     .50
 846      LG     .50      .00    3.67     .42     .00
 847      UI     22.      22.     22.     49.     79.     95.    109.    122.    132.    146.
 848      UI    163.     180.    215.    264.    291.    247.    216.    194.    178.    160.
 849      UI    143.     130.    114.    105.     86.     64.     44.     39.     37.     37.
 850      UI     26.      22.     22.     18.      7.      7.      7.      7.      7.      7.
 851      UI      7.       7.      7.      7.      7.      0.      0.      0.      0.      0.
 852      UI      0.       0.      0.      0.      0.      0.      0.      0.      0.      0.
          *
```

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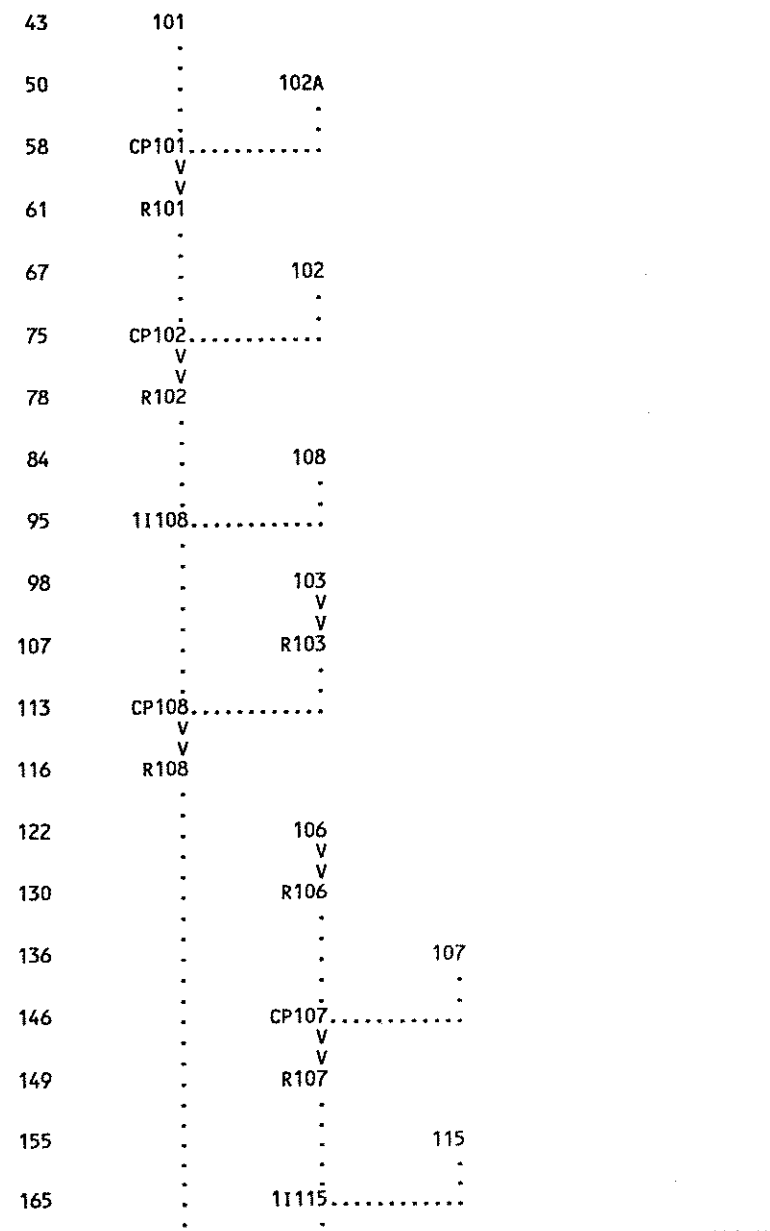
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

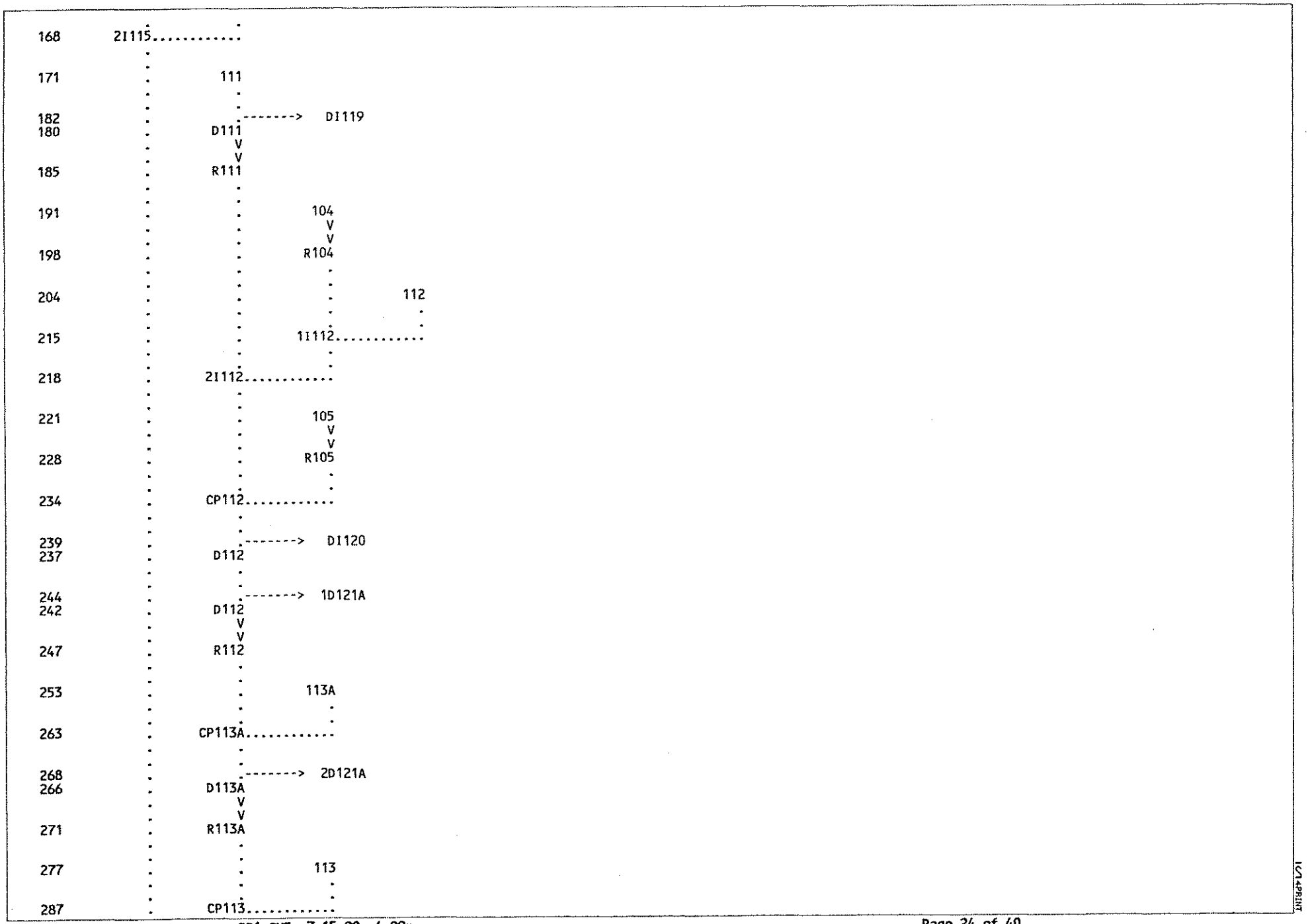
 853      KK   11136
 854      KM        ADD HYDROGRAPHS AT CP136
 855      HC       2    1.47
          *
 856      KK   CP136
 857      KM        ADD HYDROGRAPHS AT CP136
 858      HC       2   16.94
          *
 859      KK    R136
 860      KM        ROUTE FLOW FROM CP136 TO CP137
 861      RS       5              -1       0
 862      RC     .08    .035     .035    2640   .0042
 863      RX    1000    1370     1790    3210    3270    3298    3299    3300
 864      RY    1170    1168     1166    1164    1164    1165    1165    1165
          *
 865      KK     137
 866      KM        RUNOFF HYDROGRAPH FROM SUB-BASIN 137
 867      KM     Basin S-Graph modified from original ADMS;0.04 mi^2 moved to basin 136
 868      BA     .50
 869      LG     .50     .00    4.62     .36     .00
 870      UI     21.     21.     21.     35.     70.     83.     98.    108.    118.    128.
 871      UI    141.    157.    172.    206.    250.    273.    233.    205.    185.    170.
 872      UI    156.    139.    127.    114.    103.     92.     74.     60.     37.     37.
 873      UI     35.     34.     26.     21.     21.     21.      8.      6.      6.      6.
 874      UI      6.      6.      6.      6.      6.      6.      6.      6.      0.      0.
 875      UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
          *
 876      KK   11137
 877      KM        ADD HYDROGRAPHS AT CP137
 878      HC       2   17.12
          * ⊙⊕
 879      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW




168
2I115
171
111
182
DI119
180
D111
185
R111
191
104
198
R104
204
112
215
11112
218
2I112
221
105
228
R105
234
CP112
239
DI120
237
D112
244
1D121A
242
D112
247
R112
253
113A
263
CP113A
268
2D121A
266
D113A
271
R113A
277
113
287
CP113

```
            .           .
            .           .
292         .           .------->   1D122
290         .        D113
            .           V
            .           V
295         .        R113
            .           .
            .           .
301         .           .         114
            .           .           .
            .           .           .
311         .       CP114............
            .           .
            .           .
316         .           .------->   2D122
314         .        D114
            .           V
            .           V
319         .        R114
            .           .
            .           .
325      CP115............
            V
            V
328       R115
            .
            .
336         .           .<-------   1D122
334         .        D113
            .           V
            .           V
337         .        R113
            .           .
            .           .
345         .           .           .<-------   2D122
343         .           .        D114
            .           .           V
            .           .           V
346         .           .        R114
            .           .           .
            .           .           .
352         .           .           .         122
            .           .           .           .
            .           .           .           .
363         .       1I122.........................
            .           .
            .           .
366      CP122............
            .
            .
371         .------->   DI134
369       D122
            V
            V
376       R122
            .
            .
384         .           .<-------   DI119
382         .        D111
            .           V
            .           V
385         .        R111
            .           .
            .           .
391         .           .         119
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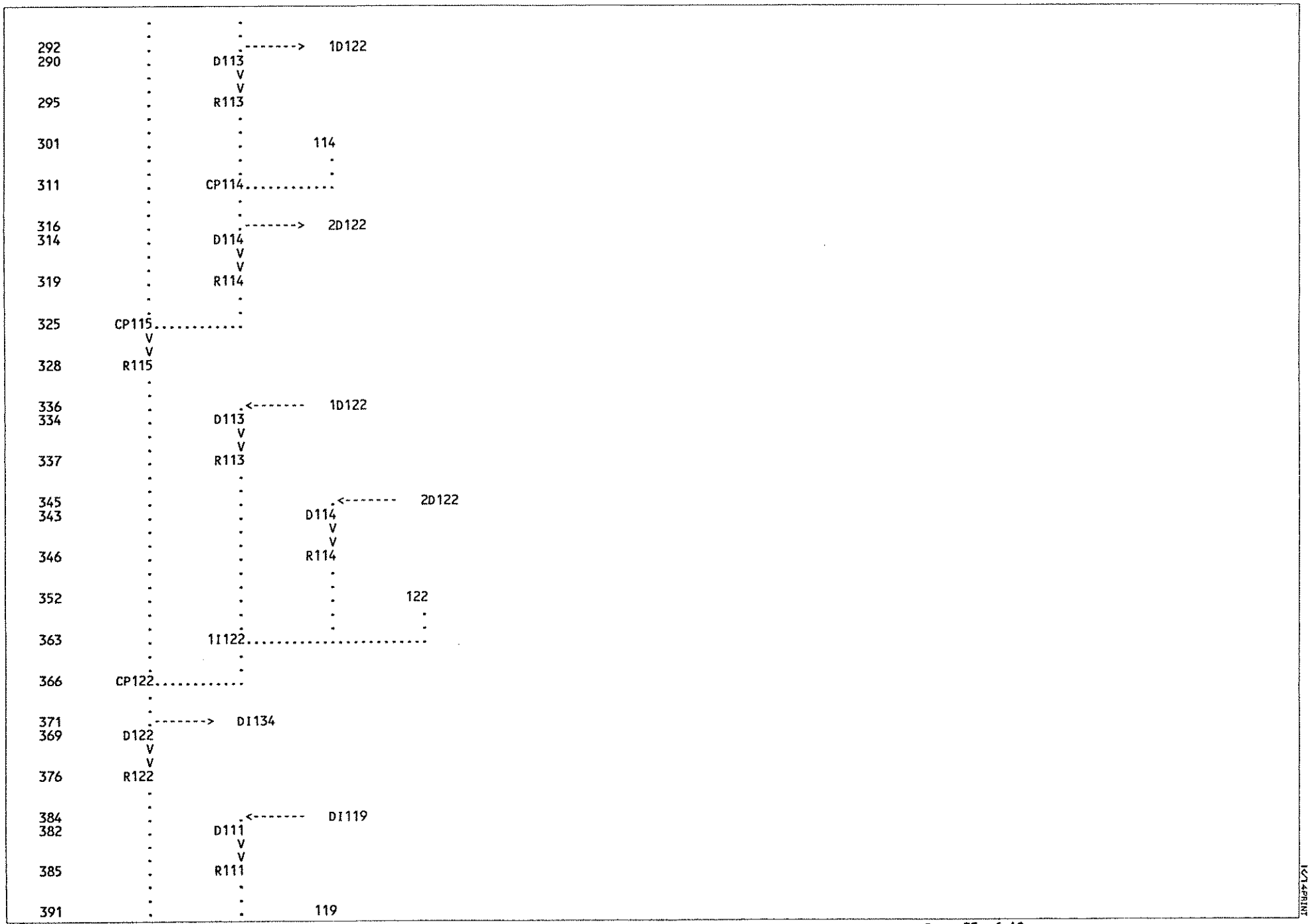
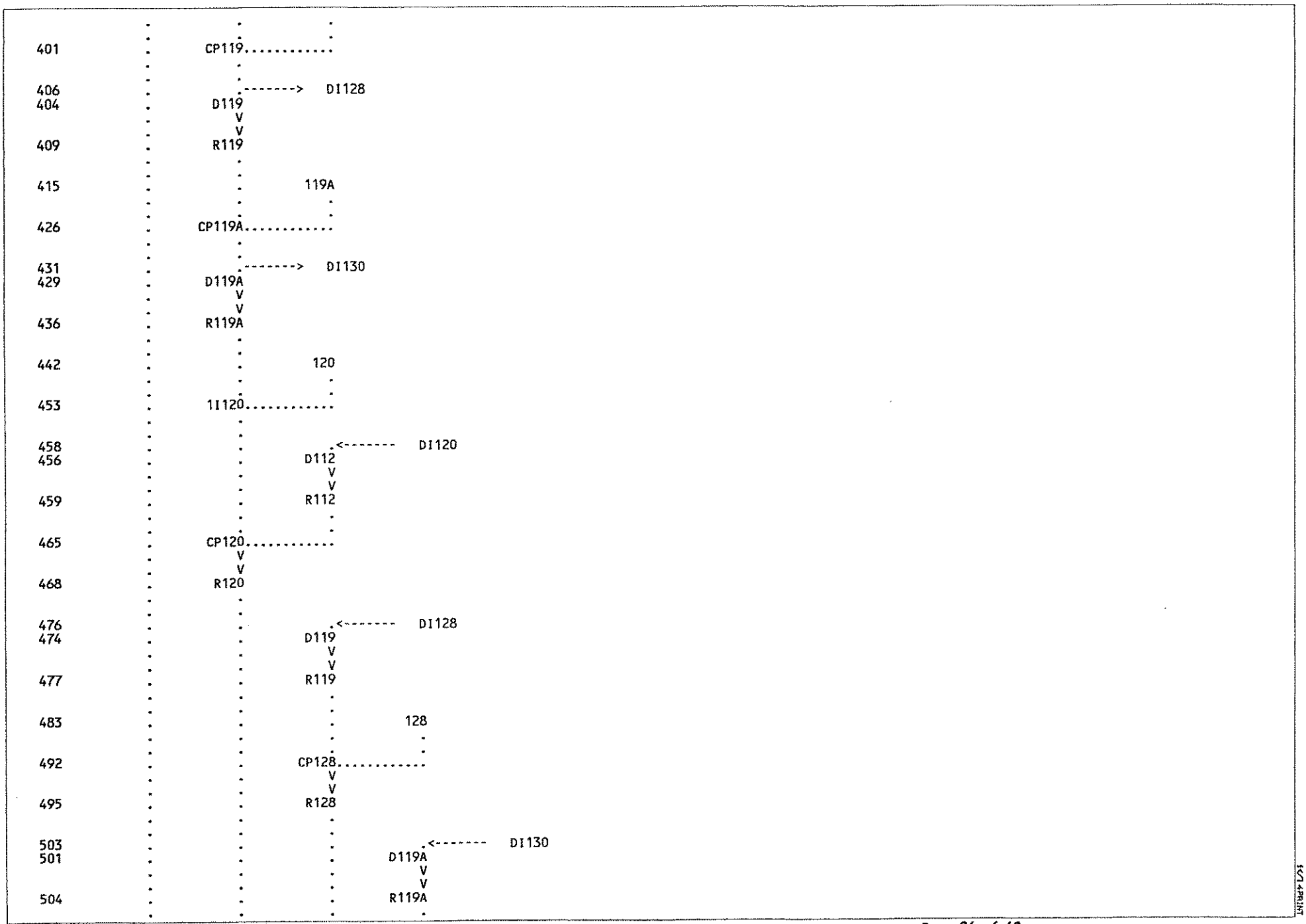
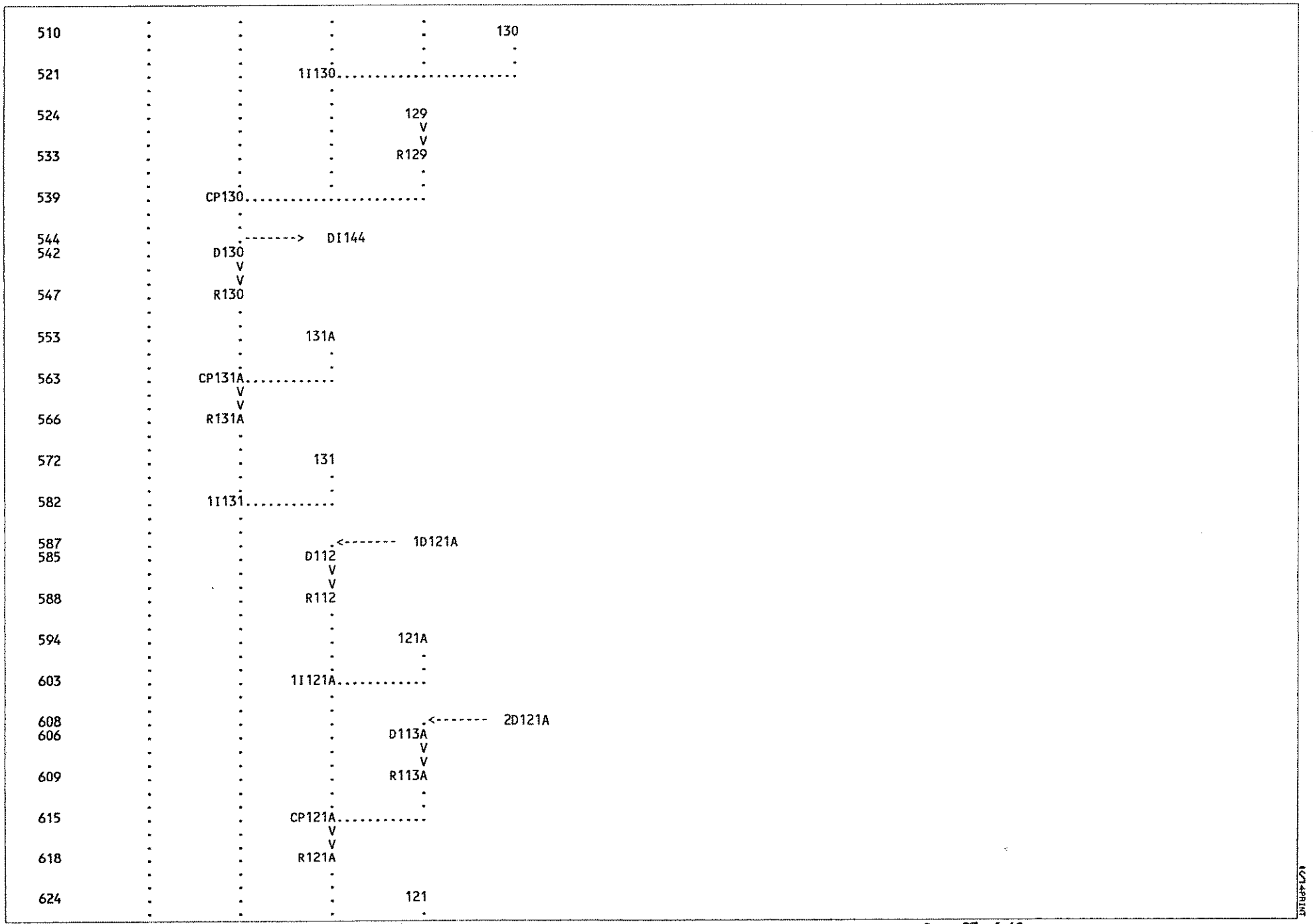



401 CP119
406 DI128
404 D119
409 R119
415 119A
426 CP119A
431 DI130
429 D119A
436 R119A
442 120
453 1I120
458 DI120
456 D112
459 R112
465 CP120
468 R120
476 DI128
474 D119
477 R119
483 128
492 CP128
495 R128
503 DI130
501 D119A
504 R119A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R129
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CP130
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DI144
542
D130
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R130
553
131A
563
CP131A
566
R131A
572
131
582
1I131
587
1D121A
585
D112
588
R112
594
121A
603
1I121A
608
2D121A
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D113A
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R113A
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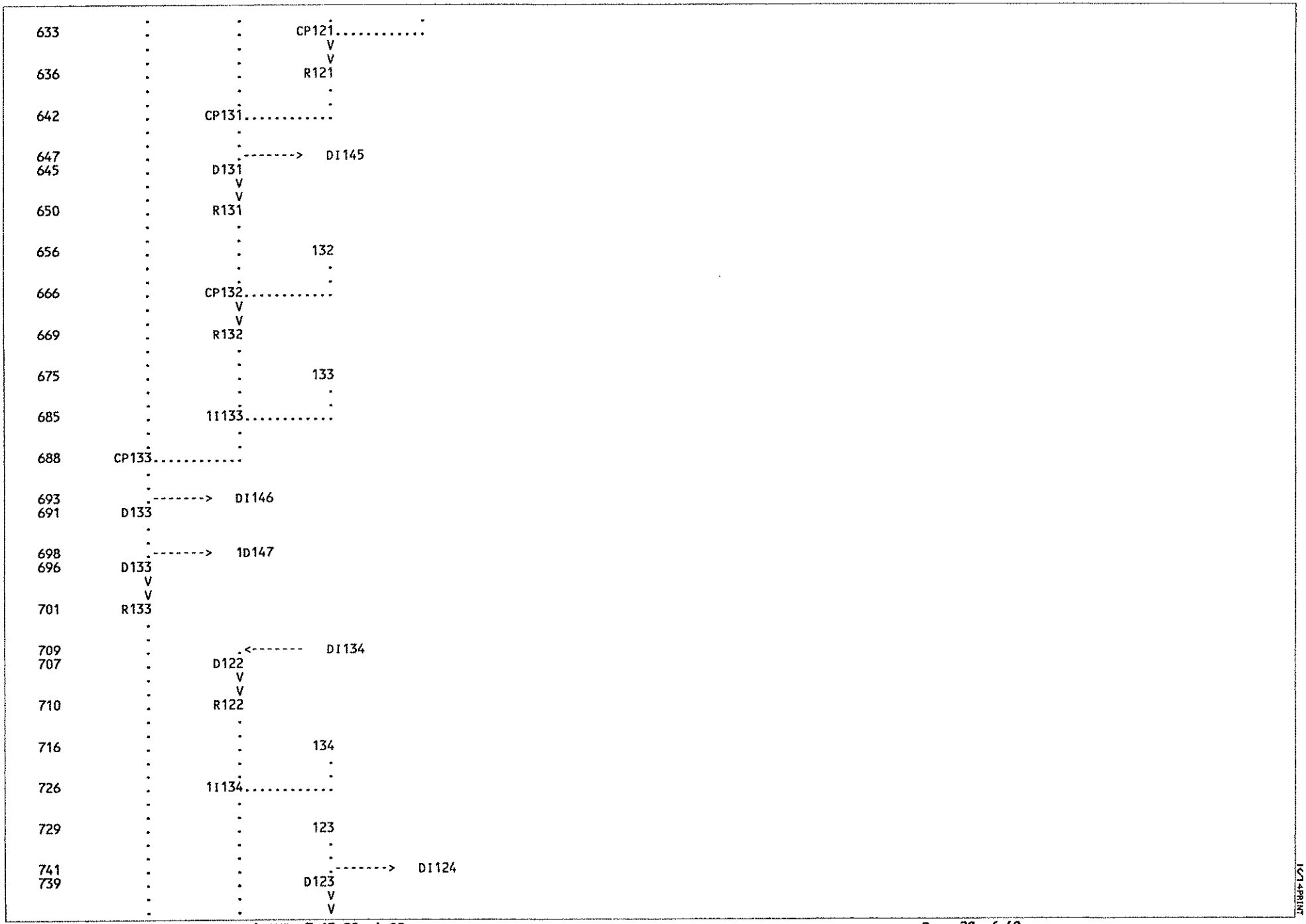
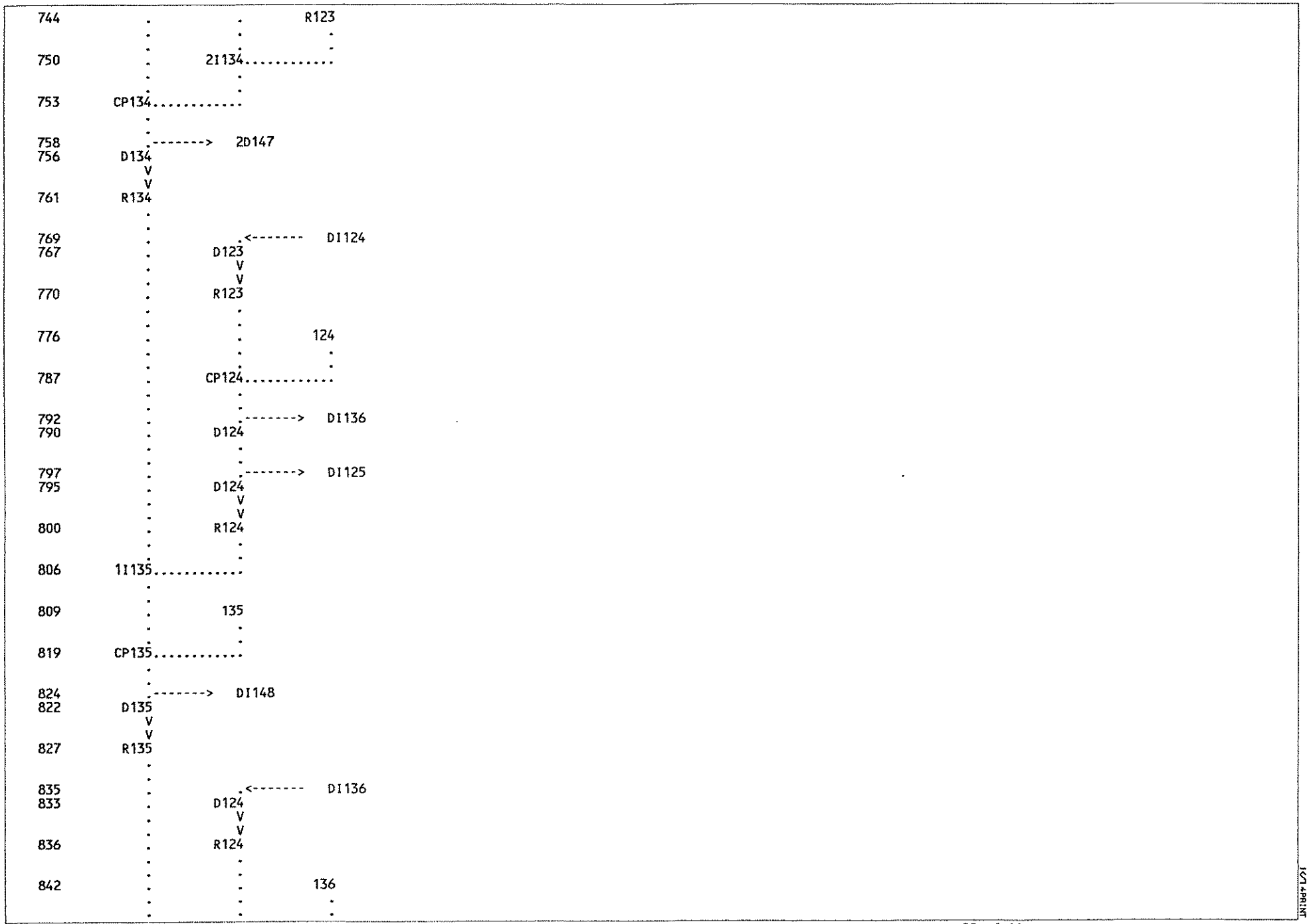
CP121A
618
R121A
624
121


633 CP121
636 R121
642 CP131
647 DI145
645 D131
650 R131
656 132
666 CP132
669 R132
675 133
685 1I133
688 CP133
693 DI146
691 D133
698 1D147
696 D133
701 R133
709 DI134
707 D122
710 R122
716 134
726 1I134
729 123
741 DI124
739 D123

IG1+PRINT


744 R123
750 21134
753 CP134
758 2D147
756 D134
761 R134
769 DI124
767 D123
770 R123
776 124
787 CP124
792 DI136
790 D124
797 DI125
795 D124
800 R124
806 11135
809 135
819 CP135
824 DI148
822 D135
827 R135
835 DI136
833 D124
836 R124
842 136

ICT4PRINT

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853          .       1I136............
             .           .
             .           .
856       CP136............
             V
             V
859        R136
             .
             .
865          .         137
             .           .
             .           .
876       1I137............
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(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUL   1997              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   15JUL98  TIME  16:14:33   *
*                                       *
*****************************************
```

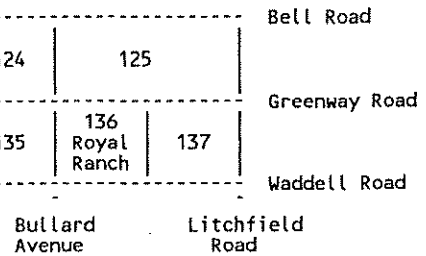
```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

ROYAL RANCH

ORIGINAL HEC-1 FILE:
FINAL HYDROLOGY RUN FOR WHITE TANKS ADMS ---- ENTIRE WATERSHED
100-YEAR, 24-HOUR STORM WTADMS.24

WHITE TANKS ADMS EDITED FOR ROYAL RANCH MASTERPLAN
PREMIER ENGINEERING CORP., July 1998

BASIN ARRANGEMENT:




```
26 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                    NMIN           5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME        0000  STARTING TIME
                      NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      2   0  ENDING DATE
                   NDTIME        0055  ENDING TIME
                   ICENT           19  CENTURY MARK

             COMPUTATION INTERVAL     .08 HOURS
                  TOTAL TIME BASE   24.92 HOURS

       ENGLISH UNITS
            DRAINAGE AREA         SQUARE MILES
            PRECIPITATION DEPTH   INCHES
            LENGTH, ELEVATION     FEET
            FLOW                  CUBIC FEET PER SECOND
            STORAGE VOLUME        ACRE-FEET
            SURFACE AREA          ACRES
            TEMPERATURE           DEGREES FAHRENHEIT

28 JD          INDEX STORM NO. 1
```


IC/L4PRINT

```
                STRM        4.03  PRECIPITATION DEPTH
                TRDA         .00  TRANSPOSITION DRAINAGE AREA

 29 PI        PRECIPITATION PATTERN
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .01      .00      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .03      .03
                .03      .09      .09      .09      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00

 39 JD       INDEX STORM NO. 2
                STRM        3.99  PRECIPITATION DEPTH
                TRDA       10.00  TRANSPOSITION DRAINAGE AREA

  0 PI        PRECIPITATION PATTERN
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .01      .00      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .03      .03
                .03      .09      .09      .09      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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                .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
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             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00

40 JD       INDEX STORM NO. 3
                STRM      3.83  PRECIPITATION DEPTH
                TRDA     50.00  TRANSPOSITION DRAINAGE AREA

 0 PI         PRECIPITATION PATTERN
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .01     .00     .01
             .01     .01     .01     .01     .01     .01     .01     .01     .03     .03
             .03     .09     .09     .09     .01     .01     .01     .01     .01     .01
             .01     .01     .01     .01     .01     .01     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00

41 JD       INDEX STORM NO. 4
                STRM      3.76  PRECIPITATION DEPTH
                TRDA    100.00  TRANSPOSITION DRAINAGE AREA

 0 PI         PRECIPITATION PATTERN
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .01     .00     .01
             .01     .01     .01     .01     .01     .01     .01     .01     .03     .03
             .03     .09     .09     .09     .01     .01     .01     .01     .01     .01
             .01     .01     .01     .01     .01     .01     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
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             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
             .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
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                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00

 42 JD        INDEX STORM NO. 5
                    STRM        3.70  PRECIPITATION DEPTH
                    TRDA      200.00  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                 .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                 .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                 .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
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                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                 .00       .00       .00       .00       .00       .00       .00       .00
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	101	233.	12.25	22.	5.	5.	.16		
HYDROGRAPH AT	102A	525.	12.58	73.	18.	18.	.51		
2 COMBINED AT	CP101	635.	12.50	95.	24.	23.	.67		
ROUTED TO	R101	629.	12.50	95.	24.	23.	.67		
HYDROGRAPH AT	102	135.	12.42	17.	4.	4.	.10		
2 COMBINED AT	CP102	753.	12.50	112.	28.	27.	.77		
ROUTED TO	R102	763.	12.58	112.	28.	27.	.77		
HYDROGRAPH AT	108	478.	13.25	117.	29.	28.	.79		
2 COMBINED AT	1I108	999.	12.58	228.	57.	55.	1.56		
HYDROGRAPH AT	103	286.	12.92	55.	14.	13.	.37		
ROUTED TO	R103	267.	13.08	55.	14.	13.	.37		
2 COMBINED AT	CP108	1158.	12.75	283.	71.	68.	1.93		
ROUTED TO	R108	1123.	13.25	283.	71.	68.	1.93		
HYDROGRAPH AT	106	871.	12.50	111.	28.	27.	.77		
ROUTED TO	R106	778.	12.67	111.	28.	27.	.77		
HYDROGRAPH AT	107	398.	13.08	88.	22.	21.	.60		
2 COMBINED AT	CP107	1044.	12.75	199.	50.	48.	1.37		
ROUTED TO	R107	948.	13.17	199.	50.	48.	1.37		
HYDROGRAPH AT	115	379.	13.08	89.	22.	22.	.49		
2 COMBINED AT	1I115	1313.	13.17	288.	72.	69.	1.86		
2 COMBINED AT	2I115	2429.	13.17	570.	143.	137.	3.79		
HYDROGRAPH AT	111	443.	12.67	71.	18.	17.	.50		
DIVERSION TO	DI119	166.	12.67	26.	7.	6.	.50		
HYDROGRAPH AT	D111	276.	12.67	45.	11.	11.	.50		
ROUTED TO	R111	232.	13.33	45.	11.	11.	.50		
HYDROGRAPH AT	104	236.	12.17	20.	5.	5.	.15		
ROUTED TO	R104	89.	14.67	20.	5.	5.	.15		
HYDROGRAPH AT	112	534.	13.33	138.	34.	33.	.97		
2 COMBINED AT	1I112	534.	13.33	157.	40.	38.	1.12		

HCI-PRINT

2 COMBINED AT	21112	765.	13.33	202.	51.	49.	1.62
HYDROGRAPH AT	105	354.	12.25	34.	9.	8.	.21
ROUTED TO	R105	316.	12.42	34.	9.	8.	.21
2 COMBINED AT	CP112	790.	13.33	236.	59.	57.	1.83
DIVERSION TO	D1120	263.	13.33	79.	20.	19.	1.83
HYDROGRAPH AT	D112	527.	13.33	158.	40.	38.	1.83
DIVERSION TO	1D121A	263.	13.33	79.	20.	19.	1.83
HYDROGRAPH AT	D112	264.	13.33	79.	20.	19.	1.83
ROUTED TO	R112	241.	13.75	79.	20.	19.	1.83
HYDROGRAPH AT	113A	409.	13.08	106.	27.	26.	.50
2 COMBINED AT	CP113A	560.	13.08	183.	46.	45.	2.33
DIVERSION TO	2D121A	58.	13.08	9.	2.	2.	2.33
HYDROGRAPH AT	D113A	502.	13.08	174.	44.	42.	2.33
ROUTED TO	R113A	444.	15.00	173.	44.	42.	2.33
HYDROGRAPH AT	113	431.	13.08	117.	29.	28.	.50
2 COMBINED AT	CP113	556.	13.08	284.	73.	71.	2.83
DIVERSION TO	1D122	442.	13.08	226.	58.	56.	2.83
HYDROGRAPH AT	D113	114.	13.08	58.	15.	14.	2.83
ROUTED TO	R113	106.	13.50	58.	15.	14.	2.83
HYDROGRAPH AT	114	326.	13.00	84.	21.	20.	.38
2 COMBINED AT	CP114	376.	13.08	140.	36.	35.	3.21
DIVERSION TO	2D122	96.	13.08	20.	5.	5.	3.21
HYDROGRAPH AT	D114	280.	13.08	120.	31.	30.	3.21
ROUTED TO	R114	278.	13.17	119.	31.	30.	3.21
2 COMBINED AT	CP115	2705.	13.17	688.	173.	167.	7.00
ROUTED TO	R115	2541.	13.67	686.	173.	167.	7.00
HYDROGRAPH AT	D113	442.	13.08	226.	58.	56.	2.83
ROUTED TO	R113	393.	14.50	220.	58.	56.	2.83
HYDROGRAPH AT	D114	96.	13.08	20.	5.	5.	3.21
ROUTED TO	R114	74.	15.08	20.	5.	5.	3.21
HYDROGRAPH AT	122	552.	13.33	146.	37.	35.	.89
3 COMBINED AT	11122	571.	14.33	357.	99.	96.	4.10
2 COMBINED AT	CP122	2976.	13.58	1041.	273.	263.	7.89

DIVERSION TO	DI134	2643.	13.58	949.	243.	234.	7.89
HYDROGRAPH AT	D122	332.	13.58	94.	29.	28.	7.89
ROUTED TO	R122	308.	14.42	93.	28.	27.	7.89
HYDROGRAPH AT	D111	166.	12.67	26.	7.	6.	.50
ROUTED TO	R111	136.	13.33	26.	7.	6.	.50
HYDROGRAPH AT	119	600.	13.17	143.	36.	34.	.86
2 COMBINED AT	CP119	706.	13.17	169.	42.	41.	1.36
DIVERSION TO	DI128	410.	13.17	98.	25.	24.	1.36
HYDROGRAPH AT	D119	296.	13.17	70.	18.	17.	1.36
ROUTED TO	R119	270.	13.58	70.	18.	17.	1.36
HYDROGRAPH AT	119A	356.	13.17	91.	23.	22.	.47
2 COMBINED AT	CP119A	533.	13.25	161.	40.	39.	1.83
DIVERSION TO	DI130	0.	.00	0.	0.	0.	1.83
HYDROGRAPH AT	D119A	533.	13.25	161.	40.	39.	1.83
ROUTED TO	R119A	531.	13.50	161.	40.	39.	1.83
HYDROGRAPH AT	120	397.	13.25	106.	27.	26.	.54
2 COMBINED AT	1I120	895.	13.33	266.	67.	64.	2.37
HYDROGRAPH AT	D112	263.	13.33	79.	20.	19.	1.83
ROUTED TO	R112	239.	13.83	78.	20.	19.	1.83
2 COMBINED AT	CP120	1056.	13.33	342.	86.	83.	4.20
ROUTED TO	R120	1023.	13.92	341.	86.	83.	4.20
HYDROGRAPH AT	D119	410.	13.17	98.	25.	24.	1.36
ROUTED TO	R119	383.	13.50	98.	25.	24.	1.36
HYDROGRAPH AT	128	312.	12.92	59.	15.	14.	.41
2 COMBINED AT	CP128	537.	13.25	158.	39.	38.	1.77
ROUTED TO	R128	538.	14.42	157.	39.	38.	1.77
HYDROGRAPH AT	D119A	0.	.00	0.	0.	0.	1.83
ROUTED TO	R119A	0.	.00	0.	0.	0.	1.83
HYDROGRAPH AT	130	647.	13.25	172.	43.	41.	1.00
3 COMBINED AT	1I130	715.	14.42	323.	82.	79.	3.24
HYDROGRAPH AT	129	378.	12.67	61.	16.	15.	.43
ROUTED TO	R129	315.	13.25	61.	16.	15.	.43
3 COMBINED AT	CP130	1703.	13.42	724.	184.	178.	5.54

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DIVERSION TO	DI144	795.	13.42	242.	61.	58.	5.54
HYDROGRAPH AT	D130	908.	13.42	481.	124.	119.	5.54
ROUTED TO	R130	907.	13.75	480.	124.	119.	5.54
HYDROGRAPH AT	131A	354.	13.08	79.	20.	19.	.49
2 COMBINED AT	CP131A	1102.	13.58	553.	143.	138.	6.03
ROUTED TO	R131A	1098.	13.75	552.	143.	138.	6.03
HYDROGRAPH AT	131	355.	13.08	79.	20.	19.	.49
2 COMBINED AT	1I131	1274.	13.58	621.	163.	157.	6.52
HYDROGRAPH AT	D112	263.	13.33	79.	20.	19.	1.83
ROUTED TO	R112	247.	13.67	78.	20.	19.	1.83
HYDROGRAPH AT	121A	324.	12.92	60.	15.	14.	.50
2 COMBINED AT	1I121A	465.	12.92	137.	35.	33.	2.33
HYDROGRAPH AT	D113A	58.	13.08	9.	2.	2.	2.33
ROUTED TO	R113A	40.	14.25	9.	2.	2.	2.33
2 COMBINED AT	CP121A	465.	12.92	146.	37.	36.	2.83
ROUTED TO	R121A	434.	13.08	146.	37.	36.	2.83
HYDROGRAPH AT	121	325.	12.92	60.	15.	14.	.50
2 COMBINED AT	CP121	708.	13.00	205.	52.	50.	3.33
ROUTED TO	R121	642.	13.50	202.	52.	50.	3.33
2 COMBINED AT	CP131	1909.	13.50	822.	215.	207.	8.52
DIVERSION TO	DI145	1550.	13.50	665.	172.	166.	8.52
HYDROGRAPH AT	D131	359.	13.50	157.	42.	41.	8.52
ROUTED TO	R131	352.	13.83	157.	42.	41.	8.52
HYDROGRAPH AT	132	271.	13.00	56.	14.	13.	.41
2 COMBINED AT	CP132	460.	13.58	208.	56.	54.	8.93
ROUTED TO	R132	451.	13.92	206.	56.	54.	8.93
HYDROGRAPH AT	133	328.	13.08	71.	18.	17.	.49
2 COMBINED AT	1I133	579.	13.42	270.	74.	71.	9.42
2 COMBINED AT	CP133	725.	14.33	354.	101.	97.	14.48
DIVERSION TO	DI146	290.	14.33	141.	40.	39.	14.48
HYDROGRAPH AT	D133	435.	14.33	213.	61.	59.	14.48
DIVERSION TO	1D147	145.	14.33	71.	20.	19.	14.48
HYDROGRAPH AT	D133	291.	14.33	142.	41.	39.	14.48

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ROUTED TO	R133	281.	14.58	142.	40.	39.	14.48
HYDROGRAPH AT	D122	2643.	13.58	949.	243.	234.	7.89
ROUTED TO	R122	2572.	14.00	941.	243.	234.	7.89
HYDROGRAPH AT	134	334.	13.08	73.	18.	18.	.50
2 COMBINED AT	1I134	2655.	14.00	980.	262.	252.	8.39
HYDROGRAPH AT	123	338.	13.00	74.	18.	18.	.44
DIVERSION TO	DI124	338.	13.00	74.	18.	18.	.44
HYDROGRAPH AT	D123	0.	.00	0.	0.	0.	.44
ROUTED TO	R123	0.	.00	0.	0.	0.	.44
2 COMBINED AT	2I134	2655.	14.00	980.	262.	252.	8.83
2 COMBINED AT	CP134	2847.	14.00	1106.	298.	287.	15.42
DIVERSION TO	2D147	2060.	14.00	741.	193.	186.	15.42
HYDROGRAPH AT	D134	787.	14.00	365.	105.	101.	15.42
ROUTED TO	R134	771.	14.17	365.	105.	101.	15.42
HYDROGRAPH AT	D123	338.	13.00	74.	18.	18.	.44
ROUTED TO	R123	311.	13.33	74.	18.	18.	.44
HYDROGRAPH AT	124	355.	13.33	97.	24.	23.	.57
2 COMBINED AT	CP124	665.	13.33	171.	43.	41.	1.01
DIVERSION TO	DI136	308.	13.33	87.	22.	21.	1.01
HYDROGRAPH AT	D124	356.	13.33	83.	21.	20.	1.01
DIVERSION TO	DI125	200.	13.33	56.	14.	14.	1.01
HYDROGRAPH AT	D124	157.	13.33	27.	7.	6.	1.01
ROUTED TO	R124	129.	14.00	27.	7.	6.	1.01
2 COMBINED AT	1I135	885.	14.17	391.	112.	107.	15.63
HYDROGRAPH AT	135	315.	13.17	72.	18.	17.	.49
2 COMBINED AT	CP135	970.	14.08	449.	129.	124.	16.48
DIVERSION TO	DI148	172.	14.08	52.	13.	13.	16.48
HYDROGRAPH AT	D135	798.	14.08	396.	116.	112.	16.48
ROUTED TO	R135	781.	14.33	395.	115.	111.	16.48
HYDROGRAPH AT	D124	308.	13.33	87.	22.	21.	1.01
ROUTED TO	R124	297.	14.92	81.	22.	21.	1.01
HYDROGRAPH AT	136	342.	13.08	75.	19.	18.	.50
2 COMBINED AT	1I136	342.	13.08	145.	40.	39.	1.47

2 COMBINED AT	CP136	932.	14.92	528.	155.	149.	16.94
ROUTED TO	R136	869.	15.25	525.	154.	149.	16.94
HYDROGRAPH AT	137	337.	13.17	79.	20.	19.	.50
2 COMBINED AT	11137	878.	15.25	585.	174.	167.	17.12

*** NORMAL END OF HEC-1 ***

B:

Greenway Road Ditch

GREENWAY ROAD DITCH

TRAPEZOIDAL CHANNEL ANALYSIS
NORMAL DEPTH COMPUTATION

July 16, 1998

PROGRAM INPUT DATA

DESCRIPTION	VALUE
Flow Rate (cfs)	210.0
Channel Bottom Slope (ft/ft)	0.004
Manning's Roughness Coefficient (n-value)	0.04
Channel Left Side Slope (horizontal/vertical)	5.0
Channel Right Side Slope (horizontal/vertical)	17.0
Channel Bottom Width (ft)	0.0

COMPUTATION RESULTS

DESCRIPTION	VALUE
Normal Depth (ft)	2.61
Flow Velocity (fps)	2.8
Froude Number	0.431
Velocity Head (ft)	0.12
Energy Head (ft)	2.73
Cross-Sectional Area of Flow (sq ft)	75.12
Top Width of Flow (ft)	57.49

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C:

Retention Basin Data and Calcs

Table 3.2
C Coefficients for Use with the Rational Method

Land Use	Return Period			
	2-10 Year	25 Year	50 Year	100 Year
Streets and Roads				
Paved Roads	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Gravel Roadways & Shoulders	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Industrial Areas				
Heavy	0.70 – 0.80	0.77 – 0.88	0.84 – 0.95	0.88 – 0.95
Light	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Business Areas				
Downtown	0.75 – 0.85	0.83 – 0.94	0.90 – 0.95	0.94 – 0.95
Neighborhood	0.55 – 0.65	0.61 – 0.72	0.66 – 0.78	0.69 – 0.81
Residential Areas				
Lawns – Flat	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
– Steep	0.25 – 0.40	0.28 – 0.44	0.30 – 0.48	0.31 – 0.50
Suburban	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Single Family	0.45 – 0.55	0.50 – 0.61	0.54 – 0.66	0.56 – 0.69
Multi-Unit	0.50 – 0.60	0.55 – 0.66	0.60 – 0.72	0.63 – 0.75
Apartments	0.60 – 0.70	0.66 – 0.77	0.72 – 0.84	0.75 – 0.88
Parks/Cemetaries	0.10 – 0.25	0.11 – 0.28	0.12 – 0.30	0.13 – 0.31
Playgrounds	0.40 – 0.50	0.44 – 0.55	0.48 – 0.60	0.50 – 0.63
Agricultural Areas	0.10 – 0.20	0.11 – 0.22	0.12 – 0.24	0.13 – 0.25
Bare Ground	0.20 – 0.30	0.22 – 0.33	0.24 – 0.36	0.25 – 0.38
Undeveloped Desert	0.30 – 0.40	0.33 – 0.44	0.36 – 0.48	0.38 – 0.50
Mountain Terrain (Slopes > 10%)	0.60 – 0.80	0.66 – 0.88	0.72 – 0.95	0.75 – 0.95

Note: Values of C for 25, 50 and 100 Year were derived using frequency adjustment factors of 1.10, 1.20, and 1.25, respectively, with an upper limit of 0.95 for C for the 2-10 Year values.

3rd PAD AMENDMENT

for

ROYAL RANCH

Prepared for:

FULTON HOMES CORPORATION
9140 S. Kyrene Road, Suite 202
Tempe, AZ 85284

Prepared by:
CMX, L.L.C.
7740 N. 16th Street, Suite 100
Phoenix, AZ 85020
Phone: (602) 567-1900
Fax: (602) 567-1901

RECEIVED
SEP 17 2004
CITY OF SURPRISE

CITY OF SURPRISE
PLANNING AND ZONING DEPARTMENT
APPROVED
Case No.: PADA04.264
P&Z Comm. Approval: _____
City Council Approval: _____
B.O.A. Approval: Admin Approval 9/27/2004
Stipulations: _____

September 2004
Project No. 6537.19

3rd PAD AMENDMENT

for

ROYAL RANCH

Prepared for:

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9140 S. Kyrene Road, Suite 202
Tempe, AZ 85284

Prepared by:
CMX, L.L.C.
7740 N. 16th Street, Suite 100
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Phone: (602) 567-1900
Fax: (602) 567-1901

Approved by:
CITY OF SURPRISE
12425 W. Bell Rd., Suite D100
Surprise, AZ 85374

_____ 9/27/04
Community Development Director Date

_____ _____
City Manager Date

September 2004
Project No. 6537.19

TABLE OF CONTENTS

ROYAL RANCH PAD AMENDMENT

Page No.

Overview 1

Governing Documents 1

Proposed PAD Amendment 1
- Objective 1 2
- Objective 2 2

Conclusion 2

Amended Land Use Summary Table 2

Amended Development Standards 3

APPENDIX

Typical Lot Comparison ..... Appendix A

ROYAL RANCH - 3rd PAD AMENDMENT

Overview:

Royal Ranch is a master planned community located at the southeast corner of Greenway Road and Bullard Avenue. Immediately north of the master planned community is the proposed Surprise Center. A Planned Area Development (PAD) was approved for Royal Ranch in 1999, and a PAD Amendment was approved in 2002. The original PAD provided for a maximum of 1,716 residential units, all within the low density residential (LDR) land use designation and all having lot sizes with a width ranging from 48 to 58 feet and a depth of 110 feet. The location of the various lot sizes (48 feet to 58 feet) were not predetermined, but were left to the discretion of the eventual developer. The PAD identified major open space areas, but did not provide detailed information as to the amenities to be provided within those open spaces.

The PAD Amendment that was approved in 2002 consisted of four objectives. One objective was to provide a more diversified mix of housing products. The second objective was to better disperse open space throughout the master planned community, and to provide amenities in additional pocket parks as well as the two major parks. Another objective introduced a "twin home" product by creating a medium density residential (MDR) land use designation with its own development standards. The final objective was to accomplish all of the above without exceeding the original PAD's allowable 1,716 residential units.

A 2nd PAD Amendment was approved in 2003, which removed two community pools due to the construction of the City of Surprise Aquatic Center immediately north of Royal Ranch.

Governing Documents:

This 3rd PAD amendment is intended to take precedence over the 2nd PAD Amendment, the 2002 PAD Amendment, and the original 1999 PAD. Where this 3rd PAD amendment has provisions which conflict with the 2nd PAD Amendment, the 2002 PAD Amendment, the original 1999 PAD and/or Zoning Ordinance, this 3rd PAD amendment shall govern. The 2nd PAD Amendment, the 2002 PAD Amendment, or the original 1999 PAD shall govern where there are no conflicting provisions within this 3rd PAD amendment. The Zoning Ordinance for the City of Surprise shall govern where there are no conflicting provisions within the 2nd PAD Amendment, the 2002 PAD Amendment, the original 1999 PAD or this 3rd PAD amendment.

Proposed PAD Amendment:

This PAD amendment is being submitted on behalf of Fulton Homes with the following objectives:

1. Introduce a residential product (The Heritage Collection) that utilizes a "Z-lot line" replacing the "twin home" product on Parcel 7.

2. Conformance with the recently approved Final Plat for Parcel 8.

Objective 1: Introduce a residential product (The Heritage Collection) that utilizes a "Z-lot line" replacing the "twin home" product on Parcel 7. The "Z-lot line" product provides the same density as the twin home product without the two homes having to share a common wall. The "Z-lot line" configuration utilizes the same total lot area, width and depth as the twin home product for two combined lots. The rear lot width of 86 feet is split by providing one unit (Lot A) a rear lot width of 46 feet and the other unit (Lot B) a rear lot width of 40 feet. The property line that splits the 86-foot lot is then offset 7 feet at a distance of 36 feet from the rear lot line to provide a front lot width of 39 feet for Lot A and 47 feet for Lot B. A 3-foot Use and Benefits Easement is provided for Lot A on Lot B, and a 4-foot Use and Benefits Easement is provided for Lot B on Lot A. A detailed lot comparison between the twin home product and the "Z-lot line" product is attached in Appendix A.

Objective 2: Conformance with the recently approved Final Plat for Parcel 8. Parcel 8 was previously approved as medium density residential (MDR) as part of the 2002 PAD Amendment. The recently approved Final Plat for Parcel 8 consists of a minimum lot size of 73-foot wide x 120-foot deep rather than the 86-foot wide x 80-foot deep twin home product lots. Therefore, Parcel 8 is now considered low density residential (LDR) in lieu of the medium density residential (MDR). The attached Land Use Summary Table and the Medium Density Residential Parcels table have been revised to reflect this PAD amendment.

Conclusion:

The attached Amended Land Use Summary Table, and the attached Amended Development Standards shall now govern the development of Royal Ranch and take precedence over the approved 2002 PAD Amendment.

AMENDED LAND USE SUMMARY

LAND USE SUMMARY TABLE				
Parcel	**Land Use Designation**	**Min. Lot Size (S.F.)**	**Standard Lot Dimension (Ft.)**	**No. of Lots**
1	LDR	6380	58x110	73
2	LDR	5830	53x110	162
3	LDR	5280	48x110	189
4	LDR	7245	63x115	92
5	LDR	7020	60x117	144
6	LDR	5520	48x115	136
7 (1)	MDR	3372	(1)	69
7 (1)	MDR	3508	(1)	69
8	LDR	8760	73x120	68
9	LDR	9375	75x125	127
Total				1060

Notes:

(1) Parcel 7 consists of a "z-lot line" configuration. The lot dimensions are as follows:

Lot A: front width = 39 feet
rear width = 46 feet
Lot B: front width = 47 feet
Rear width = 40 feet
Both lots have a depth of 80 feet.

AMENDED DEVELOPMENT STANDARDS

LOW DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.) (1)	Area (s.f.)	Max Lot Cov (%)	Front (Ft.) (2)(3)	Rear (Ft.) (3)	Side (min.) (Ft.)(3)(4)	Side (total) (Ft.)(3) (4)(5)	Bldg. Ht. (Max.) (Ft.)
1	58	110	6380	48	18	20	5	13	30
2	53	110	5830	48	18	20	5	13	30
3	48	110	5280	50	18	20	5	13	30
4	63	115	7245	48	18	20	5	13	30
5	60	117	7020	48	18	20	5	15	30
6	48	115	5520	50	18	20	5	13	30
8	73	120	8760	50	18	20	5	15	30
9	75	125	9375	45	18	20	5	15	30

Notes:

(1) Depth may be less at knuckles, cul de sacs and other special conditions as long as setbacks and minimum lot areas are met.

(2) Setback as measured to face of garage door. Setback shall be staggered between 18' and 21' with no more than 2 homes in a row having same setback to garage door (except at knuckles and cul de sacs). Front setback shall be 12' minimum to house livable area where garage is set back from livable area and for side entry garages, planters, porches, pop-outs, etc.

(3) Fireplaces, bay windows and ground mounted AC units may extend into setbacks. A minimum of 3' of side yard shall be unobstructed.

(4) 13' side yard setback required on street side of corner lots.

(5) 10' minimum separation required between homes.

MEDIUM DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.)	Area (s.f.)	Max. Lot Cov (%)	Front (Ft.)	Rear (Ft.)	Side (min.) (Ft.)	Side (total) (Ft.)	Bldg. Ht. (Max.) (Ft.)
7 (8)	39	80	3372	60	10 (6)	10	4	9 (7)	30
7 (8)	40	80	3508	60	10 (6)	10	4	9 (7)	30

Notes:

(6) 18' to face of front entry garage door.

(7) Fireplaces and ground mounted AC units may extend into setback. A minimum of 3' of side yard shall be unobstructed. The minimum separation between adjacent homes will be 8-feet.

(8) Parcel 7 consists of a "z-lot line" configuration. The lot dimensions are as follows:

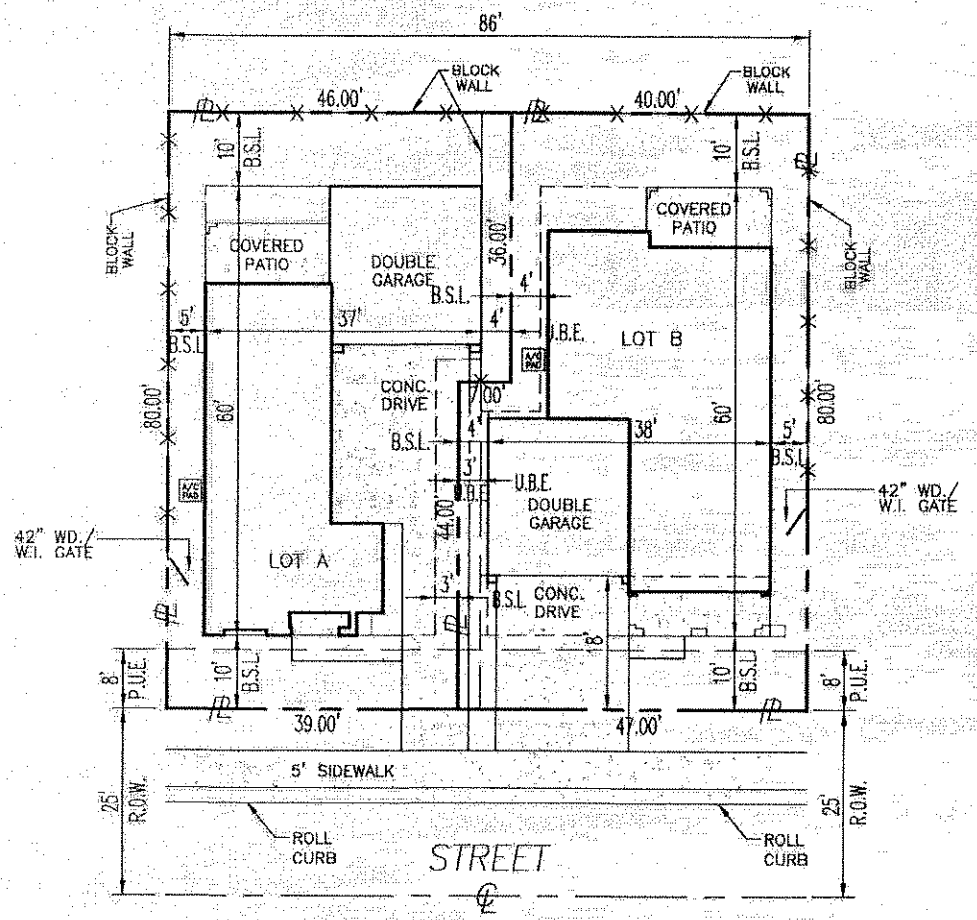
Lot A: front width = 39 feet
rear width = 46 feet
Lot B: front width = 47 feet
rear width = 40 feet

Both lots have a depth of 80 feet.

APPENDIX A

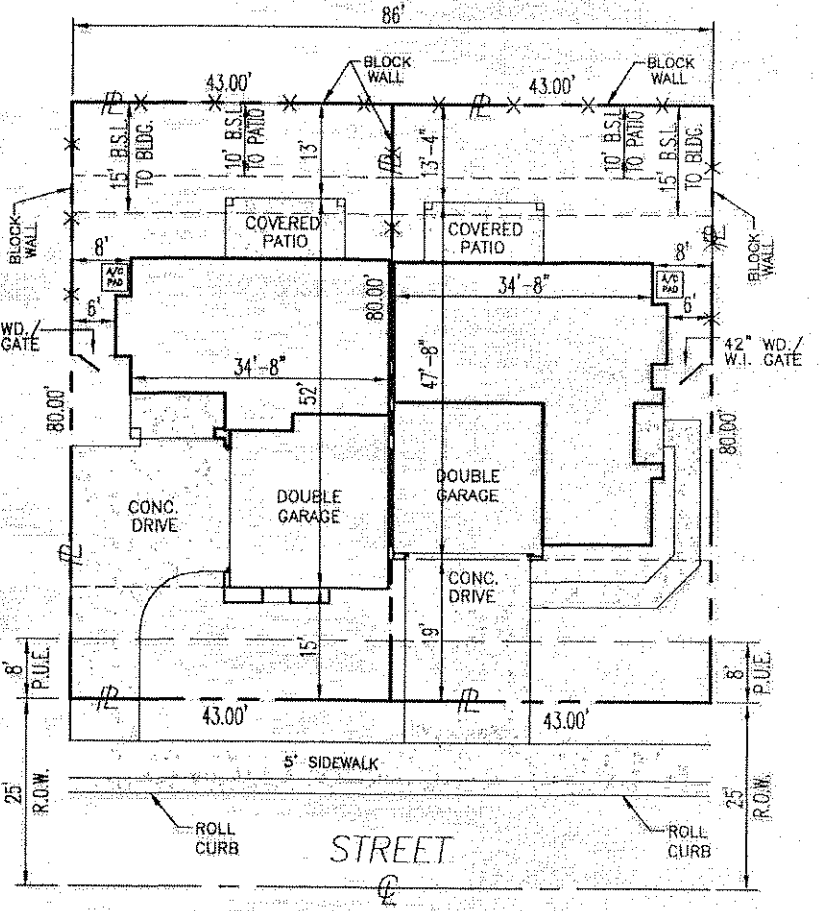
TYPICAL LOT COMPARISON

ROYAL RANCH PARCEL 7



HERITAGE COLLECTION

LOT AREA: TWO LOT TOTAL = 6,880
LOT WIDTH: TWO LOT TOTAL = 86'
LOT DEPTH: 80'



TWIN HOME

LOT AREA: TWO LOT TOTAL = 6,880
LOT WIDTH: TWO LOT TOTAL = 86'
LOT DEPTH: 80'

TYPICAL LOT COMPARISON

CITY OF SURPRISE
PLANNING AND ZONING DEPARTMENT
A P P R O V E D

Case No.: PADA 02013

P&Z Comm. Approval: 3/5/2002

City Council Approval: 4/11/2002

B.O.A. Approval: _____

Stipulations: _____

CITY OF SURPRISE
COUNCIL AGENDA ACTION FORM

(5) 10

Meeting Type: Regular Meeting **Time Scheduled:** 04/11/02 7:00PM
If Special submit date time

Submitting Department: Planning and Zoning **Contact Person:** Phil Testa
Consent ☒ **Regular** ☐ **Requesting Action** ☒ **Report Only** ☐

Type of Document Needing Approval (Check all that apply):

☐ Public Hearing	☐ Resolution	☐ First Reading/Ordinance
☐ Agreement	☐ Emergency Clause	☒ Final Reading/Ordinance
☐ Special Consideration	☐ Intergovernmental Agreement	
☐ Grant ☐ Submission	☐ Acceptance	
☐ Liquor/Bingo License Application		

Council Priority (Check Appropriate Areas):

☐ Education	☐ Public Fitness	☐ Neighborhood Revitalization
☐ Job Creation	☐ Quality Service Delivery	☐ Employment Infrastructure
☐ Public Safety	☐ Housing Rehabilitation	☐ Work Force Preparation
☐ Transportation	☐ Human Service Needs	☐ Parks, Recreation & Library
☐ City Elections	☐ Community Activities	☐ Subdivision Infrastructure Acceptance

Regular Agenda Wording: Consideration and Action to approve moving Ordinance No. 02-09 to a final reading; An Ordinance approving the Planned Area Development Amendment PADA02-013, amending the Royal Ranch PAD to change the land use of Parcels 7 and 8 from Low Density Residential to Medium Density Residential, increase the open space area from 29.41 acres to 36 acres, and incorporate a twin home product for Parcels 7 and 8. Subject site is located south of Greenway Road, east of Bullard Avenue.

Staff Recommendation:Approve Fiscal Impact:No If yes: Budget code:
Available:

Background Info: The Planning and Zoning Commission recommended approval of this application on March 5, 2002, subject to recommended stipulations.

List Attachments as Follows: Ordinance/Staff Report/Supporting Documentation.

Signatures of Submitting Officers (Sign Legibly):

Department Head | Supervisor | Budget Authorization

Legal Review | City Manager/Designee E.M. DeShazo

Distribution After Council Action:
- Shelley H.
- agenda file

Council Action:

Motion/Second	
Shafer	
Vukanovich	
Villanueva	S
Cox	

Results:

For	6
Against	0
Passed	✓
Failed	
Deny	

CITY OF SURPRISE
COUNCIL AGENDA ACTION FORM

	Montoya		Continue		
	Smith	M	Tabled		
	Allen		Absent	1	
			Other		

Cox-excused

City Clerk: Originals—Rosa
Jan BPC & DNS

ORDINANCE NO. 02-09

AN ORDINANCE APPROVING THE PLANNED AREA DEVELOPMENT AMENDMENT PADA02-013, AMENDING THE ROYAL RANCH PAD TO CHANGE THE LAND USE OF PARCELS 7 AND 8 FROM LOW DENSITY RESIDENTIAL TO MEDIUM DENSITY RESIDENTIAL, INCREASE THE OPEN SPACE AREA FROM 29.41 ACRES TO 36 ACRES, AND INCORPORATE A TWIN HOME PRODUCT FOR PARCELS 7 AND 8. SUBJECT SITE IS LOCATED SOUTH OF GREENWAY ROAD, EAST OF BULLARD AVENUE.

WHEREAS, this Ordinance has been properly noticed for public hearing and the necessary hearings and opportunity for public input have been completed; and

WHEREAS, changes have occurred in the vicinity of Section 9 of Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, which require that the zoning of a parcel of land in that area be changed; and

WHEREAS, rezoning of the subject property will not cause traffic congestion or depreciate surrounding property values and, at the same time is in harmony with the purposes and intent of the zoning ordinance, the plan for the area, and the Surprise General Plan 2020; and

WHEREAS, the Planning and Zoning Commission has recommended approval of this rezone application.

NOW THEREFORE BE IT ORDAINED, by the City Council of the City of Surprise, Arizona, that:

Section 1. This Ordinance is not of a general and permanent nature and shall not be codified.

Section 2. A portion of the property described in Exhibit A is rezoned from Planned Area Development - Low Density Residential to Planned Area Development – Medium Density Residential.

Section 3. The amount of land designated as open space in this property shall be increased from 29.41 acres to 36 acres.

Section 4. Parcels 7 and 8 shall be developed utilizing a twin home product substantially similar to that product presented in this PAD amendment, PADA 02-013.

Section 5. The property described on Exhibit A remains subject to all stipulations relating to the original Royal Ranch PAD, any subsequent amendments of the PAD, all provisions of the Development Agreement, and those stipulations contained in Exhibit B.

PASSED AND ADOPTED THIS 11th day of April, 2002

Joan H. Shafer
Mayor

ATTEST:

Sherry Ann Aguilar
City Clerk

APPROVED AS TO FORM:

City Attorney

YEAS: Mayor Shafer, Vice-Mayor Allen, Councilmembers; Montoya, Smith, Villanueva & Vukanovich. Cox - excused

NEAS: _____

ROYAL RANCH PHASE 1 & 2
LEGAL DESCRIPTION

THE NORTHWEST QUARTER AND THE NORTH HALF OF THE SOUTHWEST QUARTER, AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER, AND THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER. ALL IN SECTION 9, TOWNSHIP 3 NORTH, RANGE 1 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA,

EXCEPT THAT PORTION OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOWN SHIP 3 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 9,
THENCE NORTH ALONG THE EAST LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 1320.75 FEET TO THE NORTHEAST CORNER THEREOF, THENCE WESTERLY ALONG THE NORTH LINE OF THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 34.00 FEET, THENCE SOUTHERLY ALONG THE CENTER LINE OF A 12 INCH IRRIGATION PIPE AND ALONG A WIRE FENCE AND A SOUTHERLY PROLONGATION THERE OF 1320.80 FEET TO A POINT ON THE SOUTH LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, THENCE EASTERLY ALONG THE SOUTH LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 21.00 FEET TO THE POINT OF BEGINNING.

CONTAINING 298.926 ACRES GROSS

X:\6500\6537-10\Exhibits\Legals\ROYAL RANCH PH 1 & 2 LEGAL DESCRIPTION.dwg, 01/09/02 05:06:06 PM, BCLEMENT

EXHIBIT A TO ORNDINANCE NO. 02-09

RECOMMENDATIONS: (PADA02-013)

Subject request is consistent with the Surprise General Plan 2020. Furthermore, approval of this request would allow for efficient and orderly development. Staff recommends that the Planning and Zoning Commission recommend the City Council approve the P.A.D. amendment for Royal Ranch (PADA02-013) subject to the following stipulations:

STANDARD STIPULATIONS:

a) Major changes to this Planned Area Development with regard to use and intensity, must be processed as a revised application with approval by the City Council upon recommendation of the Planning and Zoning Commission. Minor changes to this Planned Area Development may be administratively approved by the City Manager and the Community Development Director;

b) The Applicant shall submit a written response to the stipulations and incorporate them into the final PAD document. The response and 5 copies of the final PAD shall be under one transmittal package;

SPECIAL STIPULATIONS:

c) The applicant shall submit a preliminary and full set of landscape construction drawings for review and approval by the Community Development Director prior to final plat approval for any part of this development;

d) Lot layouts indicated within the Planned Area Development documents shall not be considered approved with the approval of this document, and shall be considered as conceptual only;

e) All infrastructure improvements shall occur pursuant to section 16.20 of the Surprise Municipal Code with final plans subject to the approval of the City of Surprise Water Services Department, Engineering Department, and the Community Development Director;

f) The applicant shall provide new residential home product information (i.e., colored elevations and materials sample information) and related materials prior to release of the standard construction drawings, subject to review and approval by the Community Development Director; and

g) By its submittal of the PAD plan, the applicant - as landowner - agrees and approves in writing to the open space designated in the approved PAD plan.

REPORT TO THE PLANNING AND ZONING COMMISSION AND THE CITY COUNCIL

PREPARED BY THE COMMUNITY DEVELOPMENT DEPARTMENT

CASE NO.: PADA02-013 (Royal Ranch, Planned Area Development Amendment)
STIPULATIONS: *a through g*
PREPARED BY: Grant Penland, Planner I @ 623.875.4307

Planning & Zoning Commission Hearing Date: March 5, 2002
City Council Hearing Date: March 28, 2002

APPLICANT:

Ron Hilgart
CMX Group, Inc.
1515 E. Missouri, Suite 115
Phoenix, Arizona 85014
Phone: (602) 279-8436
Fax: (602) 265-1191

PROPERTY OWNER:

Fulton Homes
9140 S. Kyrene, Suite 202
Tempe, Arizona 85259
Phone: (480) 753-7506
Fax: (480) 753-5554

REQUEST:

Approval of a Planned Area Development Amendment for Royal Ranch.

SITE LOCATION:

Subject site is located south of Greenway Road, east of Bullard Avenue, within the west half of Section 9, Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona.

SITE SIZE:

298.92 gross acres

CONFORMANCE TO ADOPTED LAND USE PLANS:

GENERAL PLAN:

If approved, this request would comply with the Surprise General Plan 2020 and the corresponding General Plan Land Use Map.

DEVELOPMENT PLAN:

If approved, this application will amend the Royal Ranch P.A.D., which is the development plan for the subject property.

COMMENTING JURISDICTIONS:

Town of Buckeye: No comments were received.
City of El Mirage: No comments were received.

City of Peoria:	No comments were received.
Maricopa County:	No comments were received.
Dysart Unified School District:	No comments were received.
Maricopa Water District:	No comments were received.
Luke Air Force Base:	See attached comments.

DEPARTMENTAL REVIEW:

The **Engineering Department** has reviewed this application and has no additional comments.

The **Fire Department** has reviewed this application and has no additional comments.

The **Public Works Department** has reviewed this application and has no additional comments.

The **Water Services Department** has reviewed this application and has no additional comments.

STAFF RECOMMENDATION:

Staff recommends that the Planning and Zoning Commission recommend approval of the Planned Area Development Amendment for Royal Ranch, (PADA02-013), subject to the stipulations listed under "Recommendations."

EXISTING ZONING:

1.

ON-SITE:	Planned Area Development – R1-5 (Royal Ranch)
NORTH:	Planned Area Development – (Surprise Center P.A.D.)
SOUTH:	Planned Area Development – (Waddell Property)
EAST:	R-43 (Maricopa County)
WEST:	Planned Area Development – (Ashton Ranch P.A.D.)

EXISTING AND SURROUNDING LAND USE:

2.

ON-SITE:	Vacant Land
NORTH:	Vacant Land
SOUTH:	Vacant Land
EAST:	Vacant Land/Single Family Homes
WEST:	Agriculture

ADJACENT ROAD STATUS

Street Name	Right of Way	Pavement Width	Landscaping	# of Lanes in each direction	Sidewalks
Greenway Road (proposed)	110 feet	68 feet	Sides	2 lanes	6 foot, sides
Waddell Road (proposed)	130 feet	72 feet	Sides	3 Lanes	8 foot, sides
Bullard Avenue (proposed)	110 feet	66 feet	Sides	2 lanes	6 foot, sides

EXISTING UTILITIES AND SERVICES STATUS:

6.	**WATER**	City of Surprise
7.	**SEWER**	City of Surprise
8.	**FIRE PROTECTION**	The Surprise Fire Department currently has a fire station located at 15616 North Hollyhock Street. The second fire station is in operation at 18600 Reems Road near the intersection of Reems and Mountain View Boulevard.
9.	**POLICE PROTECTION**	The Surprise Police Department currently has a station located at 12425 W. Bell Road and a substation located at 18600 Reems Road.

100 YEAR ASSURED WATER SUPPLY CERTIFICATION:

10. The City of Surprise has been designated as having a Certificate of 100 Year Assured Water Supply.

FINANCIAL ASSURANCE FOR INFRASTRUCTURE COMPLETION:

11. Financial assurance will be provided pursuant to the approved Development Agreement.

SCHOOL DISTRICT POSITION:

12. An agreement has been reached between the Developer of the Royal Ranch P.A.D. and Dysart School District to provide for the assistance in the development of school facilities.

STREET LIGHT IMPROVEMENT DISTRICT:

13. A Street Light Improvement District (SLID) will be formed and maintained pursuant to the Development Agreement.

PLAN ANALYSIS:

PROPOSAL

14. The applicant has submitted with this application a P.A.D. amendment to change the land use of parcels 7 and 8 from Low Density Residential to Medium Density Residential, along with increasing the diversity of lot sizes within the master planned community.

15. The applicant is proposing to better disperse, as well as increase, the open space within the development. Additionally, the amendment will introduce a twin-home housing product with accompanying Medium Density Residential development standards.

HISTORY

16. The P.A.D. for Royal Ranch was approved by the City of Surprise City Council in February of 2000. Parcels 1 through 4 of the Royal Ranch development were recently amended to accommodate the Fulton Homes' product line.

PROPOSED LAND USES/PERCENTAGES

Subject	Land Use Designation	# Lots	Lot Size	Min. Lot Area	Percentage
Parcel 5	LDR	144	60' x 117'	7,020	21.15%
Parcel 6	LDR	136	48' x 115'	5,520	19.97%
Parcel 7	MDR	138	43' x 80'	3,440	20.26%
Parcel 8	MDR	136	43' x 80'	3,440	9.97%
Parcel 9	LDR	127	75' x 125'	9,375	18.65%
Total	-	**681**	-	-	**100%**

17. The proposed P.A.D. amendment will provide al larger range of lot sizes within the community. The original P.A.D. provided lots that ranged from 48 to 58 feet in width, with a depth of 110 feet. The amendment is proposing the utilization of lots that range in width from 48 to 75 feet. Additionally the amendment proposes lots that range from 110 to 125 feet in depth.

18. As part of increasing the diversity of housing product within the development, the amendment is proposing the incorporation of a twin-home concept with a shared building wall. Conceptual site layout and elevations of the twin-home product are provided in the P.A.D. document.

19. The amended P.A.D. is proposing the development of 1,197 residential units, yielding a gross density of 4.0 dwelling units per acre. The original P.A.D. was approved for 1,716 residential units with a gross density of 5.7 dwelling units per acre.

Subject	**Approved 1999 PAD**	**PAD Amendment**	**Change**
Residential Units	1716	1197	-519 units
Open Space	29.41 acres	36 acres	+6.59 acres
Open Space Percent of Site	9.84%	12.6%	+2.76%

EXISTING SITE CONDITIONS:

20. This property slopes gradually from the northwest to the southeast. The site is currently a citrus tree orchard. A portion of the citrus tree removal has already commenced. The engineering department has reviewed the drainage report for this application and will review further drainage studies upon final plan review.

COMPLIANCE WITH THE GENERAL PLAN

21. The Surprise General Plan 2020 calls for a "Low Density Residential" land use designation across the entire property. LDR is designated as 3-5 dwelling units/acre within the General Plan. The proposed gross density of the P.A.D. amendment is 4.0 dwelling units per acre.

22. The draft land use plan indicates that the property is to be a low and medium density residential development. The Low Density Residential land use permits a mix of single-family, duplexes, townhouses, and low-rise apartments, provided that such areas do not exceed five dwelling units per acre. The proposed Royal Ranch P.A.D. amendment is in full compliance with land use plan within the Surprise General Plan 2020.

AMENITIES PACKAGE

23. The open space exhibit provides examples of the amenities to be used throughout the Royal Ranch P.A.D. The proposed amendment provides for additional open space between parcels 8 and 9 as well as additional pocket parks within parcels 7 and 8. The trail system is shown to be integrated throughout the proposed development connecting open space areas, and encouraging neighborhood interaction. The P.A.D. amendment provides 36 acres of open space, which is twenty-two percent more than the original P.A.D.

24. Additionally, the majority of arterial frontage along Greenway Road will provide an attractive street scene exhibiting the estate-sized appearance of the twin-home product. A significant landscaped entryway will also act to enhance the views from the arterial roadway.

NOISE:

25. This property in not located within the noise contours of the 1997-revised AICUZ as adopted by the City of Surprise in March of 1998, nor is the subject property within any noise contours as defined by the 1988 MAG JLUS. However, this property is subject to over flights from Luke Air Force Base, therefore appropriate noise attenuation will be required in the homes as they are constructed.

CONCLUSION:

26. The subject request is consistent with the City of Surprise General Plan 2020 and will benefit the city by providing a greater diversity in housing. Also, this proposed P.A.D. amendment will not adversely affect the heal, safety, or welfare of the citizens of the City of Surprise.

Attachment
1. P.A.D. amendment book and attachments
2. Jurisdictional Comments

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

Colonel Dennis A. Rea
Vice Commander, 56th Fighter Wing
14185 W. Falcon Street
Luke AFB AZ 83309-1629

Ms. Shelley Hohman
City of Surprise Planning Department
12425 West Bell Road
Surprise, AZ 85374

Re: Case #s PADA 02-013 and PP 02-014 – Royal Ranch

Dear Ms. Hohman

Thank you for the opportunity to comment on this preliminary plat and planned area development amendment for Royal Ranch at the SEC of Bullard Avenue and Greenway Road. Although this site is outside the 1988 JLUS noise contours, it is within territory in the vicinity of a military airport, as defined by A.R.S. § 28-8461. More specifically, city staff has long known the adjacent parcel (Surprise Center) is an essential visual reference for F-16 pilots on approach to and departure from the Luke AFB runways. Although individual development projects may not significantly impact our operations by themselves, this one, in light of its proximity to Surprise Center causes particular concern in terms of its contribution to the cumulative effect of increased residential development and the threat posed to safe military operations and Luke's mission accomplishment.

It is important to note that this community will be affected by jet noise from our operations to include direct over-flight of the proposed development area by up to 170 over-flights a day and noise exceeding the 65-decibel level.

We appreciate the opportunity to comment on these issues. If you have any questions, please contact Mr. Cris Brownlow at (623) 856-4736.

Sincerely

DENNIS A. REA, Col, USAF

PAD AMENDMENT

for

ROYAL RANCH

Prepared for:

FULTON HOMES CORPORATION
9140 S. Kyrene Road, Suite 202
Tempe, Arizona 85284

Prepared by:

CMX GROUP INC.
1515 East Missouri, Suite 115
Phoenix, Arizona 85014
(602) 279-8436 Voice
(602) 279-8498 Fax

Revised February, 2002
January, 2002
Project No. 6537

TABLE OF CONTENTS

ROYAL RANCH PAD AMENDMENT

Page No.

Overview 1
Governing Documents 1
Proposed PAD Amendment 1
- Objective 1 1
- Objective 2 2
- Objective 3 2
- Objective 4 2

Density and Open Space Comparison 3
Phasing 3
Conclusion 3
Amended Land Use Summary Table 4
Amended Development Standards 5

LIST OF EXHIBITS

Amended Land Use Plan ..... Exhibit A
Amended Open Space and Trails Plan ..... Exhibit B
Twin Home (Parcels 7 & 8) Site Plan ..... Exhibit C

APPENDIX

Twin Home Street Plan View and Elevations ..... Appendix A

ROYAL RANCH – PAD AMENDMENT

Overview:

Royal Ranch is a 299-acre masterplanned community located at the southeast corner of Greenway Road and Bullard Avenue. Immediately north of the masterplanned community is the proposed Surprise Center. A Planned Area Development (PAD) was approved for Royal Ranch in 1999. The PAD provided for a maximum of 1,716 residential units, all within the low density residential (LDR) land use designation and all having lot sizes with a width ranging from 48 to 58 feet with a depth of 110 feet. The location of the various lot sizes (48 feet to 58 feet) were not predetermined, but were left to the discretion of the eventual developer. The PAD identified major open space areas, but did not provide detailed information as to the amenities to be provided within those open spaces.

In November 2001, Fulton Homes Corporation, a homebuilder and developer of upscale masterplanned communities throughout the Valley, acquired the Royal Ranch property.

Governing Documents:

This PAD amendment is intended to take precedence over the 1999 PAD. Where this PAD amendment has provisions which conflict with the 1999 PAD and/or Zoning Ordinance, this PAD amendment shall govern. The 1999 PAD shall govern where there are no conflicting provisions within this PAD amendment. The Zoning Ordinance for the City of Surprise shall govern where there are no conflicting provisions within the 1999 PAD or this PAD amendment.

Proposed PAD Amendment:

This PAD amendment is being submitted on behalf of Fulton Homes with the following **objectives**:

1. Provide a more diversified mix of housing products than that provided by the original PAD.

2. Better disperse open space throughout the masterplanned community; also provide amenities in additional pocket parks as well as the two major parks.

3. Introduce a "twin-home" product by creating a medium density residential (MDR) land use designation with its own development standards.

4. Accomplish the above without exceeding the original PAD's allowable 1,716 residential units.

Objective 1: **Provide a more diversified mix of housing product than that provided by the original PAD.** As previously noted, the original PAD designated the entire community as low density residential, with a range of lot widths from 48 to 58 feet. All of the lot depths were proposed to be 110 feet. This PAD amendment will provide a larger range of lot sizes, widths and depths, and will also give better definition to the location of the various lot sizes. An

Amended Land Use Plan is attached as Exhibit A. The Amended Land Use Plan shows Parcels 1 through 9, with Parcels 1 through 6 and Parcel 9 being low density residential (LDR) and Parcels 7 and 8 being medium density residential (MDR). The MDR parcels are discussed in more detail in Objective 3 below. A Land Use Summary Table is also attached, which defines the minimum lot size and number of lots for each parcel. The range of lot sizes for the LDR parcels now vary from 48 feet to 75 feet in width, rather than the 48 feet to 58 feet widths per the original PAD. In addition, LDR lot depths now vary from 110 feet to 125 feet, instead of the original proposed 110 foot. The largest lot size required within the approved PAD was 6,388 sq. ft. Parcels 4, 5 and 9 now all contain larger lots than originally approved, with Parcel 9 having the largest lot size at 9,375 sq. ft. minimum. Parcels 7 and 8 will contain a twin-home product where two homes will share an 86-foot wide x 80-foot deep lot, as discussed in Objective 3 below.

Objective 2: Better disperse open space throughout the masterplanned community; also provide amenities in additional pocket parks as well as two major parks. Exhibit B is an amended Open Space and Trails Plan. This plan provides for additional open space between Parcels 8 and 9 and additional pocket parks within Parcels 7 and 8. The plan also better defines the trail system as well as the amenities that will be contained within each of the parks. The original PAD provided for 29.41 acres (9.84%) of open space. This amendment now contains 36 acres (12.6%) of open space, resulting in an increase of 22%.

Objective 3: Introduce a twin-home product by creating a medium density residential (MDR) land use designation with its own development standards. A new innovative "twin-home" product is being provided within a newly created MDR land use designation on Parcels 7 and 8. This medium density product will be placed adjacent to Greenway Road to take advantage of the anticipated more intense land uses north of Greenway Road within the Surprise Center. The twin-home product provides for slightly higher density, while providing an attractive street scene with the appearance of "estate sized" housing. In the twin-home product, two homes are combined at a common property line. Although each home has their own property line wall, the walls are connected to give the appearance of a large "estate" home. Minimum side yard setbacks on the opposite side of each home are 8 feet, providing a minimum of 16 feet between non-contiguous homes. To reinforce the look of the "estate" home, all driveway entrances are preplanned with 50% of the units having a swing-in garage, thus giving the appearance of only one garage per twin-home pack. A detailed site plan of the twin-home parcels showing the relationship of homes and driveways is included as Exhibit "C". Proposed elevations and floor plans for the twin home products are attached in Appendix A. It should be noted that the design of this product is still being finalized and the elevations and floor plans are attached for reference only. The final product will be submitted to the City of Surprise for design review.

Objective 4: Accomplish the above without exceeding the original PAD's allowable 1,716 residential units. Although the twin-home product provides a slightly greater yield than detached residential units, this is offset by the significantly larger lots provided within the balance of the community. In addition, open space has also been increased which further reduces the overall density. As a result, this amendment provides for a total of 1,197 residential units as compared to the originally approved 1,716 residential units, resulting in an overall reduction of 30%.

Density and Open Space Comparison:

As previously mentioned, this PAD Amendment reduces Royal Ranch's density while increasing open space. Following is a comparison of this PAD Amendment with the 1999 Approved PAD.

Item	Approved 1999 PAD	PAD Amendment	Difference
Residential Units	1716	1197	-519
Open Space	29.41 acres	36 acres	+6.59 acres
Open Space as % of Site	9.84%	12.6%	+2.76%

Based on the above, this PAD Amendment will result in a 30% reduction in density and a 22% increase in open space as compared to the existing approved PAD.

Phasing:

The original PAD indicated that the portion of the project south of Acoma Drive would be Phase I and that portion north of Acoma Drive would be Phase II. It is now anticipated that phasing will occur as follows:

Phase 1A– Parcel 1 and 2
Phase 1B – Parcel 4
Phase 1C – the south half of Parcel 3 and Parcel 9
Phase 2A – the north half of Parcel 3 and Parcel 8
Phase 2B – Parcels 5 and 6
Phase 2C – Parcel 7

The phasing for the project may be altered based on market demand at the discretion of the developer. Each phase shall meet the City's requirements for drainage, emergency access, fire protection and sewer service. In all cases, the City engineering staff shall approve any phasing changes and assure that infrastructure and drainage improvements have been satisfactorily addressed for each phase.

Conclusion:

The attached Amended Land Use Summary Table, Amended Development Standards, Amended Land Use Plan and Amended Open Space and Trails Plan shall now govern the development of Royal Ranch and take precedence over the original approved PAD. As a result, Royal Ranch will have 22% more open space, 30% less residential units, and significantly more diversity of housing product.

AMENDED LAND USE SUMMARY

LAND USE SUMMARY TABLE				
Parcel	**Land Use Designation**	**Min. Lot Size (S.F.)**	**Standard Lot Dimension (Ft.)**	**No. of Lots**
1	LDR	6380	58x110	73
2	LDR	5830	53x110	162
3	LDR	5280	48x110	189
4	LDR	7245	63x115	92
5	LDR	7020	60x117	144
6	LDR	5520	48x115	136
7	MDR	3440	43x80	138
8	MDR	3440	43x80	136
9	LDR	9375	75x125	127
Total				1197

AMENDED DEVELOPMENT STANDARDS

LOW DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.)	Area (s.f.)	Max. lot cov.%	Front (Ft.)(3)	Rear (Ft.)(3)	Side (min.) (Ft.)(3)(4)	Side (total) (Ft.)(3)(4)(5)	Bldg. Ht. (Max.) (Ft.)
1	58	110 (1)	6380	48	18 (2)	20	5	13	30
2	53	110 (1)	5830	48	18 (2)	20	5	13	30
3	48	110 (1)	5280	50	18 (2)	20	5	13	30
4	63	115 (1)	7245	48	18 (2)	20	5	13	30
5	60	117 (1)	7020	48	18 (2)	20	5	15	30
6	48	115 (1)	5520	50	18 (2)	20	5	13	30
9	75	125 (1)	9375	45	18 (2)	20	5	15	30

Notes:

(1) Depth may be less at knuckles, cul de sacs and other special conditions as long as setbacks and minimum lot areas are met.

(2) Setback as measured to face of garage door. Setback shall be staggered between 18' and 21' with no more than 2 homes in a row having same setback to garage door (except at knuckles and cul de sacs). Front setback shall be 12' minimum to house livable area where garage is set back from livable area and for side entry garages, planters, porches, pop-outs, etc.

(3) Fireplaces, bay windows and ground mounted AC units may extend into setbacks. A minimum of 3' of side yard shall be unobstructed.

(4) 13' side yard setback required on street side of corner lots.

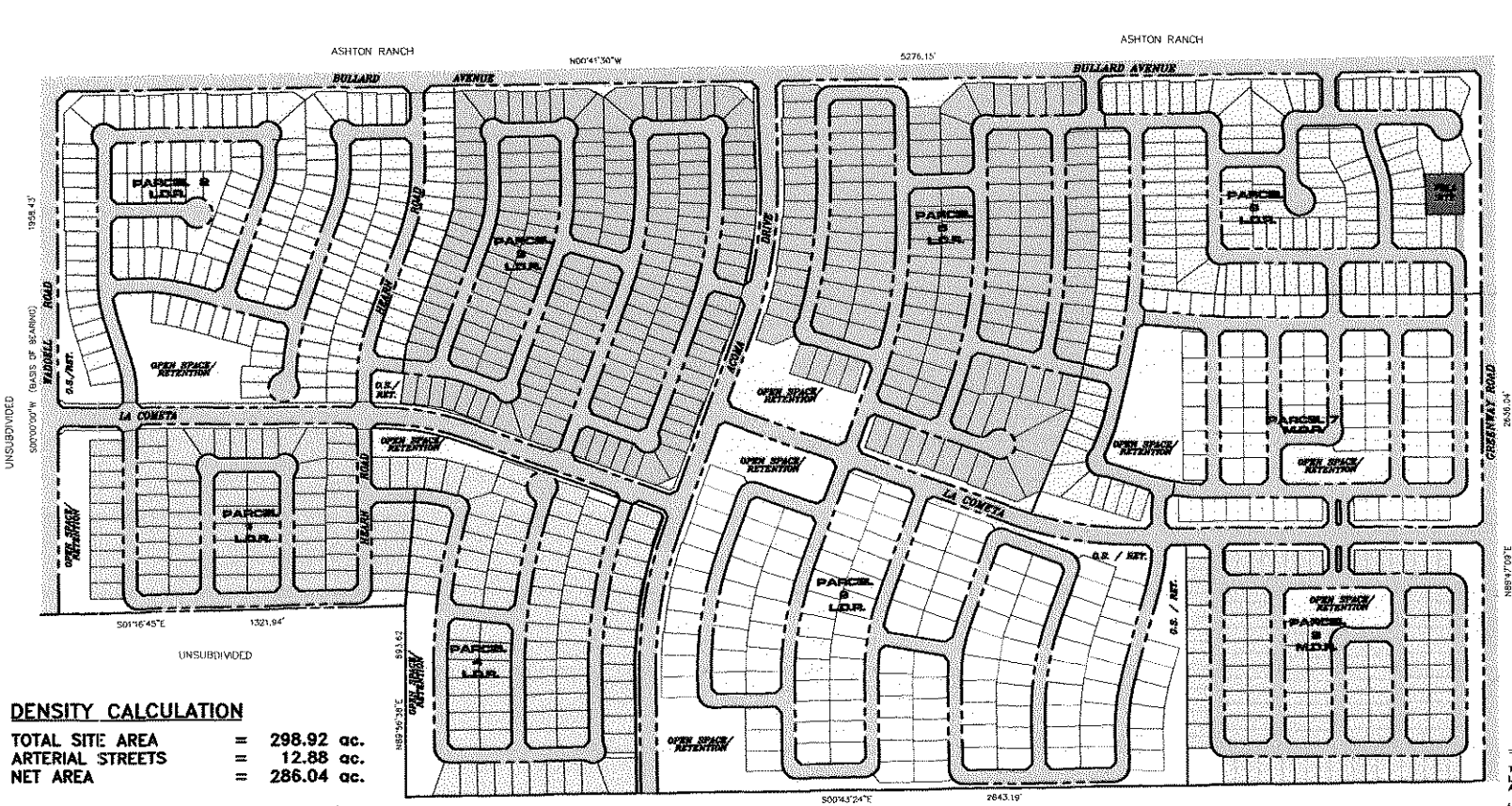
(5) 10' minimum separation required between homes.

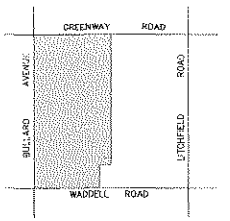
MEDIUM DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.)	Area (s.f.)	Max. lot cov.%	Front (Ft.)	Rear (Ft.)	Side (min.) (Ft.)	Side (total) (Ft.)	Bldg. Ht. (Max.) (Ft.)
7	43	80	3440	50	12 (6)	15'	0	8 (7)	30
8	43	80	3440	50	12 (6)	15'	0	8 (7)	30

Notes:

(6) 18' to face of front entry garage door.

(7) Fireplaces and ground mounted AC units may extend into setback. A minimum of 3' of side yard shall be unobstructed.





VICINITY MAP

N.T.S.

200 100 0 200 400

SCALE FEET

EXHIBIT 'A'

DENSITY CALCULATION

TOTAL SITE AREA	=	298.92 ac.
ARTERIAL STREETS	=	12.88 ac.
NET AREA	=	286.04 ac.

1197 du / 286.04 ac = 4.18 du/ac.

LAND USE TABLE				
PARCEL	LAND USE	LOT SIZE	LOT AREA	# LOTS
1	L.D.R.	58'x110'	6,380	73
2	L.D.R.	53'x110'	5,830	162
3	L.D.R.	48'x110' 50'x110'	5,280	189
4	L.D.R.	63'x115'	7,245	92
5	L.D.R.	60'x117'	7,020	144
6	L.D.R.	48'x115'	5,520	136
7	M.D.R.	43'x80'	3,440	138
8	M.D.R.	43'x80'	3,440	136
9	L.D.R.	75'x125'	9,375	127
		TOTAL:		1197

ROYAL RANCH PHASE 1 & 2 LEGAL DESCRIPTION

THE NORTHWEST QUARTER AND THE NORTH HALF OF THE SOUTHWEST QUARTER, AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER, AND THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER, ALL IN SECTION 9, TOWNSHIP 3 NORTH, RANGE 1 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

EXCEPT: THAT PORTION OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOWN SHIP 3 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 9,
THENCE NORTH ALONG THE EAST LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 1320.75 FEET TO THE NORTHEAST CORNER THEREOF, THENCE WESTERLY ALONG THE NORTH LINE OF THE WEST HALF OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 34.00 FEET, THENCE SOUTHERLY ALONG THE CENTER LINE OF A 12 INCH IRRIGATION PIPE AND ALONG A WIRE FENCE AND A SOUTHERLY PROLONGATION THERE OF 1320.80 FEET TO A POINT ON THE SOUTH LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, THENCE EASTERLY ALONG THE SOUTH LINE OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, 21.00 FEET TO THE POINT OF BEGINNING.

CONTAINING 298.926 ACRES GROSS

SITE DATA:

PROPOSED USE:	AREA (A.C.)	% SITE
TOTAL SITE	298.92	100%
CIRCULATION		
ARTERIAL STREETS	12.88	4.31%
GREENWAY ROAD (55FT. 1/2 ST.)	3.33	–
BULLARD AVENUE (55FT. 1/2 ST.)	6.72	–
WADDELL ROAD (65FT. 1/2 ST.)	2.83	–
COLLECTOR STREETS	10.98	3.68%
NET SITE AREA	275.06	92.01%
RESIDENTIAL		
SINGLE FAMILY		
LOW DENSITY RESIDENTAL(973 LOTS)	200.99	67.23%
MEDIUM DENSITY RESIDENTAL(274 LOTS)	38.07	12.73%
OPEN SPACE	36.00	12.04%
RETENTION/OPEN SPACE	19.91	–
LANDSCAPE TRACTS	16.09	–

DEVELOPER

FULTON HOMES
9140 SL KYRENE STE 202
TEMPE, ARIZONA 85284
PHONE (480) 755-7506
CONTACT: NORM NICHOLLS

NOTES

THIS LAND PLAN IS INTENDED TO SHOW LOCATION, LOT SIZE AND DENSITY OF INDIVIDUAL PARCELS AND GENERAL LOCATION OF OPEN SPACE.

LOT LAYOUTS AND LOCAL STREET GEOMETRY IS SHOWN FOR REFERENCE ONLY AND ARE NOT PART OF THIS PAD AMENDMENT.

ANY MODIFICATIONS TO LOTS, LOCAL STREETS AND MINOR MODIFICATIONS TO OPEN SPACE SHALL BE REVIEWED AND APPROVED BY THE CITY DURING THE PRELIMINARY AND FINAL PLAT PROCESSES.

APPROVALS:

PLANNING AND ZONING COMMISSION:

PRELIMINARY DEVELOPMENT PLAN APPROVED BY THE PLANNING AND ZONING COMMISSION OF THE CITY OF SURPRISE THIS DAY OF , 2002.

CHAIRPERSON SECRETARY

MAYOR AND COUNCIL:

PRELIMINARY DEVELOPMENT PLAN APPROVED BY THE MAYOR AND COUNCIL OF THE CITY OF SURPRISE THIS DAY OF , 2002.

MAYOR CLERK

I ACKNOWLEDGE THAT THE ABOVE INFORMATION I HAVE GIVEN ON THE CHECKLIST, THE ACCOMPANYING APPLICATION AND AND PRELIMINARY DEVELOPMENT PLAN TO BE TRUE AND ACCURATE.

FOR CMX GROUP INC. (PETITIONER) FOR FULTON HOMES (OWNER)

AMENDED LAND USE PLAN

ROYAL RANCH PHASE 1 & 2

GREENWAY ROAD & BULLARD AVENUE
SURPRISE, AZ

CMX GROUP INC.
ENGINEERING
PROJECT ADMINISTRATION
CONSTRUCTION ANALYSIS
1515 E. MISSOURI
PHOENIX, AZ 85014
PH (602)279-8436
FAX (602)265-1191

CMX JOB NO. 6537-10 | DATE: 02/26/02 | SCALE: 1:200
DESIGNED: | DRAWN: BC | APPROVED: RN
REV.

DWG. NO. 1 SHT. 1 OF 1

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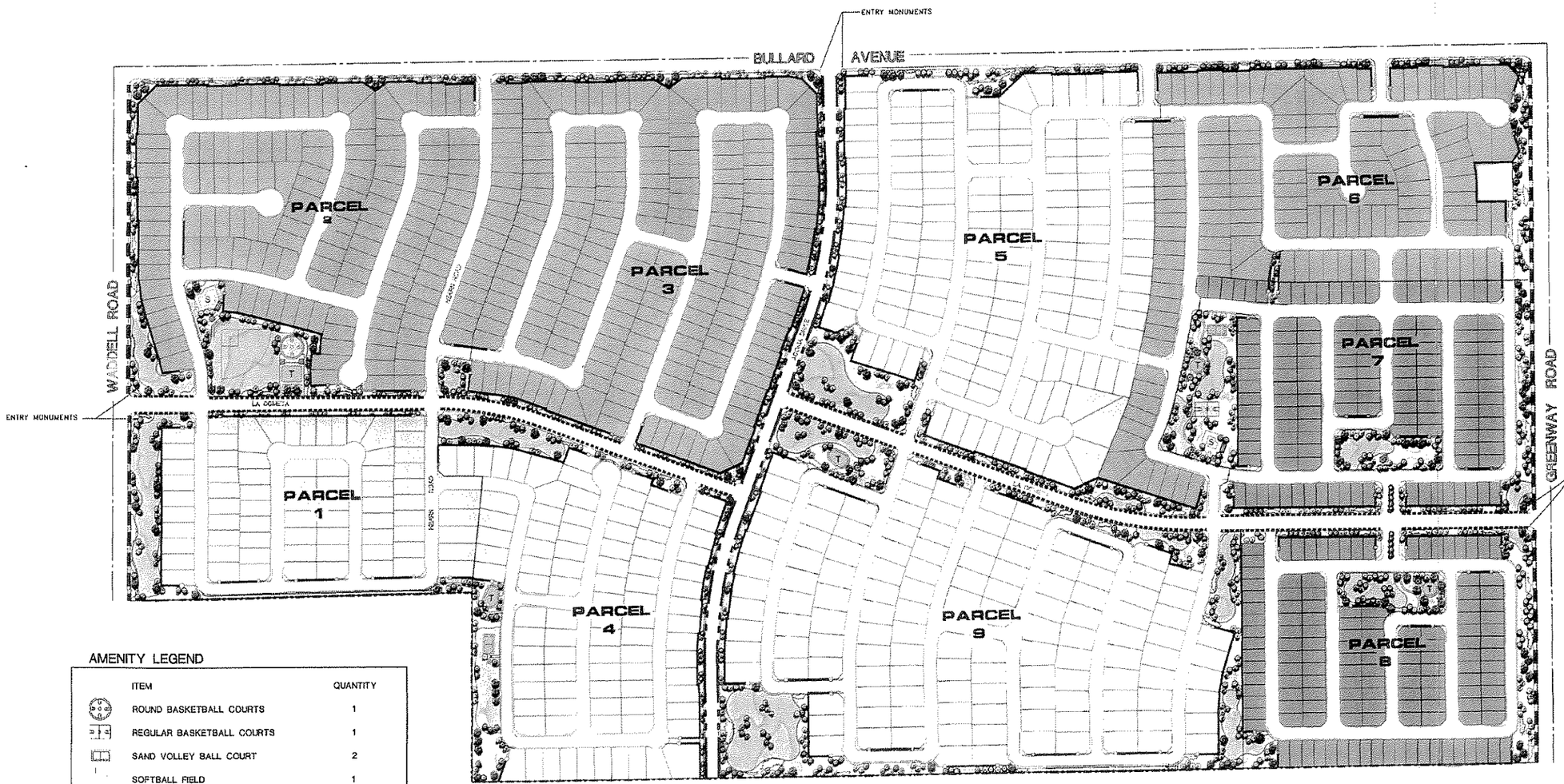
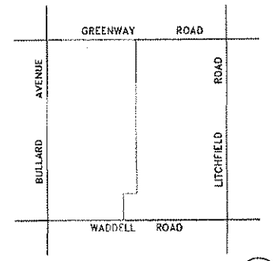




VICINITY MAP

TRAIL LEGEND

- INTERIOR NORTH TO SOUTH TRAILS
- INTERIOR EAST TO WEST TRAILS
- PEDESTRIAN BIKE WAYS AT PERIMETER
- CONNECTING PATH

NOTE

PLAN ILLUSTRATES TYPE OF AMENITIES FOR EACH PARCEL.

FINAL LOCATIONS OF AMENITIES MAY BE SUBJECT TO CHANGE.

AMENITY LEGEND

ITEM	QUANTITY
ROUND BASKETBALL COURTS	1
REGULAR BASKETBALL COURTS	1
SAND VOLLEY BALL COURT	2
SOFTBALL FIELD	1
SWIMMING POOL	2
TOT LOT	5
20'x20' RAMADA W/PICNIC TABLE & BBQ	5
16'x16' RAMADA W/PICNIC TABLE & BBQ	5
RESTROOMS	2

200 SCALE

pd/s A
LAND PLANNING/LANDSCAPE ARCHITECTURE
pd/SAURey Associates, Inc.
3550 EAST BASELINE ROAD, SUITE 117
MESA, AZ 85206 (480) 633-9500

REGISTERED LANDSCAPE ARCHITECT 13248 PAUL D. SAUREY ARIZONA, U.S.A.

B

EXHIBIT "B"

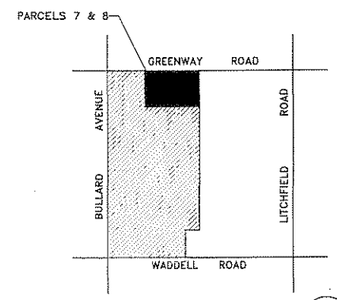
AMENDED OPEN SPACE & TRAIL PLAN — Royal Ranch Phase 1 & 2

SURPRISE, ARIZONA

ROYAL RANCH PHASE 1 & 2

LEGEND

- Ⓐ Entry Monuments
- Ⓑ 6' High Project Theme Wall
- Ⓒ 6' High Block Fence
- Ⓓ Interior North To South Trails
- Ⓔ Pedestrian Bike Ways At Perimeter
- Ⓕ Connection Path
- Ⓖ Ramada
- Ⓗ Tot Lot
- Ⓘ Full Sport Court
- Ⓙ Volleyball Court
- Ⓚ Swimming Pool
- Ⓛ Restrooms



VICINITY MAP

100 SCALE

NOTE

PLAN ILLUSTRATES TYPE OF AMENITIES FOR EACH PARCEL.

FINAL LOCATIONS OF AMENITIES MAY BE SUBJECT TO CHANGE.

pd/sA
LAND PLANNING/LANDSCAPE ARCHITECTURE
pd/SAUREY ASSOCIATES, INC.

3850 EAST BASELINE ROAD, SUITE 117
MESA, AZ 85206 (480) 833-9569

REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 13246
13246
PAUL D. SAUREY
ARIZONA, U.S.A.

C

TWIN HOME SITE PLAN

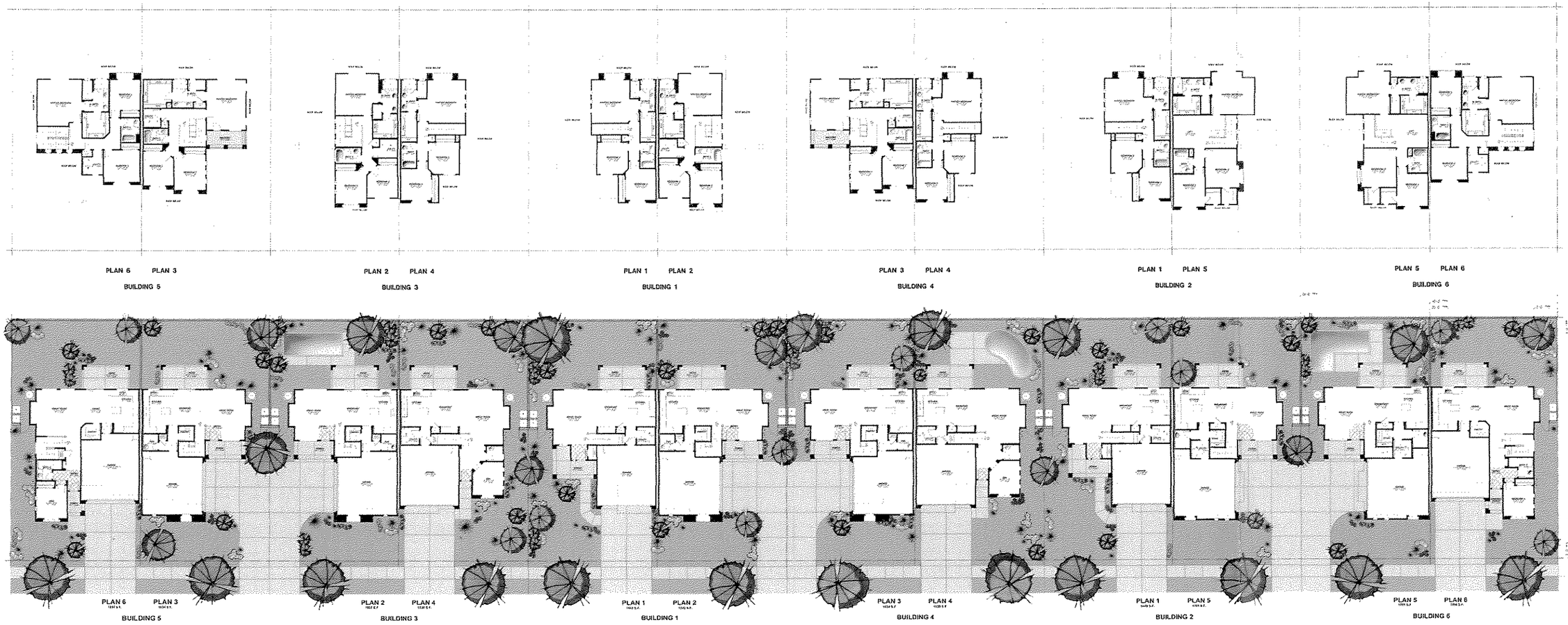
TWIN HOME SITE PLAN

Royal Ranch Parcels 7 & 8

SURPRISE, ARIZONA

APPENDIX A

Twin Home Street Elevations and Street Plan View



PAIRED HOME PRODUCT

FULTON HOMES

LINDEROTH ASSOCIATES ARCHITECTS

BUILDING 2
ELEVATION "C"

BUILDING 3
ELEVATION "A"

PAIRED HOME PRODUCT

FULTON HOMES

ELEVATIONS
SCALE 1/4" = 1'-0"

LINDEROTH ASSOCIATES ARCHITECTS
12-5-2001

BUILDING 2
ELEVATION "A"

BUILDING 6
ELEVATION "B"

PAIRED HOME PRODUCT

FULTON HOMES

ELEVATIONS
SCALE 1/4" = 1'-0"
LINDEROTH ASSOCIATES ARCHITECTS
12-5-2001

BUILDING 2
ELEVATION "C"

BUILDING 5
ELEVATION "B"

PAIRED HOME PRODUCT

FULTON HOMES

ELEVATIONS
SCALE 1/4" = 1'-0"

LINDEROTH ASSOCIATES ARCHITECTS
12-5-2001

ORDINANCE NO. 03-13

AN ORDINANCE APPROVING THE PLANNED AREA DEVELOPMENT AMENDMENT PADA03-102, AMENDING THE ROYAL RANCH PAD TO ELIMINATE THE TWO COMMUNITY POOLS AND REPLACE THEM WITH ADDITIONAL COVERED MEETING SPACE, HARDSCAPING, TURF AREA, AS WELL AS A CASH DONATION TO THE CITY OF SURPRISE TO BE USED AT THE SURPRISE CENTER PARK. SUBJECT SITE IS LOCATED SOUTH OF GREENWAY ROAD, EAST OF BULLARD AVENUE.

WHEREAS, this Ordinance has been properly noticed for public hearing and the necessary hearings and opportunity for public input have been completed; and

WHEREAS, changes have occurred in the vicinity of Section 9 of Township 3 North, Range 1 West of the Gila and Salt River Base and Meridian, which require that the zoning of a parcel of land in that area be changed; and

WHEREAS, rezoning of the subject property will not cause traffic congestion or depreciate surrounding property values and, at the same time is in harmony with the purposes and intent of the zoning ordinance, the plan for the area, and the Surprise General Plan 2020; and

WHEREAS, the Planning and Zoning Commission has recommended approval of this rezone application.

NOW THEREFORE BE IT ORDAINED, by the City Council of the City of Surprise, Arizona, that:

Section 1. This Ordinance is not of a general and permanent nature and shall not be codified.

Section 2. PADA03-102 is hereby adopted, amending the Royal Ranch PAD to eliminate the two community pools and replace them with covered meeting space, hardscaping, turf area, and a cash donation to the City of Surprise to be used at the Surprise Center Park immediately north of Royal Ranch.

Section 3. The property described on Exhibit A remains subject to all stipulations relating to the original Royal Ranch PAD, any subsequent

amendments of the PAD, all provisions of the Development Agreement, and those stipulations contained in Exhibit B.

PASSED AND ADOPTED THIS 12 day of June, 2003

Mayor

ATTEST:

City Clerk

APPROVED AS TO FORM:

City Attorney

YEAS: Mayor Shafer, Vice-Mayor Smith, Council members; Allen, Cox, Villanueva & Vukanovich.

NEAS: _____

ROYAL RANCH PHASE 1 & 2
LEGAL DESCRIPTION

THE NORTHWEST QUARTER AND THE NORTH HALF OF THE SOUTHWEST QUARTER, AND THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER, AND THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER. ALL IN SECTION 9, TOWNSHIP 3 NORTH, RANGE 1 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA,

EXCEPT THAT PORTION OF THE WEST HALF OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOWN SHIP 3 NORTH, RANGE 1 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

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CONTAINING 298.926 ACRES GROSS

X:\6500\6537-10\Exhibits\Legals\ROYAL RANCH PH 1 & 2 LEGAL DESCRIPTION.dwg, 01/09/02 05:06:06 PM, BCLEMENT

Exhibit A to Ord. No. 03-13

RECOMMENDATIONS: (PADA03-102)

Subject request is consistent with the Surprise General Plan 2020. Furthermore, approval of this request would allow for efficient and orderly development. Staff recommends that the Planning and Zoning Commission recommend the City Council approve the PAD amendment for Royal Ranch (PADA03-102) subject to the following stipulations:

STANDARD STIPULATIONS:

a) Major changes to this Planned Area Development with regard to use and intensity, must be processed as a revised application with approval by the City Council upon recommendation of the Planning and Zoning Commission. Minor changes to this Planned Area Development may be administratively approved by the City Manager and the Community Development Director; and

b) The applicant shall submit a Written Response to Stipulations and five (5) copies of the PAD amendment. Said submission must submitted within 15 days of final approval and be under one (1) transmittal package.

Exhibit B to
Ord. No. 03-13

REPORT TO THE PLANNING AND ZONING COMMISSION AND THE CITY COUNCIL

PREPARED BY THE COMMUNITY DEVELOPMENT DEPARTMENT

CASE NO.: PADA03-102 (Royal Ranch Planned Area Development Amendment)
STIPULATIONS: a through b
PREPARED BY: Scott Phillips, Planning Manager @ 623-875-4318

Planning & Zoning Commission Hearing Date: May 6, 2003
City Council Hearing Date: May 22, 2003

APPLICANT:

Dick Norton
CMX
1515 E. Missouri
Phoenix, AZ 85014
602.279.8436
Fax 602.265.1191

PROPERTY OWNER: Fulton Homes

REQUEST: Approval of a Planned Area Development Amendment for Royal Ranch

SITE LOCATION: Subject site is located south of Greenway Road, east of Bullard Road, north of Waddell Road

SITE SIZE: 300 gross acres

CONFORMANCE TO ADOPTED LAND USE PLANS:

GENERAL PLAN: If approved, this request would comply with the Surprise General Plan 2020 and the corresponding General Plan Land Use Map.

DEVELOPMENT PLAN: If approved, this application will amend the West Point Towne Center PAD, which is the development plan for the subject property.

COMMENTING JURISDICTIONS:

Town of Buckeye:	No comments were received.
City of El Mirage:	No comments were received.
City of Peoria:	No comments were received.
Maricopa County:	No comments were received.
Dysart Unified School District:	No comments were received.
Maricopa Water District:	No comments were received.
Luke Air Force Base:	No comments were received.

DEPARTMENTAL REVIEW:

The **Engineering Department** has reviewed this application and has no additional comments.

The **Fire Department** has reviewed this application and has no additional comments.

The **Public Works Department** has reviewed this application and has no additional comments.

The **Water Services Department** has reviewed this application and has no additional comments.

STAFF RECOMMENDATION:

Staff recommends that the Planning and Zoning Commission recommend approval of the Planned Area Development Amendment for Royal Ranch, (PADA03-102), subject to the stipulations listed under "Recommendations."

EXISTING ZONING:

1. ON-SITE: PAD (Planned Area Development – Royal Ranch)
   NORTH: PAD (Planned Area Development – Surprise Center)
   SOUTH: PAD (Planned Area Development – Marley Park)
   EAST: PAD (Planned Area Development – Sierra Verde)
   WEST: PAD (Planned Area Development – Ashton Ranch)

EXISTING LAND USE

2. ON-SITE: Vacant Land
   NORTH: Vacant Land/City facilities

Street Name	Right of Way	Pavement Width	Landscaping	# of Lanes in each direction	Sidewalks
Greenway Road	110 feet	64 feet	Sides	2 Lanes	8 foot
Bullard Avenue	110 feet	64 feet	Sides	2 Lanes	8 foot
Waddell Road	130 feet	88 feet	Sides, Median	3 Lanes	8 foot

SOUTH: Agriculture
EAST: Agriculture
WEST: Single Family Residential

ADJACENT ROAD STATUS

EXISTING UTILITIES AND SERVICES STATUS:

3. **WATER** City of Surprise

4.	**SEWER**	City of Surprise
5.	**FIRE PROTECTION**	The Surprise Fire Department currently has fire stations located at: 15616 North Hollyhock Street, 18600 N. Reems Road, and a temporary station located at 22443 N. 163rd Avenue.
6.	**POLICE PROTECTION**	The Surprise Police Department currently has a station located at 12425 W. Bell Road and a substation located at 18600 Reems Road.

100 YEAR ASSURED WATER SUPPLY CERTIFICATION:

7. The City of Surprise water service area has a designation of 100-Year Assured Water Supply.

FINANCIAL ASSURANCE FOR INFRASTRUCTURE COMPLETION:

8. Financial assurance will be provided pursuant to the approved Development Agreement.

SCHOOL DISTRICT POSITION:

9. Dysart School District has reviewed the project and has worked out the necessary arrangements with the applicant in order to meet the educational needs of the future residents.

STREET LIGHT IMPROVEMENT DISTRICT:

10. A Street Light Improvement District (SLID) will be formed and maintained pursuant to the Development Agreement.

PLAN ANALYSIS:

PROPOSAL

11. The applicant has submitted a request to amend the Royal Ranch PAD to eliminate the two community pools and replace them with additional covered meeting space, hardscaping, turf area, as well as a cash donation to the City of Surprise to be used at the Surprise Center Park immediately north of Royal Ranch.

HISTORY

12. The PAD for Royal Ranch was originally submitted in 1999 and approved by the City Council in 2000. The community pools were added in response to the necessity of bringing the project up to a standard that the City Council was expecting at the time. Royal Ranch, however, was not required to meet the full requirements of the Single Family Residential Design Guidelines.

13. The applicant, upon reviewing the long-term maintenance costs for the Homeowners Association, was concerned about the HOA fees to be passed on to the ultimate homeowners in Royal Ranch. Additionally, Fulton Homes has made many changes to the plan since the zoning, such as increasing the lot sizes, introducing a twin home product on the north side of the property and providing curb-separated sidewalks as requested by the City, buffering the existing agricultural use adjacent to the south end of the project, and enhancing the landscaping plan in the project.

14. Based upon the changes that have been made, including the home product that has been introduced by the applicant which exceeds significantly the minimum requirements of the PAD, the applicant exceeds the established requirements of the Single Family Residential Design Guidelines. Additionally, with the cash donation provided to the City for additional amenities at the Surprise Center Park, the amenities will be provided for an overall public benefit, not just the benefit of the residents of Royal Ranch.

EXISTING SITE CONDITIONS:

15. The site has been graded and is mostly flat. The engineering department has reviewed the drainage report for this development and will review further drainage studies upon final plan review.

COMPLIANCE WITH THE GENERAL PLAN

16. The proposed PAD Amendment does not change the compliance with the General Plan.

NOISE:

17. This property is not located within the 65 LDN line of the 1988 MAG Noise Contours. However, this property is subject to over flights from Luke Air Force Base, therefore appropriate noise attenuation will be required in the structures as they are constructed.

CONCLUSION:

18. The subject request will be consistent with the City of Surprise General Plan 2020 Land Use Map. Also, this proposed PAD amendment will not adversely affect the health, safety, or welfare of the citizens of the City of Surprise.

Attachments
1. PAD amendment book

ROYAL RANCH – 2ND PAD AMENDMENT

Overview:

Royal Ranch is a 299-acre masterplanned community located at the southeast corner of Greenway Road and Bullard Avenue. Immediately north of the masterplanned community is the proposed Surprise Center. A Planned Area Development (PAD) was approved for Royal Ranch in 1999. The PAD identified major open space areas, but did not provide detailed information as to the amenities to be provided within those open spaces.

In November 2001, Fulton Homes Corporation, a homebuilder and developer of upscale masterplanned communities throughout the Valley, acquired the Royal Ranch property. In 2002 a planned area development amendment (PAD (02-013) was approved for Royal Ranch. This approved PAD Amendment takes precedence over the original 1999 PAD.

The proposed amenities within the 2002 PAD Amendment included two community swimming pools. Due to the recent construction of the City of Surprise Aquatic Center immediately north of Royal Ranch, the swimming pools would not receive the use as originally anticipated, nor justify the maintenance costs to be paid by the residents through HOA fees.

Governing Documents:

This 2nd PAD amendment is intended to take precedence over the 2002 PAD Amendment and the 1999 PAD. Where this 2nd PAD amendment has provisions which conflict with the 1999 PAD, 2002 PAD Amendment and/or Zoning Ordinance, this 2nd PAD amendment shall govern. The 2002 PAD Amendment or 1999 PAD shall govern where there are no conflicting provisions within this 2nd PAD amendment. The Zoning Ordinance for the City of Surprise shall govern where there are no conflicting provisions within the 2002 PAD Amendment, 1999 PAD or this 2nd PAD amendment.

Proposed 2nd PAD Amendment:

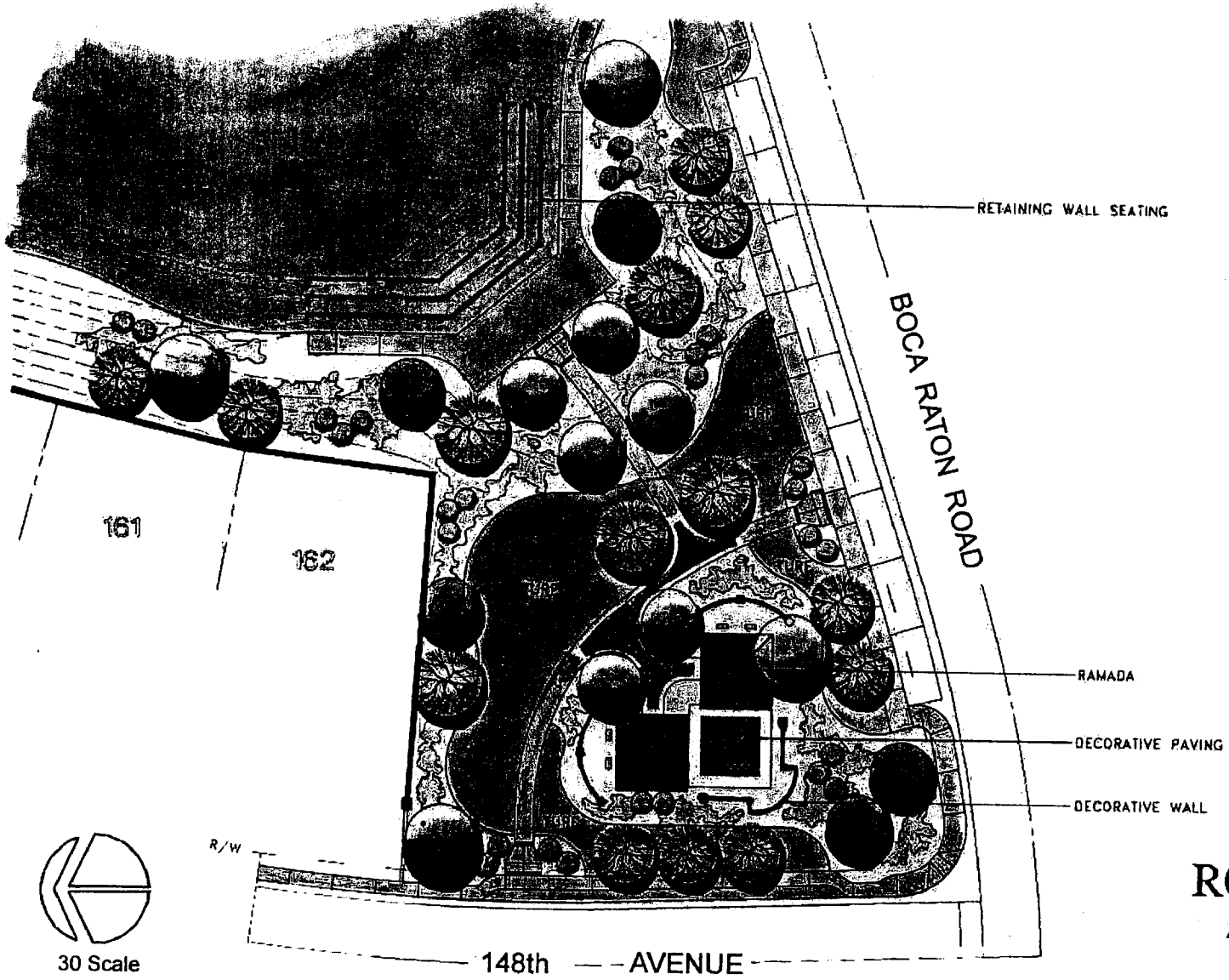
This PAD amendment is being submitted on behalf of Fulton Homes with the following **objectives**:

1. Replace the two swimming pools shown on the "Amended Open Space & Trails Plan" (Appendix 'F') with the "Amenity Area Modification", dated December 18th 2002 as attached in Appendix 'A' and 'B'. Appendix 'C' and 'D' show the overall park areas which are being revised. Appendix 'E' shows an elevation view of the ramadas and paving. Each swimming pool will be replaced by two ramadas, decorative paving, decorative walls, and landscaped open space.

   Fulton Homes has also offered and will contribute $75,000 to the City of Surprise Park & Recreation Department to be utilized within the Surprise Center Park north of Greenway Road and east of Bullard Road.

Conclusion:

By reviewing the onsite amenities as shown on the attached Phase I and Phase II plans, the residents will be able to enjoy the City of Surprise Aquatic Center as well as additional amenities in the park with funds provide by Fulton Homes.

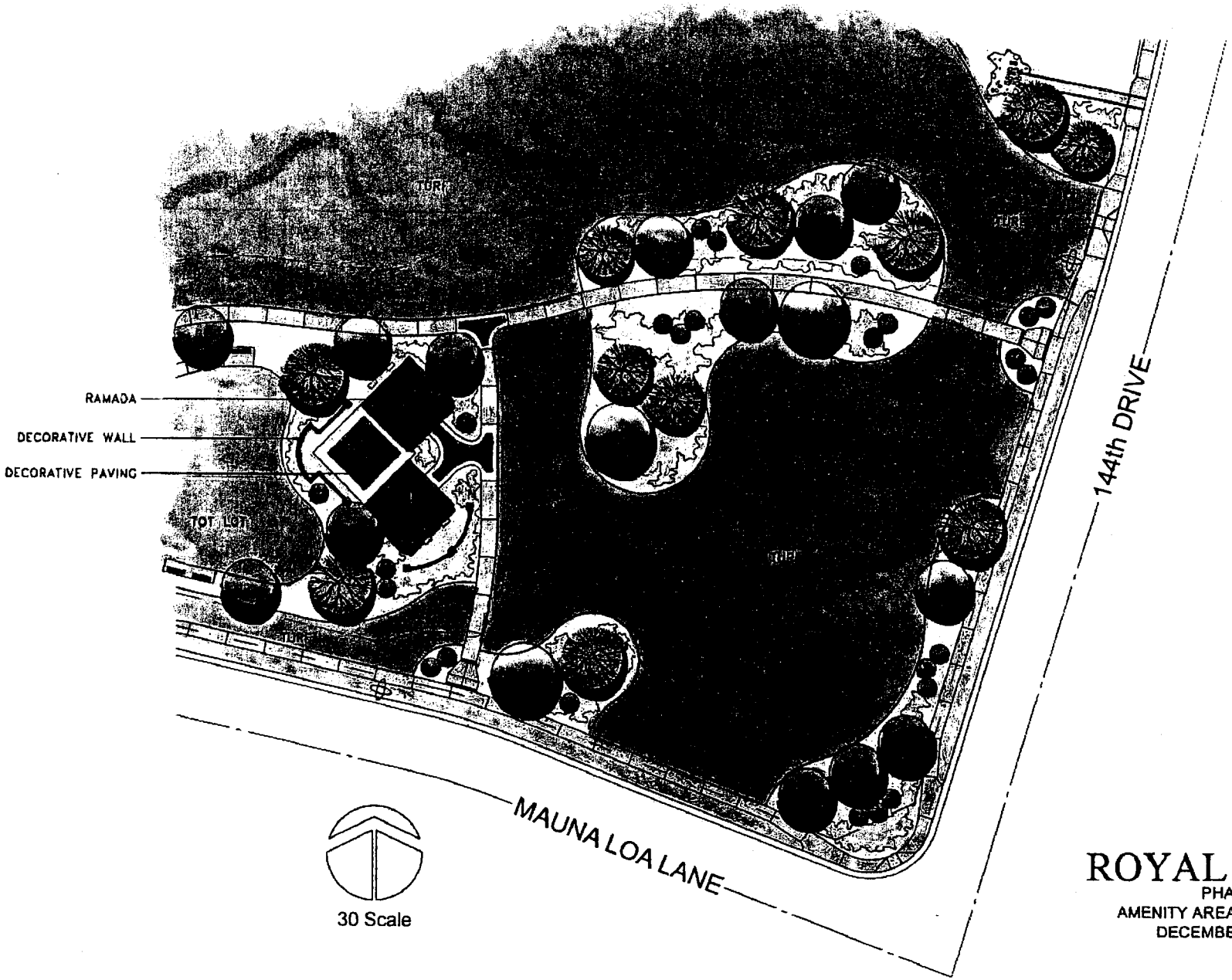


30 Scale

ROYAL RANCH

PHASE I
AMENITY AREA MODIFICATION
DECEMBER 18, 2002

APPENDIX A



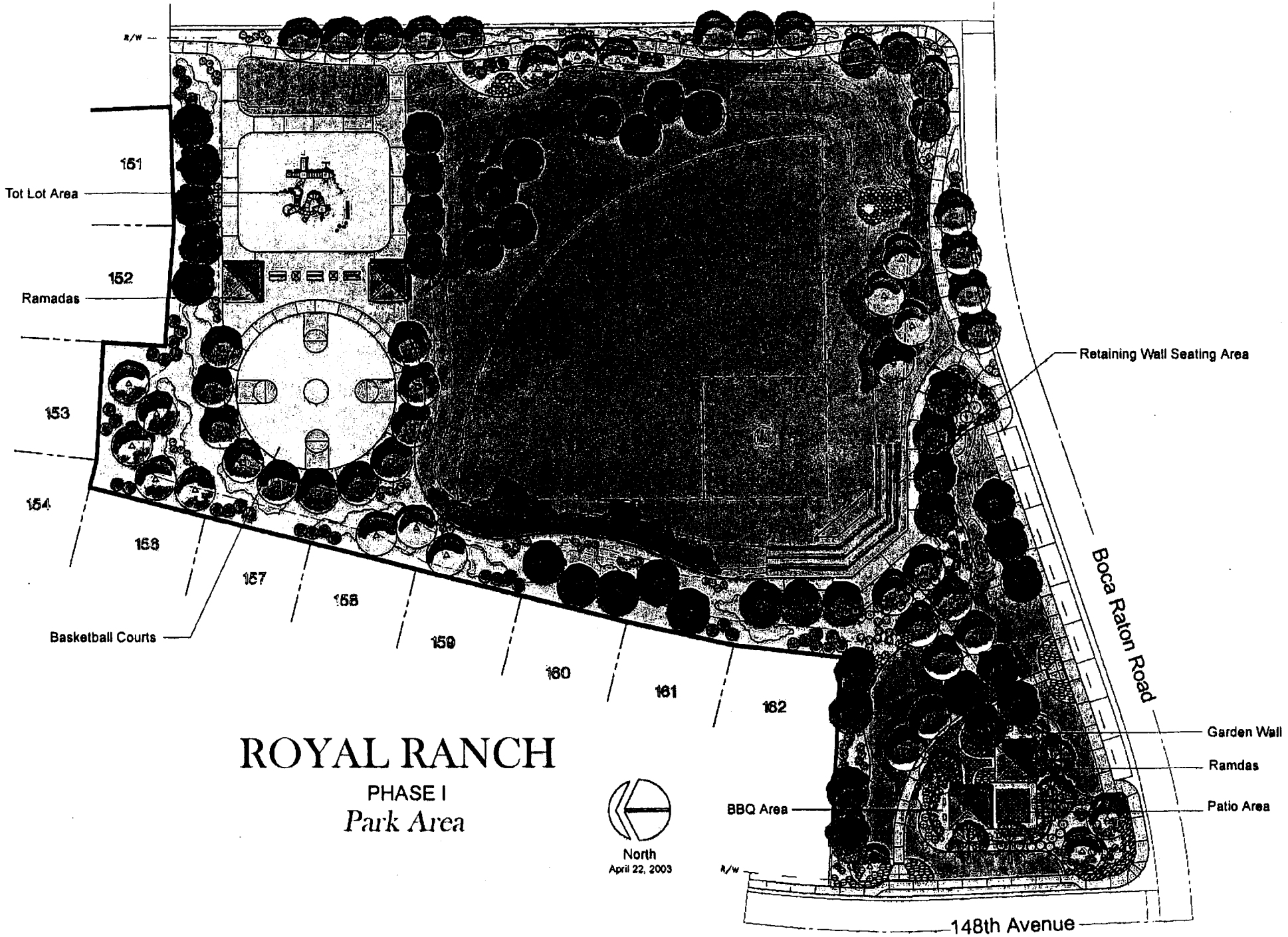
30 Scale

ROYAL RANCH

PHASE II

AMENITY AREA MODIFICATION

DECEMBER 18, 2002

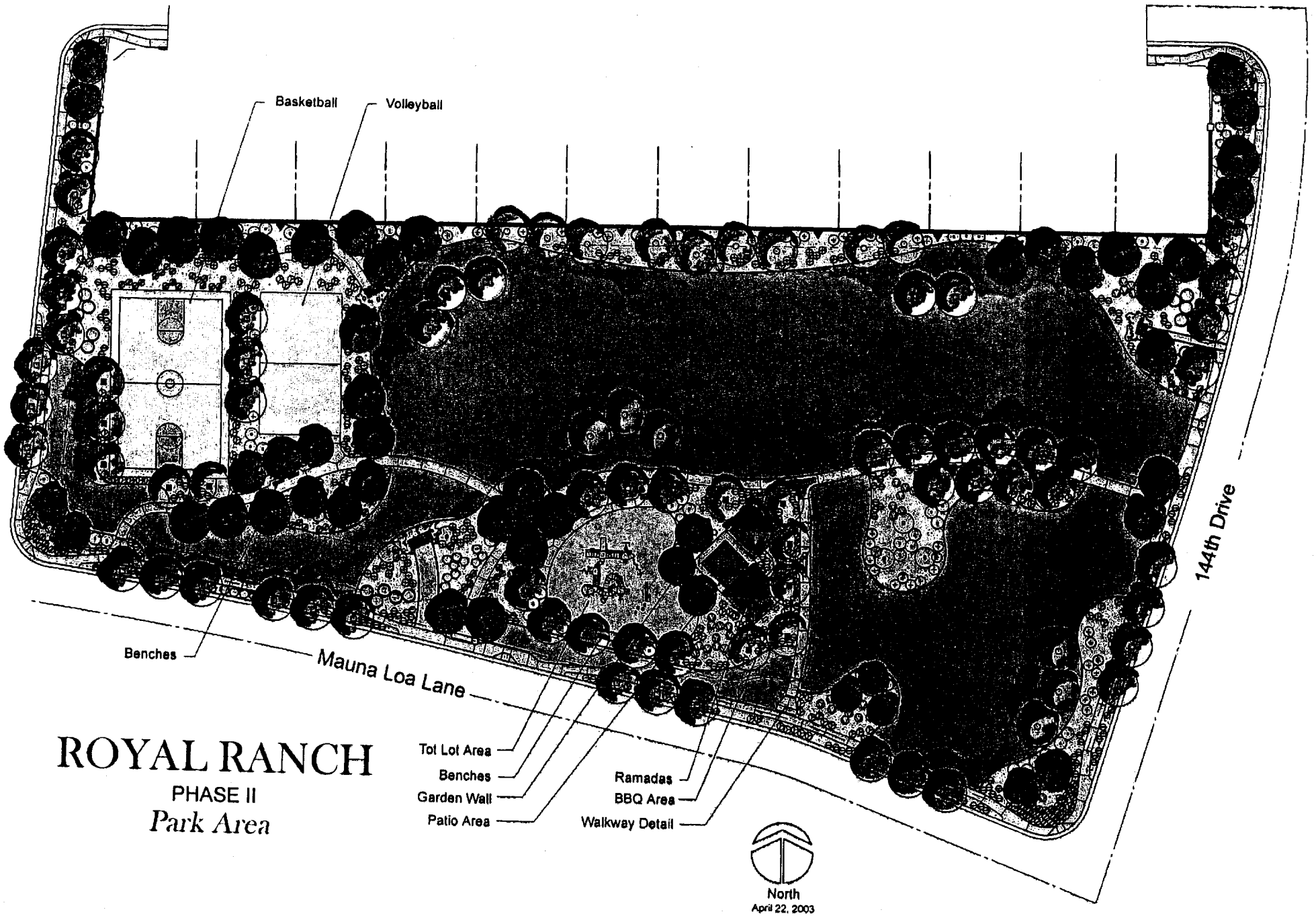


ROYAL RANCH

PHASE I

Park Area

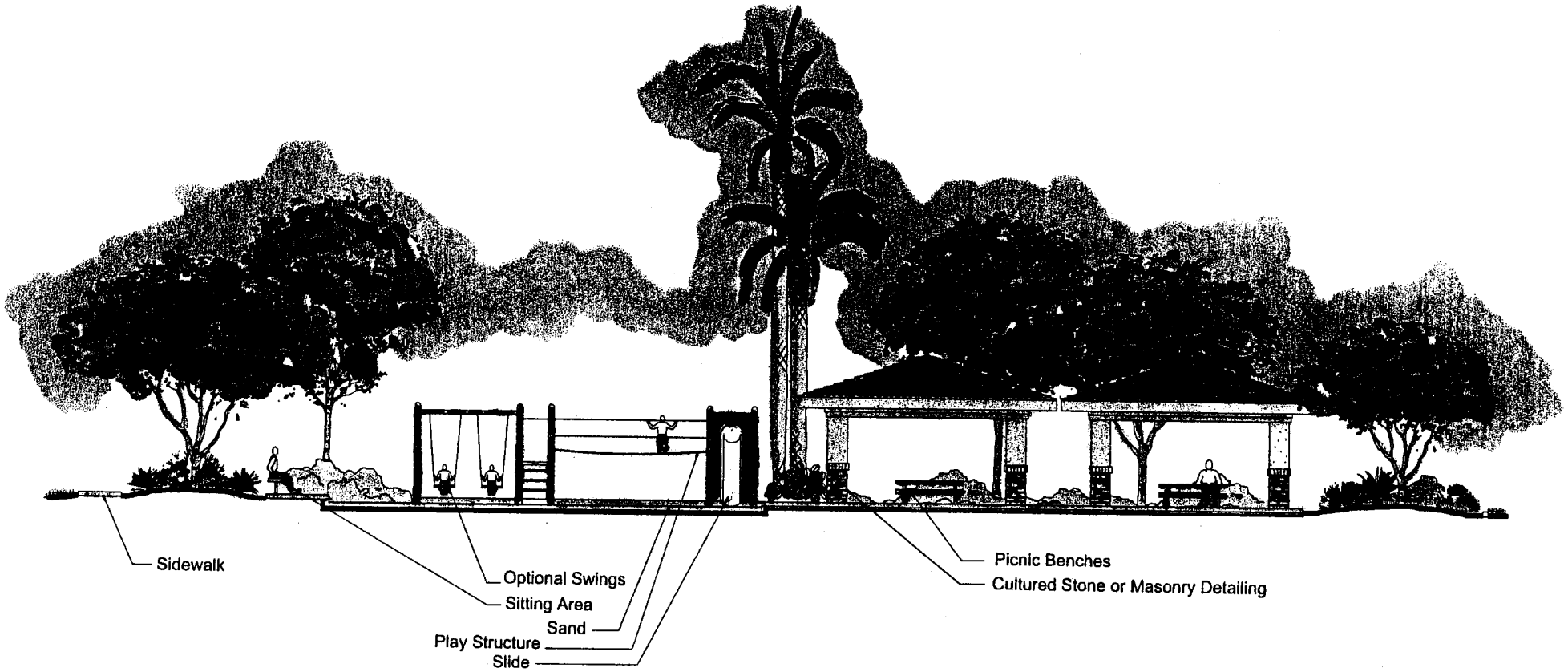
APPENDIX C



ROYAL RANCH

PHASE II

Park Area

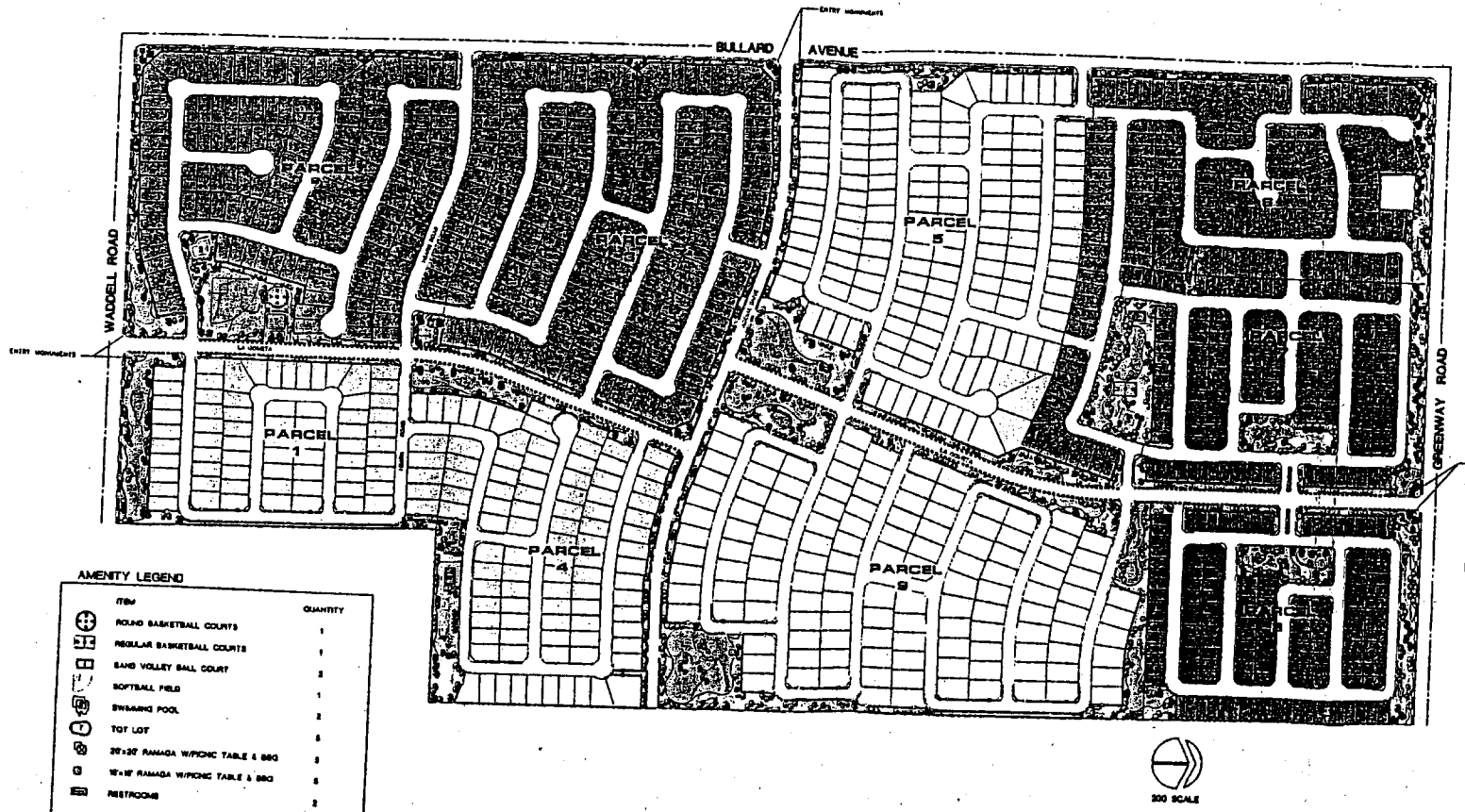


ROYAL RANCH

PHASE I & PHASE II

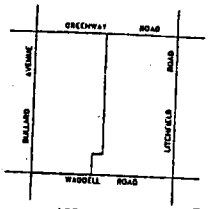
Park Areas

TYPICAL RAMADA AREA



AMENITY LEGEND

	ITEM	QUANTITY
	ROUND BASKETBALL COURTS	1
	REGULAR BASKETBALL COURTS	1
	SAND VOLLEY BALL COURT	2
	SOFTBALL FIELD	1
	SWIMMING POOL	2
	TOT LOT	4
	20'x20' RAMADA W/PICNIC TABLE & BBQ	3
G	16'x16' RAMADA W/PICNIC TABLE & BBQ	5
	RESTROOMS	2



VICINITY MAP

TRAIL LEGEND

- INTERIOR NORTH TO SOUTH TRAILS
- INTERIOR EAST TO WEST TRAILS
- PEDESTRIAN BIKE WAYS AT PERIMETER
- CONNECTING PATH

NOTE

PLAN ILLUSTRATES TYPE OF AMENITIES FOR EACH PARCEL.

FINAL LOCATIONS OF AMENITIES MAY BE SUBJECT TO CHANGE.

pd/sA
LAND PLANNING/LANDSCAPE ARCHITECTURE
pd/saurey Associates, Inc.

AMENDED OPEN SPACE & TRAIL PLAN

EXHIBIT "B"

Royal Ranch Phase 1 & 2

SURPRISE, ARIZONA

B

ROYAL RANCH PHASE 1 & 2

APPENDIX F

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

ITEM #14

1 MAY 2003

Colonel Dennis A. Rea
Vice Commander, 56th Fighter Wing
14185 W. Falcon Street
Luke AFB AZ 83309-1629

Ms Shelley Hohman
City of Surprise Planning Department
12425 West Bell Road
Surprise, AZ 85374

Re: Amend Open Space Amenities Within Royal Ranch Planned Development

Dear Ms Hohman

Thank you for the opportunity to comment on Fulton Homes' proposal to amend open space uses within the Royal Ranch Planned Area Development located south of Greenway Road and east of Bullard Avenue. The intended changes call for the replacement of two swimming pools. Each pool will be replaced by two ramadas, decorative pavement, decorative walls and landscaped open space. Luke Air Force Base has no objection to the proposed recreational amendments.

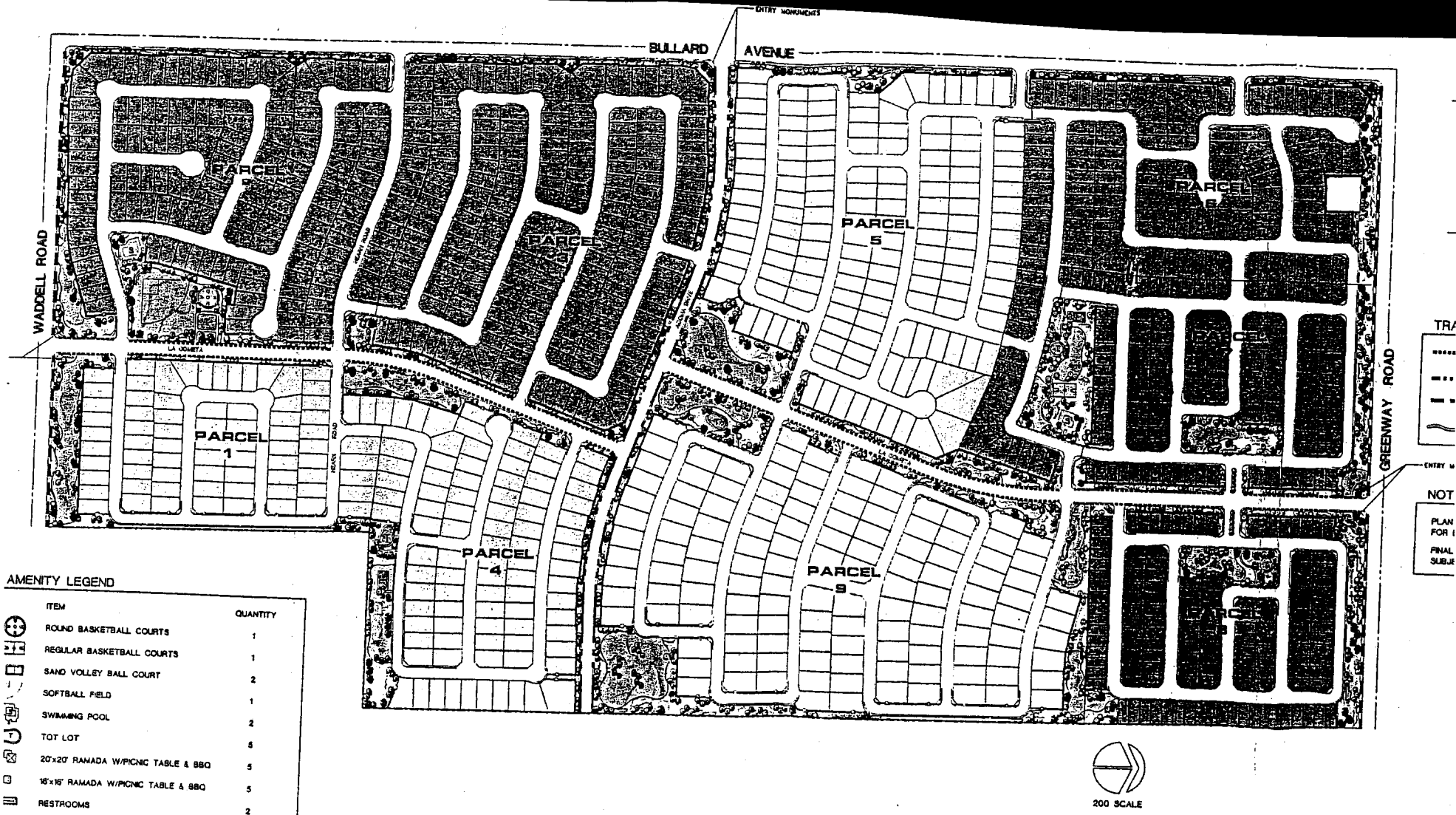
Both of the open space sites are outside of the 65 Ldn as depicted in the 1988 JLUS noise contours, but will be affected by over-flights and by single-event noise levels that could often exceed the 65-decibel level.

We appreciate the opportunity to comment on issues that may affect the operation and mission of Luke AFB, and hope that this information proves useful in making wise decisions regarding zoning and development that impacts the West Valley.

Sincerely

DENNIS A. REA, Colonel, USAF

Cc: The Honorable Joan Shafer, Mayor, City of Surprise



AMENITY LEGEND

ITEM	QUANTITY
ROUND BASKETBALL COURTS	1
REGULAR BASKETBALL COURTS	1
SAND VOLLEY BALL COURT	2
SOFTBALL FIELD	1
SWIMMING POOL	2
TOT LOT	5
20'x20' RAMADA W/PICNIC TABLE & BBQ	5
16'x16' RAMADA W/PICNIC TABLE & BBQ	5
RESTROOMS	2

AMENDED OPEN SPACE & TRAIL PLAN

EXHIBIT "B"

Royal Ranch Phase 1 & 2

SURPRISE, ARIZONA

CITY OF SURPRISE
COUNCIL AGENDA ACTION FORM

#7

Meeting Type: Regular Meeting **Time Scheduled:** 06/12/03 7:00 PM
If Special submit date time

Submitting Department: Planning and Zoning **Contact Person:** Scott Phillips

Consent [X] **Regular** [ ] **Requesting Action** [X] **Report Only** [ ]

Type of Document Needing Approval (Check all that apply):

[ ] Public Hearing	[ ] Resolution	[ ] First Reading/Ordinance
[ ] Agreement	[ ] Emergency Clause	[X] Final Reading/Ordinance
[ ] Special Consideration	[ ] Grant	[ ] Intergovernmental Agreement
[ ] Acceptance	[ ] Submission	[ ] Liquor/Bingo License Application

Council Priority (Check Appropriate Areas):

[ ] Education	[ ] Public Fitness	[ ] Neighborhood Revitalization
[ ] Job Creation	[ ] Quality Service Delivery	[ ] Employment Infrastructure
[ ] Public Safety	[ ] Housing Rehabilitation	[ ] Work Force Preparation
[ ] Transportation	[ ] Human Service Needs	[ ] Parks, Recreation & Library
[ ] City Elections	[ ] Community Activities	[X] Community Growth

Regular Agenda Wording: Discussion, consideration and action to approve Ordinance No. 03-13 An Ordinance approving the Planned Area Development Amendment PAD03-102, amending the Royal Ranch PAD to eliminate the two community pools and replace them with additional covered meeting space, hardscaping, turf area, as well as a cash donation to the City of Surprise to be used at the Surprise Center Park.

Staff Recommendation:Approve Fiscal Impact:Yes If yes: Budget code:Additional new development will have long term financial implications for the City of Surprise.
Available:

Background Info: The Planning and Zoning Commission recommended of application PADA03-102, on May 6, 2003.

List Attachments as Follows: Ordinance/Staff Report/Supporting Documentation.

Signatures of Submitting Officers (Sign Legibly):

Department Head | Supervisor | Budget Authorization

Legal Review | City Manager/Designee

Phillip A. Testa

Distribution After Council Action:
Shelley Norman
agenda

Council Action:

Motion/Second		
Shafer		
Vukanovich	S	
Villanueva		
Cox		
Montoya		

Results:

For	7
Against	0
Passed	✓
Failed	
Deny	
Continue	

CITY OF SURPRISE
COUNCIL AGENDA ACTION FORM

_____	Smith	M	Tabled	_____
_____	Allen	_____	Absent	_____
			Other	_____

City Clerk: Originals

HP LaserJet 3100
Printer/Fax/Copier/Scanner

SEND CONFIRMATION REPORT for
City Clerk's Office
6235833396
Jun-17-03 9:46AM

Job	Start Time	Usage	Phone Number or ID	Type	Pages	Mode	Status
535	6/17 9:32AM	0'47"	206 343 3038	Send	0	EC144	Communication Error 1042
535	6/17 9:36AM	0'55"	206 343 3038	Send	0/10	EC144	Communication Error 1042
535	6/17 9:41AM	5'04"	914254606822	Send	10/10	EC144	Completed
	Total	6'46"	Pages Sent: 10		Pages Printed: 0		

[redacted] SURPRISE [redacted]
ARIZONA

Facsimile Transmittal – City Clerk's Office

To: Dave Hohlbein **Fax:** 1-425-460-6822

Agency: Matthew Bender & Co., Inc. **Phone:** 1-866-501-5155

From: Rosa Herrera, Deputy Clerk **Phone:** 623-875-4213

Date: 06/02/03 **Pages:** 10

RE: **Ordinance No. 03-12 & 03-13**

[ ] Urgent [X] For Review [ ] Please Comment [ ] Please Reply [ ] Other

Attached is a copy of the above-mentioned ordinance:

Ord. #	# of pages
03-12	4
03-13	5

Status report as follows:

Ord. #	Description	Status
02-17	Theatres as Conditional Use	Pending
02-35	Noise Section of the Code	Pending
02-44	Amending Animal Control Section – SMC	Pending
03-02	Zoning Text Amendment – Setbacks	Pending
03-03	Appointments of certain Dept. Heads	Pending
03-05	PAD – Veramonte	Pending
03-11	Annexation – Nitta Property (Veramonte)	Pending
03-14	Annexation – County Right of Way	Pending
03-15	Annexation – Sarah Ann Ranch	Pending
03-16	Rezone – RDS Mini Storage	Pending

If you have any questions, please call me at 623-875-4213. Thank you.

12425 W. Bell Road, Suite D-100, Surprise, AZ 85374, Fax (623) 583-3396

HP LaserJet 3100
Printer/Fax/Copier/Scanner

SEND CONFIRMATION REPORT for
City Clerk's Office
6235833396
Jun-17-03 9:51AM

Job	Start Time	Usage	Phone Number or ID	Type	Pages	Mode	Status
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Total 2'53" Pages Sent: 10 Pages Printed: 0

[redacted] SURPRISE [redacted]
ARIZONA

Facsimile Transmittal – City Clerk's Office

To: Janet Gerster **Fax:** 623-876-2589

Agency: Daily News-Sun **Phone:** 623-876-2547

From: Rosa Herrera, Deputy Clerk **Phone:** 623-875-4213

Date: 06/17/03 **Pages:** 10

RE: **Publication of Ordinance Nos. 03-12 & 03-13**

[X] Urgent [ ] For Review [ ] Please Comment [X] Please Reply [ ] Other

Please publish the above-mentioned ordinances on the following four (4) dates:

Friday	06/20/03
Monday	06/23/03
Tuesday	06/24/03
Wednesday	06/25/03

Please call me to confirm receipt.

Thank you.

12425 W. Bell Road, Suite D-100, Surprise, AZ 85374, Fax (623) 583-3396

HP LaserJet 3100
Printer/Fax/Copier/Scanner

SEND CONFIRMATION REPORT for
City Clerk's Office
6235833396
Jun-17-03 10:21AM

Job	Start Time	Usage	Phone Number or ID	Type	Pages	Mode	Status
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537	6/17 10:10AM	0'32"	CASTELLE	Send	0/10	72	Communication Error 951
537	6/17 10:14AM	0'27"	CASTELLE	Send	0/10	72	Communication Error 951
537	6/17 10:18AM	2'59"	CASTELLE	Send	10/10	144	Completed
	Total	4'37"	Pages Sent: 10		Pages Printed: 0		

[redacted] SURPRISE [redacted]
ARIZONA

Facsimile Transmittal – City Clerk's Office

To: Linda J. Sohigian **Fax:** 1-434-972-7653

Agency: Lexis Nexis **Phone:** 1-800-446-3410

From: Rosa Herrera, Deputy Clerk **Phone:** 623-875-4213

Date: 06/02/03 **Pages:** 10

RE: Ordinance No. 03-12 & 03-13

[ ] Urgent [X] For Review [ ] Please Comment [ ] Please Reply [ ] Other

Attached are copies of the above-mentioned ordinance:

Ord. #	# of pages
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Status report as follows:

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03-05	PAD – Veramonte	Pending
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03-14	Annexation – County Right of Way	Pending
03-15	Annexation – Sarah Ann Ranch	Pending
03-16	Rezone – RDS Mini Storage	Pending

If you have any questions, please call me at 623-875-4213. Thank you.

12425 W. Bell Road, Suite D-100, Surprise, AZ 85374, Fax (623) 583-3396

3rd PAD AMENDMENT

for

ROYAL RANCH

Prepared for:

FULTON HOMES CORPORATION
9140 S. Kyrene Road, Suite 202
Tempe, AZ 85284

Prepared by:
CMX, L.L.C.
7740 N. 16th Street, Suite 100
Phoenix, AZ 85020
Phone: (602) 567-1900
Fax: (602) 567-1901

RECEIVED
SEP 17 2004
CITY OF SURPRISE

CITY OF SURPRISE
PLANNING AND ZONING DEPARTMENT
APPROVED
Case No.: PADA04.264
P&Z Comm. Approval: _____
City Council Approval: _____
B.O.A. Approval: Admin Approval 9/27/2004
Stipulations: _____

September 2004
Project No. 6537.19

3rd PAD AMENDMENT

for

ROYAL RANCH

Prepared for:

FULTON HOMES CORPORATION
9140 S. Kyrene Road, Suite 202
Tempe, AZ 85284

Prepared by:
CMX, L.L.C.
7740 N. 16th Street, Suite 100
Phoenix, AZ 85020
Phone: (602) 567-1900
Fax: (602) 567-1901

Approved by:
CITY OF SURPRISE
12425 W. Bell Rd., Suite D100
Surprise, AZ 85374

_____ 9/27/04
Community Development Director Date

_____ _____
City Manager Date

September 2004
Project No. 6537.19

TABLE OF CONTENTS

ROYAL RANCH PAD AMENDMENT

Page No.

Overview 1

Governing Documents 1

Proposed PAD Amendment 1
- Objective 1 2
- Objective 2 2

Conclusion 2

Amended Land Use Summary Table 2

Amended Development Standards 3

APPENDIX

Typical Lot Comparison ..... Appendix A

ROYAL RANCH - 3rd PAD AMENDMENT

Overview:

Royal Ranch is a master planned community located at the southeast corner of Greenway Road and Bullard Avenue. Immediately north of the master planned community is the proposed Surprise Center. A Planned Area Development (PAD) was approved for Royal Ranch in 1999, and a PAD Amendment was approved in 2002. The original PAD provided for a maximum of 1,716 residential units, all within the low density residential (LDR) land use designation and all having lot sizes with a width ranging from 48 to 58 feet and a depth of 110 feet. The location of the various lot sizes (48 feet to 58 feet) were not predetermined, but were left to the discretion of the eventual developer. The PAD identified major open space areas, but did not provide detailed information as to the amenities to be provided within those open spaces.

The PAD Amendment that was approved in 2002 consisted of four objectives. One objective was to provide a more diversified mix of housing products. The second objective was to better disperse open space throughout the master planned community, and to provide amenities in additional pocket parks as well as the two major parks. Another objective introduced a "twin home" product by creating a medium density residential (MDR) land use designation with its own development standards. The final objective was to accomplish all of the above without exceeding the original PAD's allowable 1,716 residential units.

A 2nd PAD Amendment was approved in 2003, which removed two community pools due to the construction of the City of Surprise Aquatic Center immediately north of Royal Ranch.

Governing Documents:

This 3rd PAD amendment is intended to take precedence over the 2nd PAD Amendment, the 2002 PAD Amendment, and the original 1999 PAD. Where this 3rd PAD amendment has provisions which conflict with the 2nd PAD Amendment, the 2002 PAD Amendment, the original 1999 PAD and/or Zoning Ordinance, this 3rd PAD amendment shall govern. The 2nd PAD Amendment, the 2002 PAD Amendment, or the original 1999 PAD shall govern where there are no conflicting provisions within this 3rd PAD amendment. The Zoning Ordinance for the City of Surprise shall govern where there are no conflicting provisions within the 2nd PAD Amendment, the 2002 PAD Amendment, the original 1999 PAD or this 3rd PAD amendment.

Proposed PAD Amendment:

This PAD amendment is being submitted on behalf of Fulton Homes with the following objectives:

1. Introduce a residential product (The Heritage Collection) that utilizes a "Z-lot line" replacing the "twin home" product on Parcel 7.

2. Conformance with the recently approved Final Plat for Parcel 8.

Objective 1: Introduce a residential product (The Heritage Collection) that utilizes a "Z-lot line" replacing the "twin home" product on Parcel 7. The "Z-lot line" product provides the same density as the twin home product without the two homes having to share a common wall. The "Z-lot line" configuration utilizes the same total lot area, width and depth as the twin home product for two combined lots. The rear lot width of 86 feet is split by providing one unit (Lot A) a rear lot width of 46 feet and the other unit (Lot B) a rear lot width of 40 feet. The property line that splits the 86-foot lot is then offset 7 feet at a distance of 36 feet from the rear lot line to provide a front lot width of 39 feet for Lot A and 47 feet for Lot B. A 3-foot Use and Benefits Easement is provided for Lot A on Lot B, and a 4-foot Use and Benefits Easement is provided for Lot B on Lot A. A detailed lot comparison between the twin home product and the "Z-lot line" product is attached in Appendix A.

Objective 2: Conformance with the recently approved Final Plat for Parcel 8. Parcel 8 was previously approved as medium density residential (MDR) as part of the 2002 PAD Amendment. The recently approved Final Plat for Parcel 8 consists of a minimum lot size of 73-foot wide x 120-foot deep rather than the 86-foot wide x 80-foot deep twin home product lots. Therefore, Parcel 8 is now considered low density residential (LDR) in lieu of the medium density residential (MDR). The attached Land Use Summary Table and the Medium Density Residential Parcels table have been revised to reflect this PAD amendment.

Conclusion:

The attached Amended Land Use Summary Table, and the attached Amended Development Standards shall now govern the development of Royal Ranch and take precedence over the approved 2002 PAD Amendment.

AMENDED LAND USE SUMMARY

LAND USE SUMMARY TABLE				
Parcel	**Land Use Designation**	**Min. Lot Size (S.F.)**	**Standard Lot Dimension (Ft.)**	**No. of Lots**
1	LDR	6380	58x110	73
2	LDR	5830	53x110	162
3	LDR	5280	48x110	189
4	LDR	7245	63x115	92
5	LDR	7020	60x117	144
6	LDR	5520	48x115	136
7 (1)	MDR	3372	(1)	69
7 (1)	MDR	3508	(1)	69
8	LDR	8760	73x120	68
9	LDR	9375	75x125	127
Total				1060

Notes:

(1) Parcel 7 consists of a "z-lot line" configuration. The lot dimensions are as follows:

Lot A: front width = 39 feet
rear width = 46 feet
Lot B: front width = 47 feet
Rear width = 40 feet
Both lots have a depth of 80 feet.

AMENDED DEVELOPMENT STANDARDS

LOW DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.) (1)	Area (s.f.)	Max Lot Cov (%)	Front (Ft.) (2)(3)	Rear (Ft.) (3)	Side (min.) (Ft.)(3)(4)	Side (total) (Ft.)(3) (4)(5)	Bldg. Ht. (Max.) (Ft.)
1	58	110	6380	48	18	20	5	13	30
2	53	110	5830	48	18	20	5	13	30
3	48	110	5280	50	18	20	5	13	30
4	63	115	7245	48	18	20	5	13	30
5	60	117	7020	48	18	20	5	15	30
6	48	115	5520	50	18	20	5	13	30
8	73	120	8760	50	18	20	5	15	30
9	75	125	9375	45	18	20	5	15	30

Notes:

(1) Depth may be less at knuckles, cul de sacs and other special conditions as long as setbacks and minimum lot areas are met.

(2) Setback as measured to face of garage door. Setback shall be staggered between 18' and 21' with no more than 2 homes in a row having same setback to garage door (except at knuckles and cul de sacs). Front setback shall be 12' minimum to house livable area where garage is set back from livable area and for side entry garages, planters, porches, pop-outs, etc.

(3) Fireplaces, bay windows and ground mounted AC units may extend into setbacks. A minimum of 3' of side yard shall be unobstructed.

(4) 13' side yard setback required on street side of corner lots.

(5) 10' minimum separation required between homes.

MEDIUM DENSITY RESIDENTIAL PARCELS									
Parcel	Width (min.) (Ft.)	Depth (min.) (Ft.)	Area (s.f.)	Max. Lot Cov (%)	Front (Ft.)	Rear (Ft.)	Side (min.) (Ft.)	Side (total) (Ft.)	Bldg. Ht. (Max.) (Ft.)
7 (8)	39	80	3372	60	10 (6)	10	4	9 (7)	30
7 (8)	40	80	3508	60	10 (6)	10	4	9 (7)	30

Notes:

(6) 18' to face of front entry garage door.

(7) Fireplaces and ground mounted AC units may extend into setback. A minimum of 3' of side yard shall be unobstructed. The minimum separation between adjacent homes will be 8-feet.

(8) Parcel 7 consists of a "z-lot line" configuration. The lot dimensions are as follows:

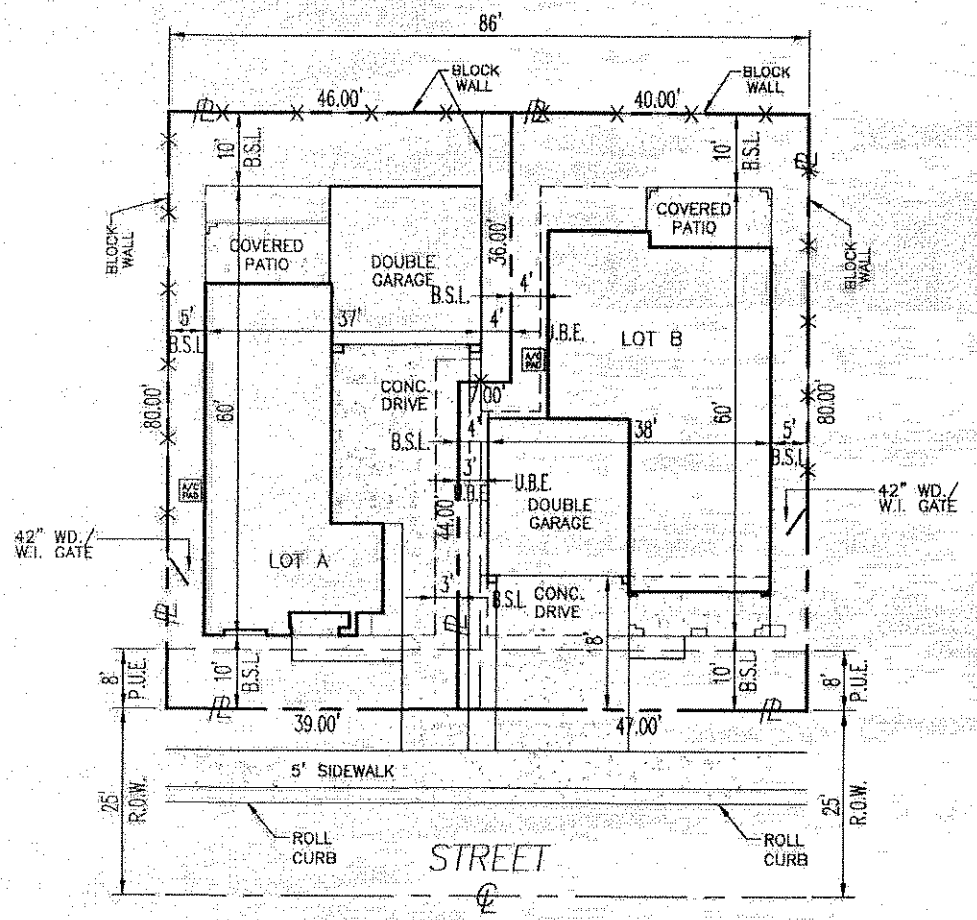
Lot A: front width = 39 feet
rear width = 46 feet
Lot B: front width = 47 feet
rear width = 40 feet

Both lots have a depth of 80 feet.

APPENDIX A

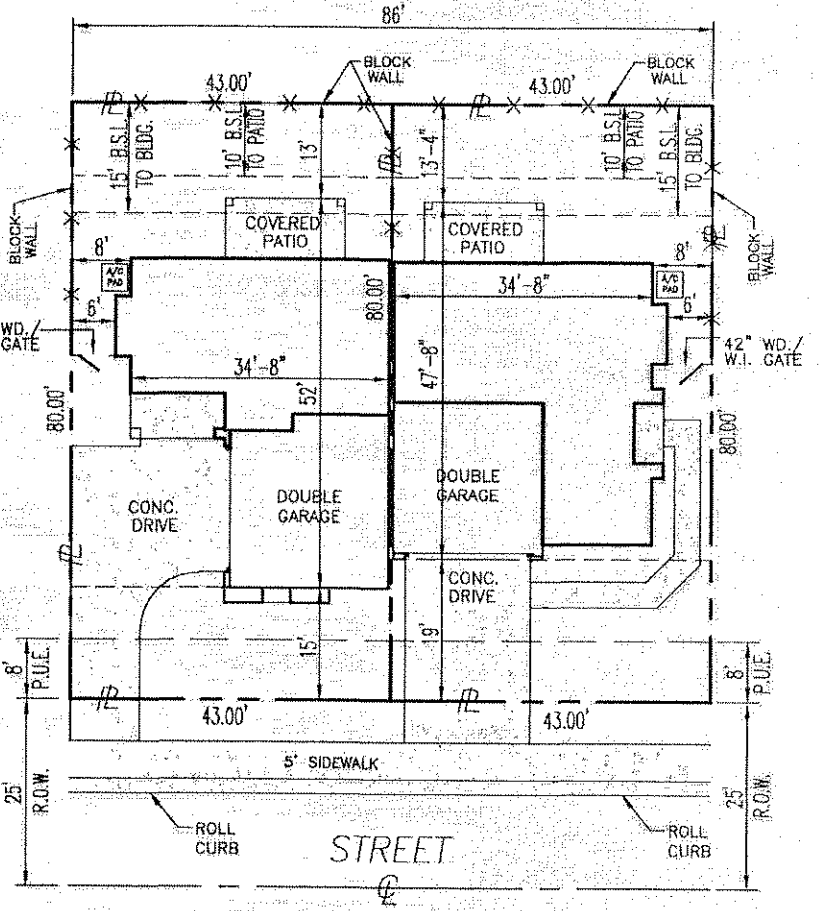
TYPICAL LOT COMPARISON

ROYAL RANCH PARCEL 7



HERITAGE COLLECTION

LOT AREA: TWO LOT TOTAL = 6,880
LOT WIDTH: TWO LOT TOTAL = 86'
LOT DEPTH: 80'



TWIN HOME

LOT AREA: TWO LOT TOTAL = 6,880
LOT WIDTH: TWO LOT TOTAL = 86'
LOT DEPTH: 80'

TYPICAL LOT COMPARISON