Maricopa County Department of Transportation

FINAL
DESIGN CONCEPT REPORT

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

MARICOPA COUNTY, AZ
Work Order No. 68932

AUGUST 1997

Registered Professional Engineer (Civil)
CERTIFICATE NO.
10494
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ARIZONA, U.S.A.

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ENGINEERS AND PLANNERS

TABLE OF CONTENTS

TABLE OF CONTENTS Continued...

TABLE OF CONTENTS Continued...

EXECUTIVE SUMMARY

This Design Concept Report (DCR) presents the results of an investigation of alternatives for improving 107th Avenue between Rose Garden Lane and Jomax Road consistent with Maricopa County Department of Transportation (MCDOT) Rural Minor Collector Road classification.

The studies have involved both agency and public participation. A public information meeting was conducted. An Intergovernmental Agreement (IGA) has been negotiated with the City of Peoria.

The purpose of the project is to minimize dust generated by Sunward Materials haul trucks. Additional DCR goals were to utilize existing alignment where economically feasible, enhance safety, improve drainage characteristics, minimize impact to adjacent property, minimize impact to Agua Fria floodplain, and select an alternative. This DCR recommends specific improvements and provides data for long-range improvement projects.

The original project included widening 107th Avenue between Rose Garden Lane and Deer Valley Road. The beginning of the project has been moved to Williams Road in accordance with the IGA. The City of Peoria decided to wait for subdivision developers to construct the portion of 107th Avenue within Peoria's jurisdiction. The new project limits will be Williams Road to Jomax Road. Essentially all of the new project is located in Maricopa County jurisdiction. The new project limits will provide two-lane two directional Rural Collector roadway with a left turn lane at Sunward Materials.

This study analyzes the traffic needs within the project limits, including an evaluation of the existing design, traffic volumes, and accidents. Traffic projections through the design year have been developed and agency and public participation obtained to define the transportation needs of the route. Alternatives for improving the highway to meet current criteria for safety, capacity, and operational characteristics have been developed and evaluated. The evaluation includes right-of-way requirements, provisions for limiting access points between the highway and adjacent properties, constructability, traffic control, and drainage. An environmental overview was prepared as part of this study to provide the necessary environmental and socio-economic impact evaluations for the alternative selection process.

The design year traffic projection indicates the project area may evolve into four-lane divided Minor Arterial Road by Design Year 2021. Maricopa Association of Governments' (MAG) long range "Build Out" traffic projection will require a Principle Arterial Road classification. The Rural Minor Collector classification will operate adequately with over ten times today's traffic volume. MCDOT management selected the Rural Minor Collector classification to preserve limited funds for use on other critical projects. "Full Improvement" was considered beyond the scope of this DCR. Future "Full Improvement" projects will be scheduled in response to actual growth, rather than projected growth.

This corridor has several key characteristics in addition to Sunward Materials access and dust control. The southern portion of the project is within City of Peoria jurisdiction where subdivision developers will construct part of 107th Avenue. An IGA was required to coordinate design and construction. Salt River Project (SRP) has plans to construct a future East wing substation along 107th Avenue in the middle portion of the project. Available right-of-way is restricted and several high voltage transmission towers must be avoided near the SRP site. Alignment of 107th Avenue must shift east of the section line or cross the Agua Fria floodplain in the northern portion of the project area. The Central Arizona Project (CAP) is planning a groundwater "Recharge" project on the west bank of the Agua Fria. The City of Peoria is studying development of a "Linear Park" within the Agua Fria floodplain. An at grade connection with the future Interim Estrella Roadway must be provided. The ultimate configuration of the Estrella Roadway includes a bridge across the Agua Fria River and a Traffic Interchange (TI) at 107th Avenue.

Environmental issues include desert tortoise, 404 permits, potential prehistoric sites in the northern two thirds of the project, and the abandoned historic canal that runs the length of the corridor. The historic Marnette Heading Canal is eligible for the National Register of Historic Places. A Class III cultural resources survey will be conducted by MCDOT to investigate issues related to the canal and prehistoric Hohokam town/village sites. Desert tortoise mitigation is limited to guidelines for handling Sonoran Desert tortoises encountered during construction. Project Special Provisions will adequately address tortoise mitigation. Preconsultation with the Army Corps of Engineers indicated Nationwide 14 Permits could be obtained for all road crossings. Most of the Agua Fria floodplain will not be considered "Waters of the United States".

A total of five alternatives were identified including the "Enhanced Maintenance" Alternative "A". The other four alternatives ("B" through "E") were "Low/Reasonable Cost Improvement" alternatives. The "Full Improvement" and "Do Nothing" alternatives were not investigated. The five alternatives that were studied and evaluated are:

- Alternative "A" - Enhanced Maintenance with purchase of right-of-way.
- Alternative "B" - Two-lane Rural Collector Roadway crossing the Agua Fria floodplain.
- Alternative "C" - Two-lane Rural Collector Roadway east of the Agua Fria floodplain and west of SRP substation.
- Alternative "D" - Two-lane Rural Collector Roadway east of the Agua Fria floodplain and east of SRP substation.
- Alternative "E" - Two-lane Rural Collector Roadway on east bank of Agua Fria floodplain and west of SRP substation.

All five alternatives follow the same alignment and provide variable three-lane to five-lane roadway within City of Peoria jurisdiction.

The analysis of these five alternatives is presented in the Alternatives Matrix in DCR subsection 5.13.

Investigation of Alternative "D" was discontinued from consideration due to high construction cost and high impact on private property.

In depth analysis of the four remaining alternatives ("A", "B", "C" and "E") is the heart of this DCR. The selection matrix presented in subsection 6.1 was used to select the preferred alternative.

Alternative "E" is the selected alternative for improvement of 107th Avenue within the study area. This alternative avoids the Agua Fria floodplain, avoids property with high potential for development, and provides the least expensive at grade intersection with the Interim Estrella Roadway.

COST ESTIMATE SUMMARY

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)

WORK ORDER NO. 68932

Project Activity Description	Factors	Enhanced Maintenace of Existing Alignment (Alt. A)	New Alignment in Floodplain (Alt. B)	New Aligment East of Floodplain (Alt. C)	New Alignment on Bank of Floodplain (Alt. E)
Construction Cost					
MCDOT	N/A	$141,707	$2,115,817	$5,042,446	$2,118,483
City of Peoria	N/A	$0	$6,433	$6,433	$6,433
DCR, R/W & Design Cost	N/A	$249,449	$249,449	$249,449	$249,449
Construction Management					
MCDOT	15%	$21,256	$317,373	$756,367	$317,772
City of Peoria	15%	$0	$965	$965	$965
Right-of-Way	N/A	$844,100	$1,200,400	$2,279,400	$1,111,900
Utility Relocation	N/A	$0	$147,000	$140,000	$140,000
Administration	12%	$17,005	$254,670	$605,866	$254,990
Total Project Cost		**$1,273,516**	**$4,292,107**	**$9,080,926**	**$4,199,992**
MCDOT Total Cost		$1,273,516	$4,284,708	$9,073,527	$4,192,594
Peoria Total Cost		$0	$7,398	$7,398	$7,398

Section 1. INTRODUCTION

1.1 Project Overview

MCDOT Work Order Number 68932 for 107th Avenue encompasses the design of improvements to upgrade the existing facility to a rural minor collector road from Rose Garden Lane to Jomax Road.

The project area is located within the jurisdictions of Maricopa County and the City of Peoria. Proposed work includes widening within City of Peoria and realignment (as necessary) in rural areas within Maricopa County. 107th Avenue is an existing paved half street, 9.75 m (32 feet) west to face of curb, for one mile from Rose Garden Lane to Williams Road, within the jurisdiction of the City of Peoria. The remaining 4.023 km (2.5 miles) is an existing curvilinear gravel two-lane county roadway that is mainly within the Agua Fria flood plain.

An Intergovernmental Agreement is being drafted with the City of Peoria. This project is currently scheduled in the 5 year CIP for the fiscal year of 2001 and is a potential early construction project.

107th Avenue roadway design must be interfaced with on-going subdivision and roadway design projects, including a Design Concept Report (DCR) that is in progress for the Estrella Interim Roadway Phase II.

The 2021 design year traffic projection of 21,000 ADT indicates the project area will evolve into a Minor Arterial road during the next twenty years. MAG's long range build out traffic projection of over 50,000 ADT will require a Principal Arterial road. Nevertheless, the Rural Minor Collector classification will operate adequately with over ten times today's traffic volume of 500 ADT. Therefore, management selected the Rural Minor Collector classification to preserve limited funds for use on other critical projects. Alternatives investigated by this study were limited to "enhanced Maintenance" and "Low/Reasonable Cost Improvements". "Full Improvement" was considered beyond the scope of work. Planning, right-of-way, design, and construction of the "Full Improvement" will be scheduled in response to actual future growth, rather than projected growth. This scenario has the added benefit of shifting some of the "Full Improvement" cost onto subdivision developers.

Design criteria was upgraded to the same horizontal and vertical design characteristics as arterial roads, but limited to Rural Collector road widths.

1.2 Purpose of the Report

The purpose of this roadway project is to:

- Minimize dust generated by Sunward Materials haul trucks along 107th Avenue.
- Utilize existing alignment where economically feasible.

- Enhance roadway safety.
- Provide adequate drainage improvements.
- Minimize impact to adjacent property owners.
- Minimize impact to the Agua Fria floodplain.

This report developed alignment alternatives consistent with design criteria, and analyze their conformance with evaluation criteria that MCDOT considered important. Selection of the Preferred Alternative was the ultimate goal of this report.

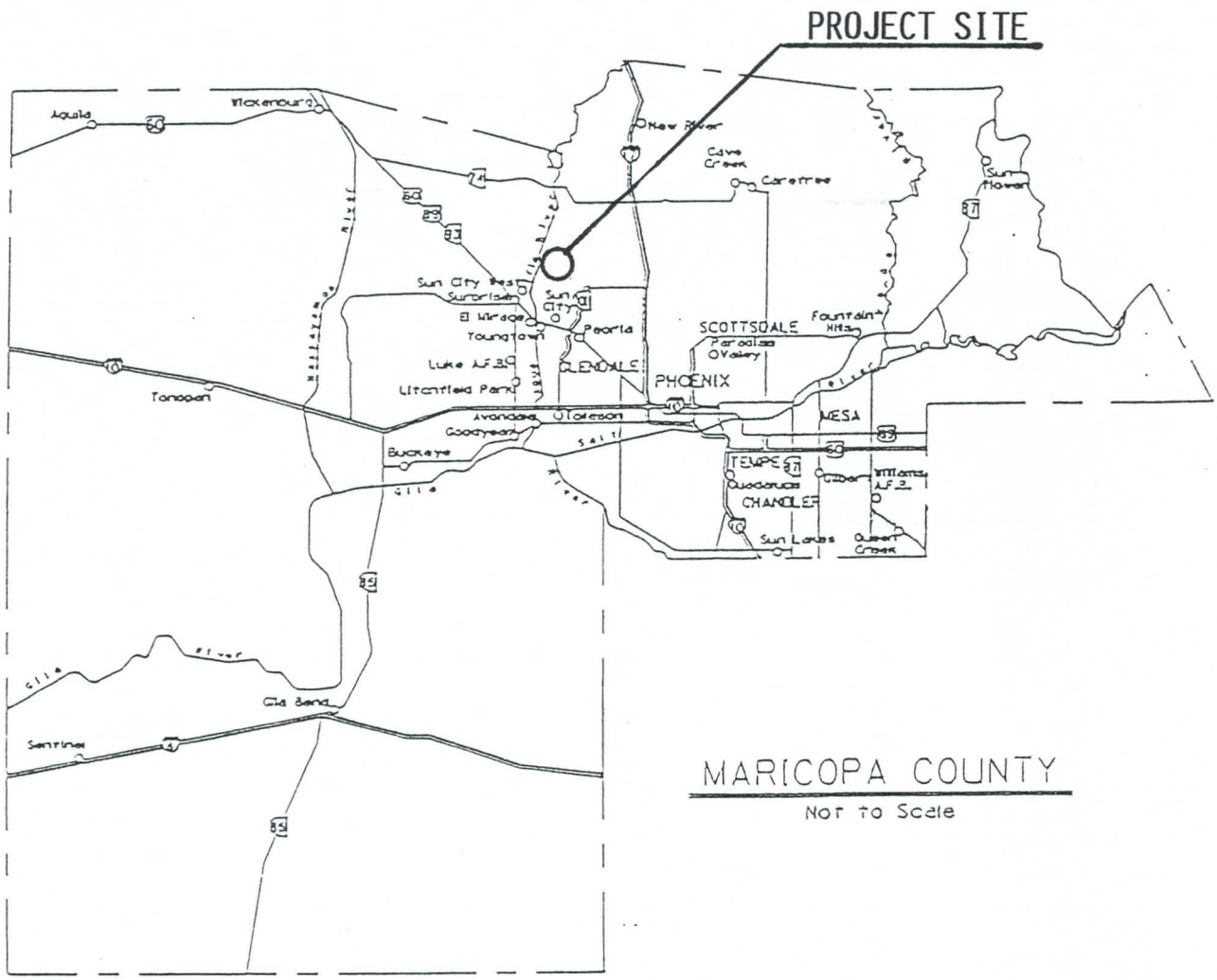

FIGURE 1
LOCATION MAP

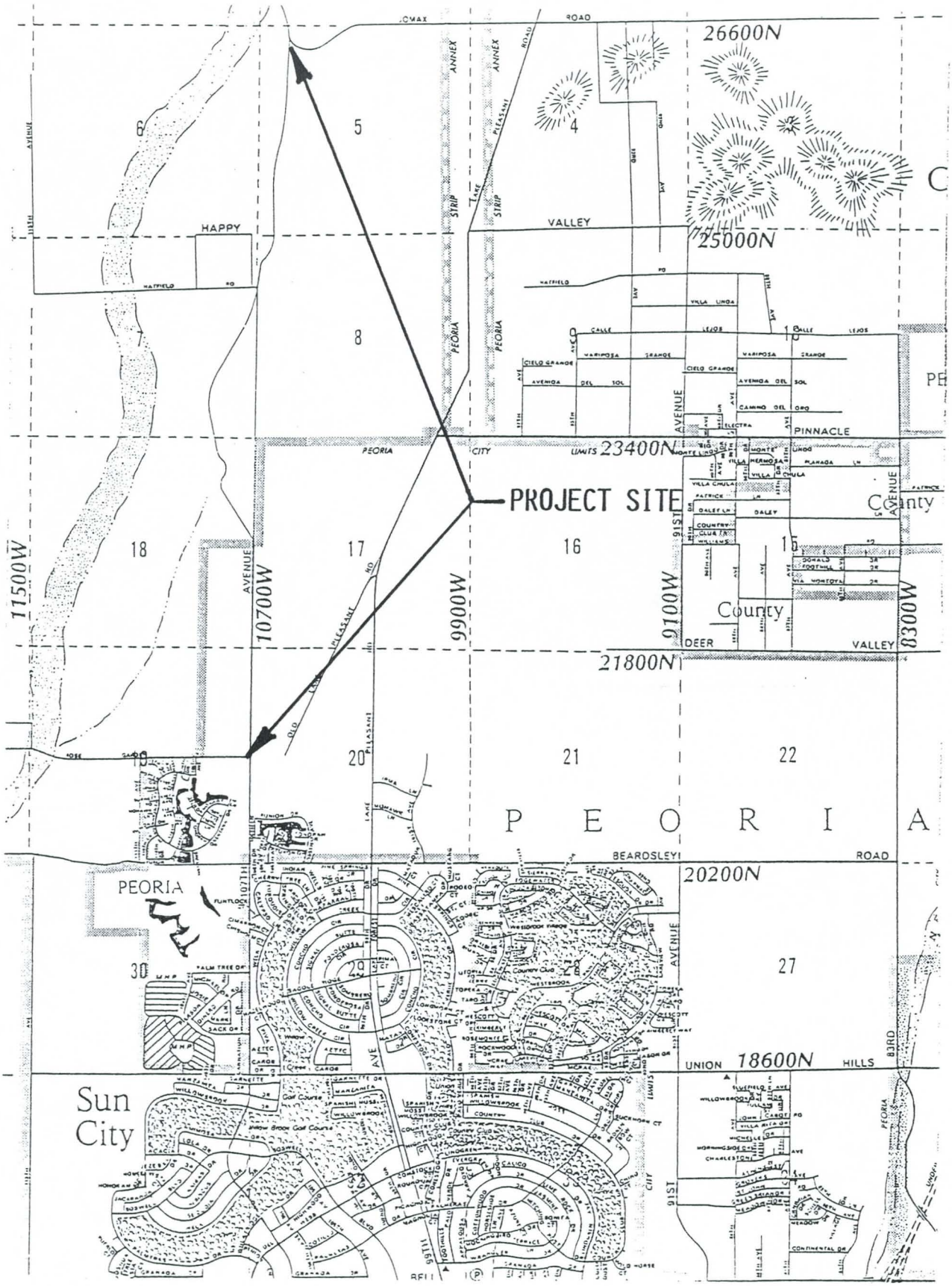

FIGURE 2
VICINITY MAP

Section 2. CORRIDOR CHARACTERISTICS

2.1 Existing Roadway

107th Avenue from Rose Garden Lane to Jomax Road is located north of Sun City and west of Peoria in the northwest part of the valley. The southern mile of the project is within the City of Peoria (Rose Garden Lane to Williams Road). From the Williams Road alignment to 200 m (660') south of the Pinnacle Peak Road alignment the east half of the roadway is within the City limits. 107th Avenue begins (2.5 miles) south of project site in Sun City and ends at Jomax Road. It functions as a urban major collector up to Rose Garden Lane. The City of Peoria, according to their master plan, classifies 107th Avenue from Rose Garden Lane to Pinnacle Peak Road alignment as urban minor arterial. 107th Avenue currently functions as a rural local road within the project site.

The west ½ of the roadway from Rose Garden Lane to Williams Road is currently paved. From Williams Road to Jomax Road 107th Avenue consists of a graded dirt road. The alignment of the dirt road follows the section line to ½ mile north of Pinnacle Peak Road. The roadway drops into the Agua Fria River channel at this location. The roadway follows the existing terrain from this point north to Jomax Road east of the section line (see Figure 3). The existing alignment has numerous curves from this location to Jomax Road. 107th Avenue intersects Jomax Road where it curves to the north. The northbound traffic turning east onto Jomax Road is separated from west bound traffic turning south onto 107th Avenue. Jomax Road is paved at this location.

There are four developments along 107th Avenue in the City of Peoria. The first two developments are residential subdivisions on the west side of 107th Avenue between Rose Garden Lane and Deer Valley Road. The west half of 107th Avenue was paved in 1994 in conjunction with this development. This pavement is 9.754 m (32') wide and consists of 100 mm (4") of asphaltic concrete over 100 mm (4") of aggregate base and 180 mm (7") of select material. Curb and gutter, sidewalk, and curb returns for three streets are also included in the improvements along 107th Avenue. The pavement is striped for two way traffic and the Sunward Materials haul trucks use this pavement extensively. The pavement appears to be in very good condition.

Deer Valley Ranch is another single family residential development located on the west side of 107th Avenue. It extends from Deer Valley Road to Williams Road (½ mile north of Deer Valley Road). The west half of 107th Avenue was paved in 1995 as part of this development. This pavement is 9.754 m (32') feet wide and consists of 100 mm (4") of asphaltic concrete over 100mm (4") of aggregate base and 180 mm (7") of select material. Curb and gutter, sidewalk, and curb returns for four streets are also included in these improvements along 107th Avenue. The Sunward Materials trucks use this recently paved section of 107th Avenue also. The pavement remains in good condition.

Alta Vista Estates is another residential development located on the east side of 107th Avenue that will include single family as well as multi-family dwellings. It extends from Deer Valley Road to 200 m (660') south of the Pinnacle Peak Road alignment. It will include

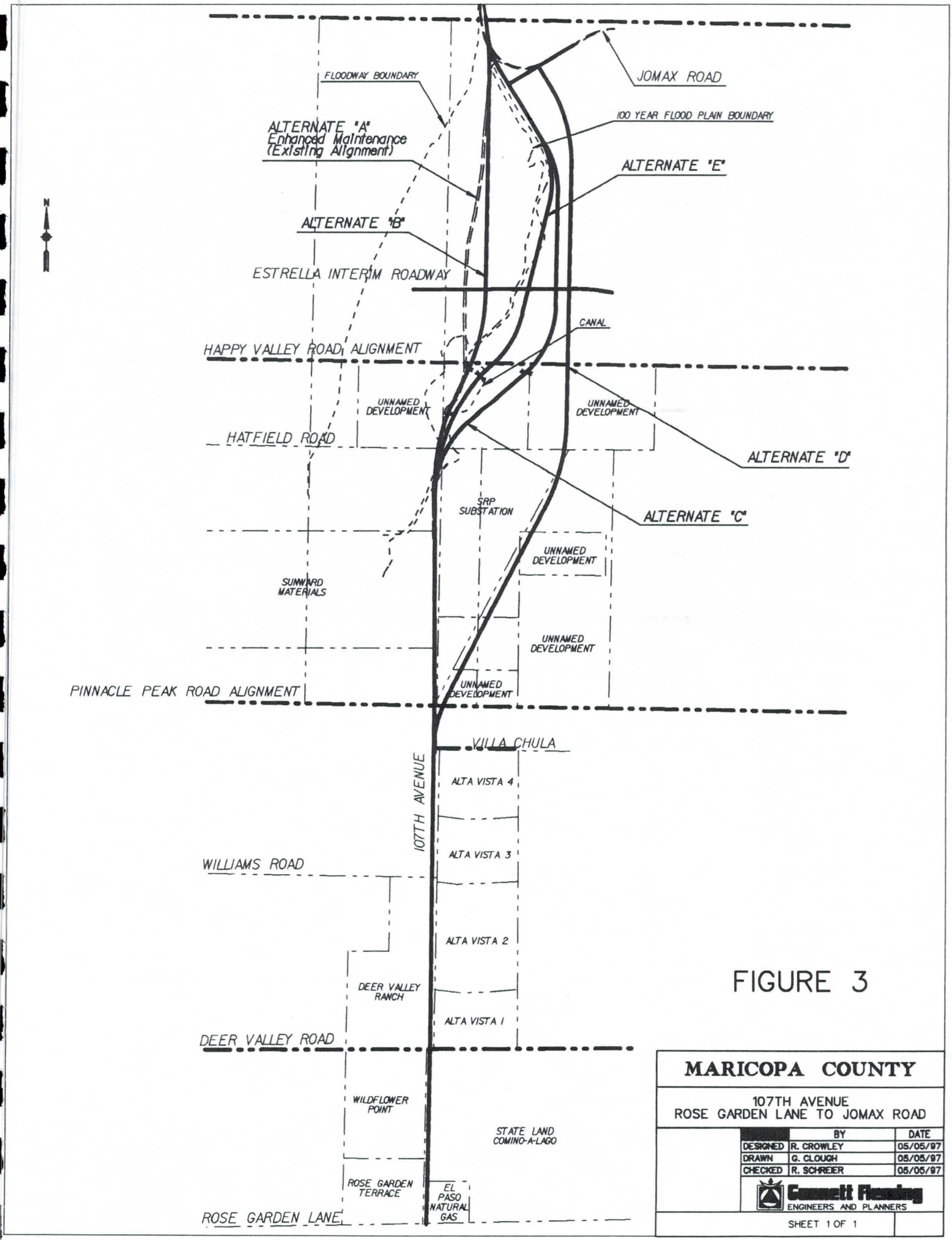

FIGURE 3

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	05/05/97
DRAWN	G. CLOUGH	05/05/97
CHECKED	R. SCHREIER	05/05/97

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ENGINEERS AND PLANNERS

SHEET 1 OF 1

improvements to 107th Avenue similar to the other two developments and dedication of 16.764 m (55') of right-of-way. It is anticipated that the Alta Vista off site improvements will be completed prior to advertising this project. This location currently consists of a graded dirt road varying in width from 7.620 m (25') to 13.716 m (45').

2.2 Land Use

The land adjacent to the project site is mostly vacant native desert land. Most of the county land near the project is zoned R43 which specifies a maximum density of one unit per acre (see Zoning Maps). The City of Peoria has zoned most of the land within their jurisdiction residential. The northwest corner of 107th Avenue and Rose Garden Lane is zoned Planned Unit Development (PUD) and is included in the Rose Garden Acres subdivision. The area north of the PUD and south of Deer Valley Road is zoned R1-6 (single family 6000 sf) and is called the Wildflower Point Development. On the east side of 107th Avenue from Rose Garden Lane to Deer Valley Road is primarily State land that is zoned AG (agriculture). The northeast corner of 107th Avenue and Rose Garden Lane is owned by El Paso Natural Gas. The west side of 107th Avenue is zoned R1-6 and is included in the Deer Valley Ranch Subdivision. The east side of 107th Avenue from Deer Valley Road to 200 m (660') south of Pinnacle Peak Road alignment is part of the Alta Vista Estates development and included zonings of R1-6, R1-8 (Single Family Residential with 8000 SF lots), and RM-1 (Multi-Family Residential). The southeast corner of 107th Avenue and Pinnacle Peak Road is zoned C-2 (commercial).

107th Avenue from Williams Road to Jomax Road is primarily a haul road for Sunward Materials. Sunward operates a sand and gravel plant on the west side of 107th Avenue north of Pinnacle Peak Road alignment and south of Hatfield Road. The existing two entrances must be maintained.

SRP owns the property on the east side of 107th Avenue north of Pinnacle Peak Road alignment and south of Hatfield Road alignment. A future SRP Eastwing Substation will be constructed on the parcel. The estimated construction date is 25 to 30 years in the future. The two gates on the south side of their property must have future access, but the northwest gate can be abandoned.

The future Estrella Freeway will cross 107th Avenue north of Happy Valley Road alignment and south of Jomax Road. No interchange is planned for this location. The intersection will be an at-grade facility. An interchange is planned for Lake Pleasant Road about 1 mile east of 107th Avenue. Lake Pleasant Road will be the major north/south route through Peoria according to Peoria's master plan. MAG and ADOT have deleted the Loop 303 Estrella Freeway from the regional transportation plan. However, MCDOT is planning to construct an interim roadway in the ADOT right-of-way for the Estrella. This interim facility will consist of a two lane roadway widened at the intersections for left turns. Ritoch-Powell is currently preparing a DCR for Phase II of the Estrella Parkway which is from Deer Valley Road west of Sun City West to Lake Pleasant Road. Phase II is scheduled to advertise for construction during May 2001. Phase II will have an at-grade intersection at 107th Avenue.

The City of Peoria has an active water well site located at the southwest corner of 107th Avenue and Williams Road. The City is in the process of acquiring another well site near the southeast corner of 107th Avenue and Pinnacle Peak Road. The property owner is requesting that the City extend 107th Avenue to Pinnacle Peak by June 1998, and Pinnacle Peak Road from 107th Avenue to Lake Pleasant Road by June 1999. These roads are not included in the City's 5 year CIP, and may not meet the requested schedules. But this request combined with other requests to route truck traffic onto Pinnacle Peak Road will prompt the City to submit a candidate assessment report for Pinnacle Peak Road.

2.3 Key Topographic Features

The study corridor is parallel to the east bank of the Agua Fria River. The existing and future roadway is located on the first terrace above the floodplain from Rose Garden Lane to about 150 m (500') south of Hatfield Road. From there to Jomax Road the first terrace is very narrow, or missing and the second (higher) terrace is adjacent to the Agua Fria Floodplain.

At least six minor washes and one major wash flow from east to west and terminate with alluvial fans in the Agua Fria Floodplain.

The historic Marnette Heading Canal wanders from north to south along the entire corridor. Sections of the canal have been obliterated near Sunward Materials and Alta Vista Estates.

The City of Peoria has approved construction of a concrete lined drainage channel in the existing right-of-way east of the section line from Rose Garden Lane to Deer Valley Road. The ditch will be constructed in 1997 by the Alta Vista Estates developer.

The existing and future water well sites for the City of Peoria, future SRP substation, Sunward Materials sand and gravel plant, and future Estrella Freeway were discussed in the "*Land Use*" section of this report.

Realignment of existing 107th Avenue is required north of Pinnacle Peak Road alignment to avoid the transmission tower located on the west edge of the dirt road. See the "*Utilities*" Section for more detail.

Edge of pavement for 107th Avenue near Hatfield Road must be located a minimum of 30.48 m (100') west of a WAPA transmission tower. The critical tower is located in the northwest corner of the future SRP substation. See the "*Utilities*" section of this report for more detail.

The City of Peoria is planning a linear park in the Agua Fria River at some future date.

2.4 Utility Corridors

There is an existing overhead 12 KV power line on the east side of the roadway from Rose Garden Lane to ¼ mile south of the Happy Valley Road alignment. The power line crosses 107th Avenue ¼ mile south of Happy Valley Road and continues to the north past Jomax Road. The poles are located about 9.144 m (30') from the existing edge of the dirt roadway

between Williams Road and Hatfield Road. From Hatfield Road north the power poles are located a few hundred feet west of the 107th Avenue alignment.

US West also has buried telephone cables along the east side of the 107th Avenue from Rose Garden Lane to Happy Valley Road. From Rose Garden Lane to Deer Valley Road, a telephone cable is located 7.315 m (24') east of the section line and a major line with manholes is located 11.582 m (38') east. From Deer Valley Road to Pinnacle Peak Road a cable is located 9.449 m (31') east of the section line and from Pinnacle Peak to Happy Valley it is located 8.534 m (28') east of the section line. A 400 mm (16") water line and a 380 mm (15") sewer line are located west of the section line along 107th Avenue from Rose Garden Lane to Williams Road. Cox Cable and SW gas have no facilities in the area.

A 203 KV transmission line crosses 107th Avenue near the Pinnacle Peak alignment. The base for one transmission tower is located at the edge of existing 107th Avenue.

SRP and WAPA transmission lines cross the Agua Fria River and 107th Avenue just south of Hatfield Road. SRP has a 100.584 m (330') east-west easement along the south side of the ¼ section line. WAPA has a 100.584 m (330') east-west easement along the south side of SRP's east-west easement. The WAPA transmission tower east of 107th Avenue adjacent to the floodplain must be avoided. The critical tower is located in the northwest corner of the future SRP substation. SRP requires a 30.48 m (100') clear zone around towers to provide access for cranes and other construction equipment.

The City of Peoria has sewer and water lines under the existing 107th Avenue pavement. The existing sewer line on 107th Avenue extends from Rose Garden Lane to Williams Road and will be extended to approximately 660 feet south of Pinnacle Peak Road. Due to defective pipe material the City is having to replace the entire section of 16" water line on 107th Avenue from Rose Garden Lane to Williams Road. The water line will also be extended from Williams Road to approximately Pinnacle Peak Road. Sewer line and water line extensions to undeveloped properties will not be extended at this time. These extensions will have to take place with the paving project.

2.5 Right-of-Way

The existing right-of-way width varies in the project area. From Rose Garden Lane to Deer Valley Road, there is 16.764 m (55') of right-of-way west of the section line adjacent to the Rose Garden Acres and Wildflower Point developments and 10.058 m (33') east of the section line (see Figure 4). The right-of-way width is 33.528 m (110') from Deer Valley Road to Williams Road; 16.764 m (55') west of the section line next to Deer Valley Ranches, and 16.764 m (55') east of the section line adjacent Alta Vista Estates (see Figure 5). From Williams Road to 200 m (660') south of Pinnacle Peak Road alignment, the only right-of-way is 16.764 m (55') east of the section line to be dedicated with the Alta Vista Estates Development (see Figure 6). No right-of-way exists north of Pinnacle Peak Road alignment along 107th Avenue alignment (see Figure 7) except for 396.240 m (1300') of 12.192 m (40') right-of-way between Hatfield Road and Happy Valley Road alignment west of the section line and 24.384 m (80') of right-of-way along Jomax Road.

A 10.058 m (33') roadway easement exists on SRP property between the Pinnacle Peak Road alignment and Hatfield Road alignment (see Figure 8).

The required right-of-way for a section line rural local road and collector road is 33.528 m (110'). 33.528 m (110') of new right-of-way is required from 200 m (660') south of Pinnacle Peak Road to Jomax Road. An additional 16.746 m (55') of right-of-way west of the section line is required from Williams Road to 200 m (660') south of Pinnacle Peak Road. An additional 6.706 m (22') of right-of-way is required in the City of Peoria east of the existing right-of-way from Rose Garden Lane to Deer Valley Road. It may be possible to obtain much of the required right-of-way through dedication.

2.6 Hydrology

The existing natural drainage flows from the north to the south and from the east to the west adjacent to the Agua Fria River. The existing roadway is in the FEMA 100-year flood plain from ¼ mile south of Happy Valley Road to Jomax Road. Flood Control District of Maricopa County (FCDMC) has submitted a letter of Map Revision to FEMA in order to update the 100 year event for the new Lake Pleasant Dam configuration. If the revision is approved, then Agua Fria discharge will be reduced from 3610 m^3/s (127,440 cfs) to 820 m^3/s (29,000 cfs) at Jomax Road. The Agua Fria flows south from Jomax Road. Discharge increases to 880 m^3/s (31,000 cfs) where 107th Avenue enters the floodplain near Hatfield Road.

There is a major wash that crosses the existing 107th Avenue alignment near the Happy Valley Road alignment. The Happy Valley Road wash drains an area of 2.75 square miles extending about a mile north of Jomax Road to Happy Valley Road and from Calderwood Butte on the west to West Wing Mountain on the east. It generates an estimated peak flow of 94 m^3/s (3300 cfs) for a 100 year storm. Existing 107th Avenue crosses this wash in the Agua Fria River Channel. The wash at this location is very wide and shallow and not well defined. No drainage structure exists at the crossing.

Another major wash crosses 107th Avenue near Pinnacle Peak Road alignment. The Pinnacle Peak wash drains 52 hectares (128 acres). It generates an estimated peak flow of 11.4 m^3/Ss (400 cfs) for a 100 year storm. The existing channel conflicts with the new roadway alignment.

About 5 minor washes flow into the Agua Fria River Channel from Pinnacle Peak Road to Jomax Road. 100 year flows generated from these washes range from 3.2 m^3/s (115 cfs) to 6.7 m^3/s (235 cfs).

The abandoned Marnette Heading Canal east of 107th Avenue from Rose Garden Lane to Williams Road alignment acts as a berm to prevent overland sheet flow from reaching 107th Avenue.

A gunite lined channel south of Rose Garden Lane conveys storm water from the east to the west. 107th Avenue runoff from the south and north and the east and west is intercepted in scuppers and catch basins at Rose Garden Lane.

The Central Arizona Project has completed a Feasibility Assessment, Conceptual Design, and Hydrologic Investigation for a groundwater "Recharge Project". The CAP recharge project starts 4 miles north of Jomax at CAP canal. Water will be discharged from the CAP Canal into Agua Fria and flow to recharge basins located between Hatfield Road and Jomax Road near the west bank of the Agua Fria Floodplain. A structure will intercept Agua Fria and redirect flow to a canal above Jomax Road. Flow would cross Jomax Road in pipe or canal.

The future Interim Estrella Parkway will cross the Agua Fria Floodplain and 107th Avenue south of Jomax Road.

Section 3. ENVIRONMENTAL OVERVIEW

3.1 Introduction

The purpose of this Environmental Overview is to characterize the natural and socioeconomic aspects of the study corridor to serve as an input to the alternatives development and selection process. The following sections identify and describe the habitat, vegetation, wildlife, and potential for threatened and endangered plant and animal species in the project area. In addition, this report discusses existing and planned land use patterns, known cultural resource (archaeological and historic) sites, known hazardous materials sites, and the need for Section 404/401 or NPDES permits. Analysis of the likely impacts of the study alternatives on the various environmental elements are noted in the "Alternative Development and Evaluation" section.

3.2 Ecological Communities

Elevations in the project area range from 380 m (1250') at Rose Garden Lane to 415 m (1360') at Jomax Road. The study corridor is located in the Arizona Upland Division of the Sonoran Desert scrub lifezone or biome. The outstanding geomorphic feature of the project area is its proximity to the Aqua Fria River. Most of the corridor is located on the first bench above the floodplain on the western edge of the City of Peoria (please refer to Figure 2, the Vicinity Map).

At least six minor washes and one major wash cross the project area draining from east to west into the Agua Fria River. The desert riparian vegetation associated with the washes and the floodplain of the Agua Fria River includes blue paloverde, velvet mesquite, ironwood, netleaf hackberry, and shrubs such as catclaw acacia. It is concentrated at the edges of channels and in portions of the floodplain that rarely see the high velocities of flood waters.

These washes and the river itself represent an important migration corridor for wildlife and provide nesting habitat for a large variety of desert birds such as Curve-billed Thrasher, Northern Cardinal, House Finch, Gambel's Quail, Black-tailed Gnatcatcher, Abert's Towhee, and Mourning Dove. In addition, desert riparian habitat is important to wintering populations of White-crowned Sparrows, Cooper's Hawks, and Common Flickers. Mammals found in desert riparian habitat may include coyote, striped skunk, and desert mule deer.

The uplands are vegetated with saguaro cactus, ocotillo, creosote, foothills paloverde, several species of cholla, *Mammillaria*, strawberry hedgehog, barrel cactus and prickly pear cactus as well as numerous perennial shrubs such as brittlebush and triangle bursage. This habitat provides nest sites for birds such as Gila Woodpecker, White-winged Dove, Black-throated Sparrow, Gilded Flicker, American Kestrel, Harris' Hawk, Cactus Wren, Elf Owl, Verdin, and Red-tailed Hawk. Mammals associated with the upland habitat within the project area may include cactus mouse, coyote, rock squirrel, ringtail, kangaroo rat, wood rat, javelina, several species of bat, and two species of ground squirrel, the antelope squirrel and the round-tailed ground squirrel.

A reptile of importance that is likely to be found throughout the project area is the Sonoran subspecies of the desert tortoise. The Sonoran subspecies is not listed as Threatened under the Endangered Species Act as is its Mohave Desert relative, but it is considered by the U.S. Fish and Wildlife Service and the Arizona Game & Fish Department (AGF) to be a species of special concern. The AGF has developed guidelines for handling desert tortoises encountered during roadway construction.

The Arizona Native Plant law protects cactus species such as saguaro, *Mammillaria*, cholla, hedgehog, and prickly pear and other species including mesquite, ironwood, and ocotillo. Salvageable specimens must be tagged and nurseried prior to construction of the roadway as practicable. The Arizona Department of Agriculture must be notified at least 60 days before construction in order to perform a survey of salvageable protected plants.

Coordination with the AGF indicates that no species of plants and animals protected under the Endangered Species Act are likely to reside in the project area. There is, however, an active Bald Eagle nest in the upper Agua Fria arm of Lake Pleasant north of the project area, and this pair's territory may extend into the project area.

In addition to the desert tortoise, the Heritage Database accessed by the Arizona Game & Fish Department indicated the potential in the project area of the greater western mastiff bat, also a species of wildlife of special concern. This is the largest bat found in the United States. Most of this bat's roosts are on cliffs over twenty feet in height. No such habitat exists within the project area. As a result, the project area would provide foraging habitat only.

The AGFD's site inspection noted no riparian habitat within the study area and, by inference, no wetlands. This has been confirmed by the study team's field work.

3.3 SOCIAL ENVIRONMENT

3.3.1 Land Use

The project area is located in a rapidly growing portion of Maricopa County. Most of the corridor is undeveloped desert land in private ownership. However, land is being developed at a rapid rate for single-family housing at the southern end of the project area. This moderate density new development is proceeding from the south where there is already substantial residential development. According to the City of Peoria Planning and Zoning Department, there are six subdivisions currently platted for construction or now under construction within the project area. No construction is underway in the north half of the corridor. Refer to Figure 3 for subdivision locations.

Other residences within the project area include at least four "ranchettes," homes sited on parcels of several acres each. These residences are located to the east of the Salt River Project substation property which is at the midway point in the study corridor and are accessed from Jomax Road on the north. Additional land on the northeast side of the corridor is being advertised for sale in five acre parcels.

The corridor also includes adjacent State Land northeast of Rose Garden Lane extending to Lake Pleasant Road.

Commercial land uses within the corridor are limited to the Sunward Materials facility near the midpoint of the project area. This enterprise is responsible for a high level of truck activity on 107th Avenue between Jomax Road and Rose Garden Lane. (Much of the current 500 vehicles per day Average Daily Traffic consists of these trucks.) Although Salt River Project owns a triangular-shaped parcel near the Sunward Materials site and plans to develop it into a substation, this is not considered a commercial activity.

3.3.2 Demographics

The residential land uses either newly constructed, under construction, or planned for near-term construction in the southern portion of the corridor are priced for sale to people of moderate incomes. Unlike Sun City to the south, these communities are not targeted exclusively toward retired households but more toward a wide mix of age groups, especially younger families. Because the residential development in the corridor is so recent, no statistics about the residents are available from public sources. According to the Current Planning Section of the City of Peoria Planning and Zoning Department, the densities of these new developments range from four to six homes per acre. There are no known low income or minority neighborhoods nor are there any nursing homes or hospitals.

3.3.3 Recreation Planning

The City of Peoria, as a part of a larger recreation planning effort, has recently (February, 1996) adopted a Parks, Recreation, & Open Space Master Plan. Under the plan, the City will be developing a new neighborhood park of 10 acres in the vicinity of 107th Avenue and Deer Valley Road. No actual site has yet been selected for this park. Not included in the Plan but known to the study team are two other small recreation sites are planned. These are to be uses of detention/retention basins related to new residential development, linked by trails to a new elementary school to be built at 109th Avenue and Williams. The locations of these facilities are both along Williams Road, one at 105th Avenue the other at 107th Avenue. Development of 107th Avenue will include a pedestrian/bicycle crossing at Williams Road.

A recommendation of Peoria's Parks, Recreation, & Open Space Master Plan is to develop linear parks along the New River, Skunk Creek, and the Agua Fria River. Details await development of a River Park Master Plan. It is expected that such linear parks would feature multiple-use trails (pedestrian, biking, equestrian, etc.) and provide for passive uses such as picnicking. This recommendation itself does not represent a barrier to locating the future 107th Avenue in or near the Agua Fria River. The City's comprehensive plan, dated May 1996, shows the northern two-thirds of the project area as "Park/Open Space."

3.3.4 Visual and View Character

The visual character of the project area is one of open views across the Agua Fria River, views of unspoiled Sonoran desert vegetation, and views of dramatic landforms such as

Calderwood Butte to the north. Other views of residential development, overhead powerlines, and commercial/industrial activities can also be found within the corridor.

3.4 HAZARDOUS MATERIAL SITES

A Phase I site assessment has not been performed for the project area. A review of government databases pertaining to hazardous materials was conducted, however, including those for:

RCRA (Resource Conservation and Recovery Act: EPA list of potential hazardous waste generators)

CERCLIS (Comprehensive Environmental Response Compensation and Liability Act: EPA Superfund sites)

NPL (National Priority List, those CERCLA sites targeted for priority clean-up)

AZ-CERCLIS (Arizona Department of Environmental Quality Superfund sites)

LUST (ADEQ list of known leaking underground storage sites)

SWLD (ADEQ list of solid waste landfills and dumps)

WQARF (ADEQ Water Quality Assurance Revolving Fund)

Radon Survey (ARRA Home Radon Survey)

Drywell Registration (ADEQ list)

AZ-UST (ADEQ registered underground storage tanks)

AZ-SARA (AERC Superfund Amendments and Reauthorization Act)

ERNS (EPA Emergency Response Notification System)

The database search identified three AZ-SARA sites within the project area. Such sites are not necessarily contaminated with hazardous wastes, but are listed because hazardous materials are known to have been released in the past. Only one of these sites is located within one-half mile of the study corridor. This is the Sunward Materials - Sun City Plant. The chemical(s) or compound(s) released is not specified, nor are the quantities involved.

The two other AZ-SARA sites include a ready-mix plant located approximately 1.7 miles southwest of the center of the project area on 115th Avenue. Fly ash and Portland cement are the materials released. The third site is a water treatment plant located one-half mile west of the southern terminus of the project area on Rose Garden Lane. The chemical released is chlorine.

No other database accessed indicated any site of note within two miles of the project area. (It should be noted that a home radon survey conducted in 1987-88 for the Sun City area resulted in radon levels that averaged well below action levels.)

To protect the County, a Phase I site assessment should be performed for the recommended alignment prior to acquisition of right-of-way.

3.5 Air Quality

The study corridor is located in the Phoenix Metropolitan Non-Attainment Area, meaning that air quality in the region does not consistently meet U.S. Environmental Protection Agency standards. Heavy trucks moving to and from the Sunward Materials plant can generate substantial air quality impacts; however, dust impacts are currently controlled in the project area by watering trucks operating on the gravel roads. Construction impacts on air quality are not expected to be significant. This conclusion is based on the surroundings and the nature of the work. These construction activities can result in some deterioration of the existing air quality. Such impacts are expected to be localized and temporary, ceasing when construction is completed. Dust generated by construction activities will be mitigated and controlled in accordance with local rules and ordinances.

This project is included in a conforming Transportation Improvement Plan (TIP) and Long Range Transportation Plan. The project is included in the Maricopa Association of Governments (MAG) TIP for Fiscal Years 1997-2001, and the 1996 Update of the MAG Long Range Transportation Plan (LRTP). The conformity analysis for the TIP and Plan was conducted by MAG consistent with all federal requirements applicable at that time. In September 1996, the MAG Regional Council approved the TIP, LRTP, and Air Quality Conformity Analysis. The Conformity Analysis was approved by the Federal Highway Administration and the Federal Transit Administration on January 3, 1997. The TIP and LRTP are in conformance with the State Implementation Plan for achieving air quality standards.

3.6 Noise

The northern two-thirds of the project area does not contain noise receptors. Potential noise receptors in the corridor include the numerous single-family homes that have been constructed recently or will soon be built at the southern end of the corridor. In addition, the "ranchettes" to the east of the corridor are also potential noise receptors.

3.7 Cultural Resources

No on-ground cultural resource surveys have been conducted for this project. However, site file searches have been undertaken both at the Arizona State Museum at the University of Arizona in Tucson and at the State Historic Preservation Office in Phoenix. The site file searches indicate that portions of the project area have been the subject of previous surveys for cultural resources. Both historic and prehistoric sites were identified in these previous surveys. The highest density of sites is in the southern part of the corridor, especially on the bench just east of the current roadway alignment. Other sites in this vicinity are closer to the existing roadway.

A historic irrigation feature, the Marinette Heading Canal, runs the length of the corridor, crossing the existing roadway at approximately Williams Road. The canal was built by R. P. Davie of the Marinette Land and Cattle Company of Glendale CA. 1909-1910. It follows the edge of the first terrace of the Agua Fria River southward until the location of the current Sunward Materials and then turns eastward away from the river. Associated with the canal are the remains of a pumphouse. The most recent possible use of this canal was in 1959 when the agricultural land it served was sold to Del E. Webb for the construction of Sun City.

The eligibility of the canal for inclusion on the National Register of Historic Places has been questioned by at least one researcher (Landis, 1988). Other work, however, has suggested that the feature is eligible (Crary and Champagne, 1994). For our purposes, the canal must be considered eligible under Criterion "a." As with most linear cultural resource sites, the feature must be surveyed in the field at the likely crossing point for the proposed roadway. A determination will then be made as to the surviving integrity of the feature at that location and the resultant need for testing, data recovery, or other mitigation. The need to cross this feature should not be considered a "fatal flaw" of a study alignment.

Recent residential construction appears to have obliterated several hundred linear feet of the canal on the east side of existing 107th Avenue south of Williams Road.

Three prehistoric sites found within the study corridor bear mentioning. The significance of the sites is undetermined. One is in the vicinity of the northern boundary of the Sunward Materials site. It is thought to be a former Hohokam town/village site exhibiting stone features, lithic scatters and sherd scatters. The site dates from A.D. 900-1200.

A second site is located just north of and within the SRP property. It also was a Hohokam site, with water control features and ceramic, cobble alignments. The site dates to A.D. 900-1100.

Another site is located near the southern tip of the SRP property. It is of unknown cultural affiliation and indicates limited activity.

Most of the northern two-thirds of the corridor has never been systematically surveyed for cultural resources. The portion of the corridor from Williams Road north to Sunward Materials has not been surveyed. Previously unidentified cultural resources, both historic and

prehistoric, could be present in these unsurveyed areas. In general, locations within the floodplain of the Agua Fria River would have the lowest potential for cultural resources, due to the action of past flooding. Locations on the first bench and just out of the floodplain would have the highest probability of cultural resources because they are closest to the river and would not have been lost by way of flooding. Locations on the higher benches above the river would have a somewhat more moderate probability of containing cultural resources.

It is the recommendation of this Overview that a Class III cultural resources survey be undertaken for the Preferred Alignment of 107th Avenue, its entire proposed right-of-way, and any temporary construction easements through the study corridor once that alignment has been identified and before roadway design is substantially completed.

3.8 Environmental Permits

Floodplain Development Permits. The U.S. Army Corps of Engineers administers a permit process for floodplain development and encroachment under Section 404 of the Clean Water Act. Essentially, a permit is required for any discharge of dredged or fill material into the "waters of the United States." The Agua Fria River, and its tributaries, are considered within Corps jurisdiction. Clean Water Act Section 404 Permits are required. Initial consultation with the U.S. Army Corps of Engineers indicated Nationwide 14 Permits (NWP14) may suffice. NWP14 construction activity may affect no more than 1/3 acre of waters of the United States and not more than 200 linear feet of fill in Special aquatic sites (such as wetlands). Section 401 Permit is not required.

More than five acres will be disturbed so the EPA National Pollution Discharge Elimination System (NPDES) requirements will be followed.

Section 4. MAJOR DESIGN FEATURES

4.1 Design Criteria

All alternatives utilized the same design criteria, except "Enhanced Maintenance" Alternative "A".

MCDOT Work Order Number 68932 for 107th Avenue encompasses the design of improvements to upgrade the existing facility to a rural minor collector road from Rose Garden Lane to Jomax Road. Design criteria was upgraded to the same horizontal and vertical design characteristics as arterial roads, but limited to Rural Collector road widths.

The controlling design criteria set forth for this project were collected from numerous documents including:

- Scope of Work and General Scope of Work for the DCR and Final Design
- MCDOT Roadway Design Manual adopted November 3, 1993
- MCDOT Pavement Marking Manual, 1995
- MCDOT Sign Manual, 1995-1996
- AASHTO "A Policy on Geometric Design of Highways and Streets" (Green Book), metric edition, 1994
- AASHTO "Guide for Development of New Bicycle Facilities", latest edition
- AASHTO "Roadside Design Guide", 1989
- Maricopa Association of Governmental Standard Details (M.A.G.)
- Volumes 1 & 11 of the Drainage Design Manual for Maricopa County

The following table presents the proposed design criteria to be applied during design. The DCR pavement structural section is for estimating purposes only. The pavement structural design will be based on the geotechnical report, design year (2021) traffic volumes, and other design parameters shown in the table.

DESIGN CRITERIA	
Functional Classification	County Rural Minor Collector Road
Design Year	2021
Design Traffic Volume	21,000 ADT
Design Vehicle	WB-15 (WB-50)
Design Speed	90 km/h (55 mph)
Terrain	Level/Rolling
Superelevation	"e max" = 0.08
Elevation Datum	City of Peoria Datum (USGS)
Pavement Design Life	20 years
DCR Pavement Structure	100mm (4") min. A.C. (Superpave Mix) on 280mm (11")min. Aggregate Base
Pavement Structural Design	• 500 ADT in 1996 • 21,000 ADT in 2021 • Superpave mixture design and analysis • 9% Truck Factor (T) • Directional Distribution (D) 60-40 • 8% Peak Hour Factor (K) • Structural Coefficient - New Asphalt 0.44 • Structural Coefficient - Aggregate Base Course 0.14 • Structural Coefficient - Aggregate Subbase Course 0.11 • ADOT Materials Preliminary Engineering and Design Manual shall prevail.
Pavement Width • Rose Garden Lane to Deer Valley Rd. • Deer Valley Rd. to Williams Rd. • Williams Rd. to Villa Chula Rd. • Villa Chulla Rd. to Jomax Rd. • Widened at Sunward Materials driveway	 9.75m (32 ft. exist) 19.5 (64 ft. by others) (F.O.C. to F.O.C.) 9.75m (32 ft. by others) + 5.2m (12' lane + 5' shoulder) 10.4m (34 feet) 14.6 m (48 ft.)
Horizontal Alignment	V=90km/h
Vertical Alignment	Vertical curve is required for algebraic grade difference equal or greater than 0.3%

Clear Zone	Evaluate (use American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide, 1989).
Traffic Lanes	See typical sections.
Median	North of Williams Rd. - left turn lane at Sunward Mtrls.
Lane Widths	Two-way left turn lane = 4.2 m Travel lanes = 3.6 m
Shoulder Widths	1.5 m (5') paved plus 2.1 m (7') graded
Longitudinal Profile Grades	MCDOT* 5% Max. 0.25% Min. 0.15% Absolute Min. * (MCDOT Roadway Design Manual, November 3, 1993; Section 5)
Roadway Cross-slope	MCDOT - 2%
Shoulder Cross-slope	2% Paved 20:1 graded 8% max. grade break
Embankment Cut/Fill Slopes	Match existing, 4:1 maximum
Curb and Gutter Types	MAG Std. Detail 220, Type A
Curb Return Radii (face of curb)	10.668 m (35') with curb and gutter 13.716 m (45') w/o curb and gutter
Sidewalks	N/A
Tapers	55:1
Flares	25:1
Traffic Signalization	Layout per MCDOT Traffic Signal Design Guidelines Signals will not be installed until warranted, but pull boxes and conduit will be installed at Williams Road, Pinnacle Peak Road and Jomax Road
Pavement Marking	Design per MCDOT Traffic Engineering Division Pavement Marking Manual
Signing Plans	Design per MCDOT Traffic Engineering Division Signing Manual and latest edition of USDOT/FHWA MUTCD

Intersections & Driveways	Intersections within City of Peoria are/were partially designed by others. Design will match anticipated condition at time of construction. Intersection legs will be designed to extend a minimum of approximately 91.44 meters for Jomax Road and Hatfield Road intersections. Each intersecting road will be extended, if necessary, and appropriately tapered to match the existing edge of pavement. Sunward Materials entrance will be designed for left turn lanes. Sight distances will be checked and designed to comply with AASHTO criteria. Signalized intersections will have a minimum left turn storage length at least twice that required to store design volume accumulated per cycle. Other intersections will have 25 m (75') minimum left turn storage length Intersection approach lanes will not exceed 450 vehicles/hour/lane Right turn lanes will be provided if design volume exceeds 300 right turns/hour w/o turn lane Left turn lanes will be provided if design volume exceeds 100 left turns/hour w/o turn lane Driveway entrance turnouts will be designed to maintain ingress and egress. Driveway entrances will provide a width that is equal to existing widths provided that the new driveway width is at least equal to the minimum standard width and does not exceed the maximum allowable standard width, in accordance with MCDOT Design Manual and MAG Uniform Standard Details. Intersection Ride Through sheets are required for section corner and quarter section corner intersections, as well as future signalized intersections. Maximum algebraic difference for intersection ride-through is 2.5% Roads shall intersect each other at no less than 80 degrees. Non-signalized intersections minimum separation 200 m (660 ft.) 100 m (330 ft.) tangent between intersections and horizontal curves desirable.

Drainage	The roadway will be designed so that drainage follows the historic path of flows and does not create off-site flooding or adverse ponding within the right-of-way. Runoff from intersecting streets will be conveyed to maintain or improve existing drainage conditions, as economically feasible, and in no case adversely impact 107th Avenue. Drainage ditch design per AASHTO roadside Design Guide, 1989 Cross Culverts shall be designed to convey the 100 year storm, if economically feasible. MCDOT frequency criteria for cross culverts is at least for a 50 year storm. Design Storm:: 1. Roadway: 10 year storm 2. Parallel Roadside Ditches: 10 year storm 3. Open Channel: 50 year storm, without flooding beyond the right-of-way for the 100 year storm. 4. Culverts: 50 year with maximum water surface at edge of pavement 5. Retention: 100 year 2 hour storm 6. Runoff crossing dip sections or topping the roadway at any location shall be no deeper than 200 mm, at the roadway crown, for the 100 year storm
Right-of-Way	33.528m (110') minimum
Utilities	MCDOT guidelines for relocation and AUCC Guide
Lighting	None
Guardrail	Design per MCDOT Roadway Design Manual
Stopping Sight Distance	140 m (450 ft.) minimum
Passing Sight Distance	600 m (1950ft.) minimum
Structures	Reinforced Concrete Box Culverts and pipe culvert headwalls per ADOT Bridge Group Standard Drawings - Metric - August 1995 Bridge design parameters to be furnished by MCDOT. Crest vertical curve over bridge and no grade flatter than 0.5%

4.2 Design Exception Report

Grade and alignment of existing Jomax Road is less than ideal. The "T" intersection was designed to eliminate curvature on the Jomax approach to 107th Avenue and provide ample stopping sight distance. The steep 7 1/2% to 8% downgrade on the Jomax approach can not be eliminated without extensive reconstruction on Jomax. The steep grade on Jomax Road should not present a safety concern because vehicles would be slowing down for the stop at the "T" intersection with 107th Avenue.

The Estrella Interim Roadway grade is 3% at the intersection with 107th Avenue. The intersection is at grade, so it is desirable to reduce Estrella gradient through the intersection.

4.3 Design Assumptions

4.3.1 Roadway Classification:

107th Avenue is currently classified as a Rural Minor Collector. A roadway classification of "Minor Arterial" correlates with Design Year traffic volumes but the scope of work limits this study to Rural Minor Collector. See the Introduction for details.

4.3.2 Future Estrella Interface:

The Interim Estrella Roadway is currently under study. Design is based on the assumption that the Interim Estrella will be constructed prior to this project. An at-grade intersection with 107th Avenue is assumed. These two assumptions add considerable cost to Alternates "B" and "C," but favor Alternate "E." See the analysis for details.

The ultimate Estrella Roadway and Agua Fria bridge influence design assumptions. Ultimate and Design Year traffic volumes indicate a traffic interchange (TI) will eventually replace the at-grade intersection with 107th Avenue. The location of the Interim Estrella intersection relative to the future Agua Fria Bridge and TI was assumed so impacts could be evaluated. Alternate alignment "B", "C" and "E" are compatible with future build-out. See the analysis for more details.

4.3.3 Agua Fria Floodplain:

The existing FEMA 100 year floodplain map for the Agua Fria River is outdated. Flood Control District of Maricopa County (FLDMC) has submitted a "Letter of Map Revision" to FEMA in order to update the 100 year event for the new Lake Pleasant Dam Configuration. Design is based on the assumption that the revision will be approved.

4.3.4 Existing Roadway:

Some existing roadway shown on typical sections has not been constructed. Design assumes that current development plans approved by the City of Peoria will be constructed prior to bidding this project.

4.3.5 404 Permit:

The wash crossing 107th Avenue at the Pinnacle Peak Road intersection exceeds 60 m (200 lineal feet) criteria for Nationwide 14 Permit. Design assumes the U.S. Army Corps of Engineers will approve the required channelizing.

4.3.6 Right-of-Way

Right-of-Way required to upgrade from Rural Minor Collector (two-lane) to Minor Arterial (four-lane) was not included in this report. Design Year traffic volumes warrant the upgrade. Contract scope of work limitations, plus potential for obtaining future right-of-way by dedication indicate only interim right-of-way should be purchased at this time. See Introduction for more details.

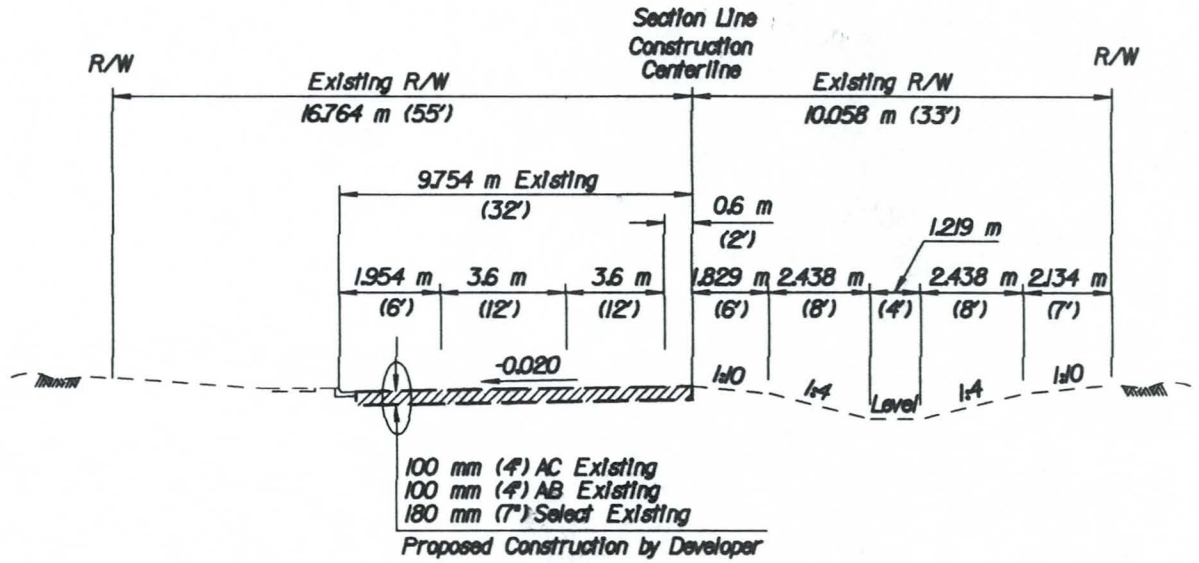
MCDOT estimated right-of-way cost in the Agua Fria floodplain and first bench above the floodplain at $25,000 per acre. All other right-of-way was estimated at $40,000 per acre.

4.3.7 Utility Relocation

All utility relocations within City of Peoria will be coordinated and paid by developers. Rural utility relocations have prior rights. All alternatives except Enhanced Maintenance require the same utility relocations.

4.4 Typical Sections

Typical sections were based on Figure 5.3 in the MCDOT Roadway Design Manual. Roadway width varies considerably from one segment to another on this project. Figures 4 to 9 show typical sections used for the various design segments, and Figure 10 summarizes the intersection and lane configurations.



TYPICAL SECTION
107TH AVENUE

Rose Garden Lane to Deer Valley Road
Sta 0+097.000 to 0+913.000

FIGURE 4
TYPICAL SECTION

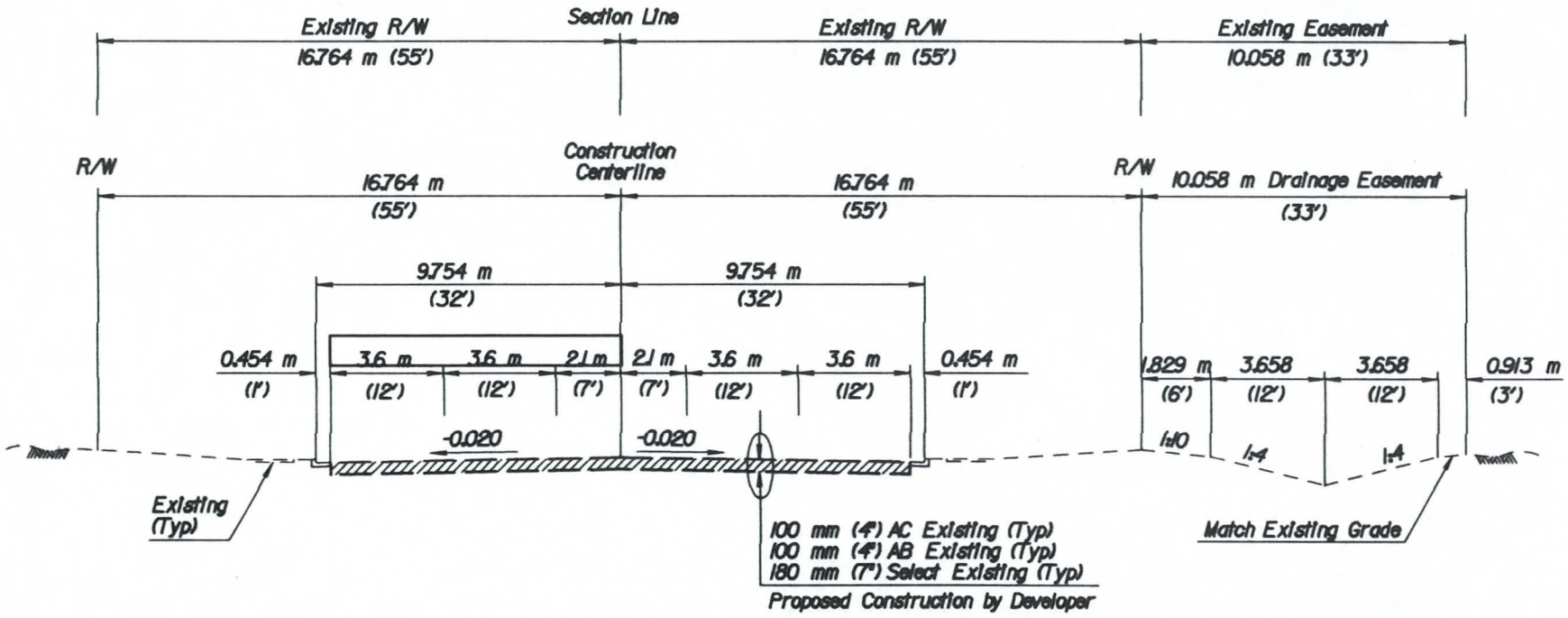
MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Connett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 6

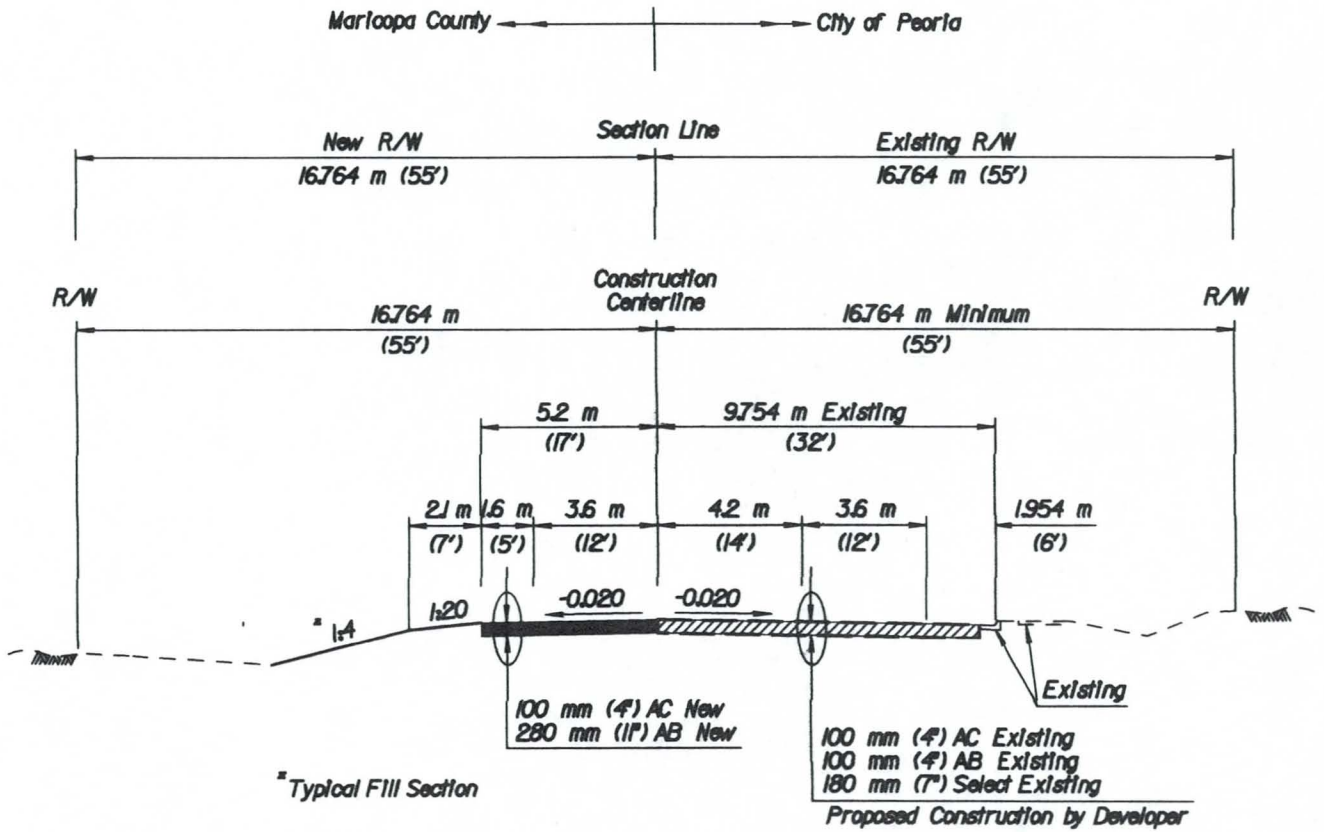


TYPICAL SECTION
107TH AVENUE

Deer Valley Road to Williams Road
Sta 0+913.000 to 1+724.000

MARICOPA COUNTY		
107TH AVENUE ROSE GARDEN LANE TO JOMAX ROAD		
	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97
Connell Fleming ENGINEERS AND PLANNERS		
SHEET 2 OF 6		

FIGURE 5
TYPICAL SECTION



TYPICAL SECTION
107TH AVENUE

Williams Road to Pinnacle Peak Road
Sta 1+724.000 to 2+347.267=

= 185.733 m (609.36')
South of Pinnacle Peak
Road Alignment

MARICOPA COUNTY

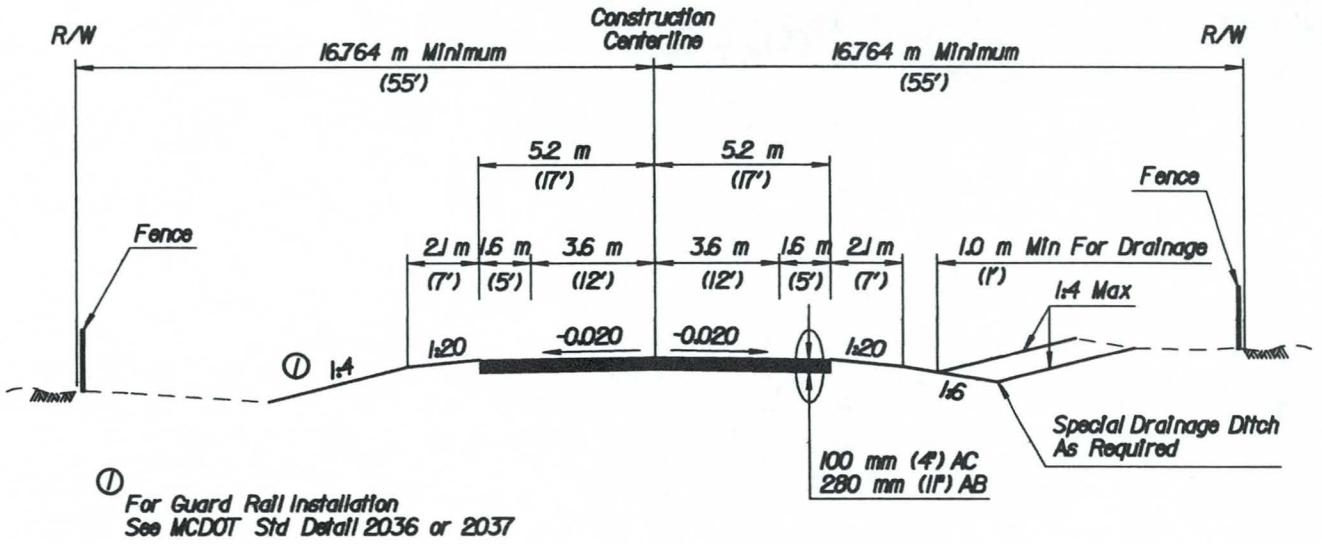
107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS

SHEET 3 OF 6

FIGURE 6
TYPICAL SECTION

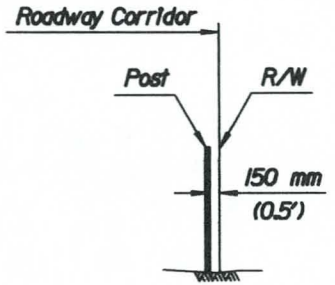


① For Guard Rail Installation
See MCDOT Std Detail 2036 or 2037

TYPICAL SECTION
107TH AVENUE

Pinnacle Peak Road to Jomax Road
Alternate "B" Sta 2+347.267= to 5+796.823
Alternate "C" Sta 2+347.267= to 6+037.510
Alternate "E" Sta 2+347.267= to 5+944.230

= 185.733 m (609.36')
South of Pinnacle Peak
Road Alignment



TYPICAL FENCE LOCATION

FIGURE 7
TYPICAL SECTION

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
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CHECKED	C. BINGHAM	07/28/97

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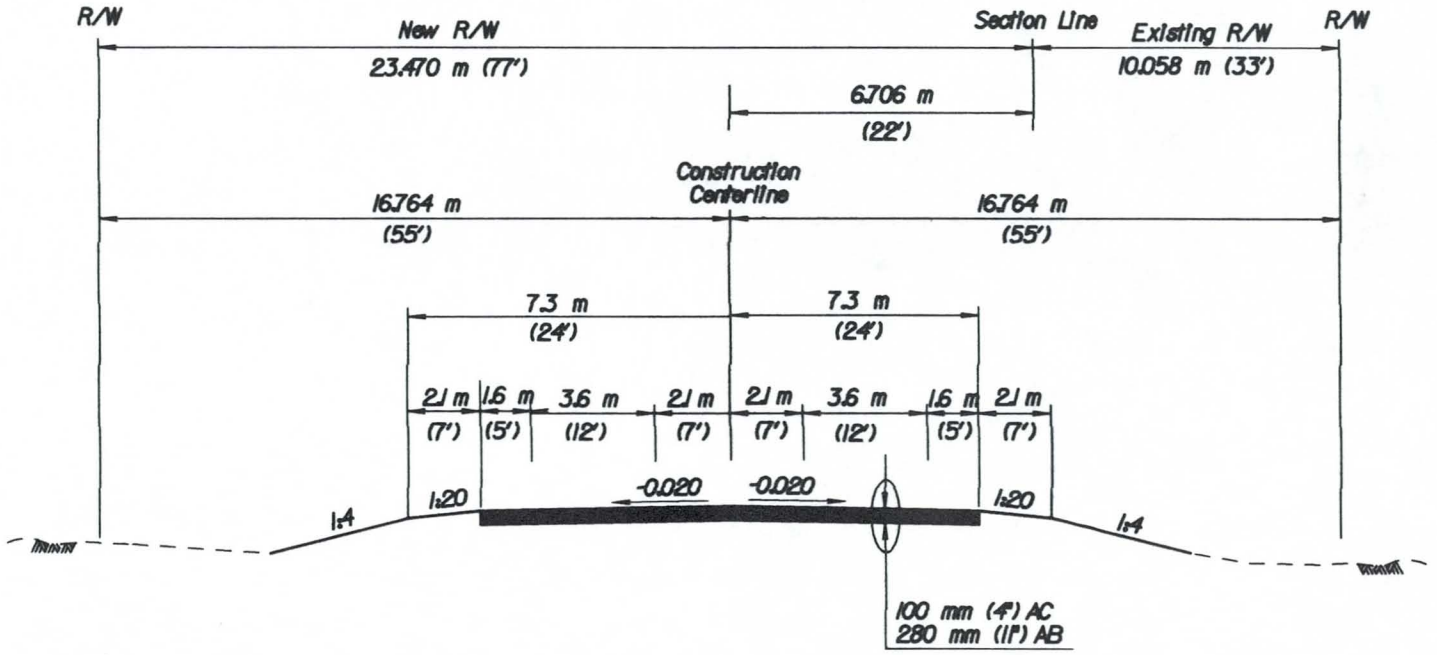

WIDENED SECTION FOR LEFT TURN LANES

107 th Avenue @ Sunward Materials
Sta 2+781.000 to 3+339.000

FIGURE 8
TYPICAL SECTION

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
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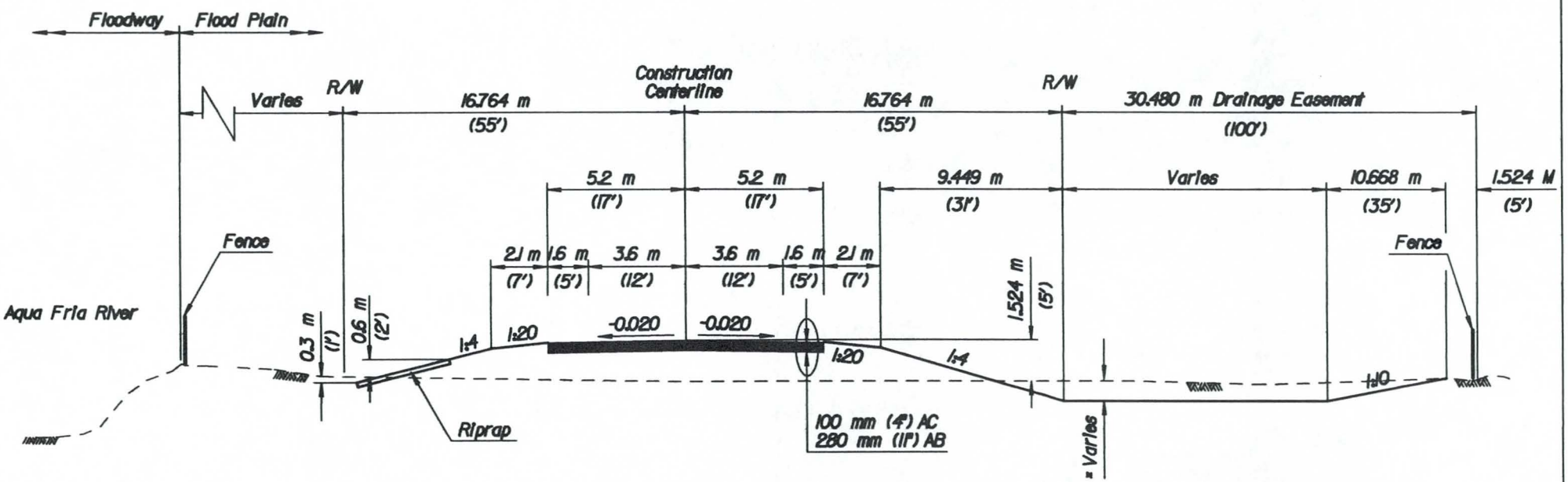
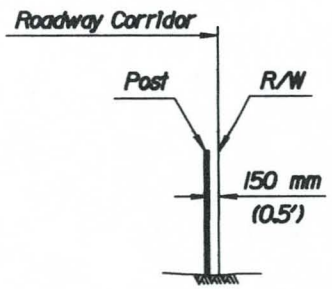


* Use depth required to balance earthwork

FLOOD PLAIN TYPICAL SECTION

Alternate "B" From Happy Valley Road to Jomax Road
Sta 4+169.000 to 5+796.823



TYPICAL FENCE LOCATION

FIGURE 9
TYPICAL SECTION

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
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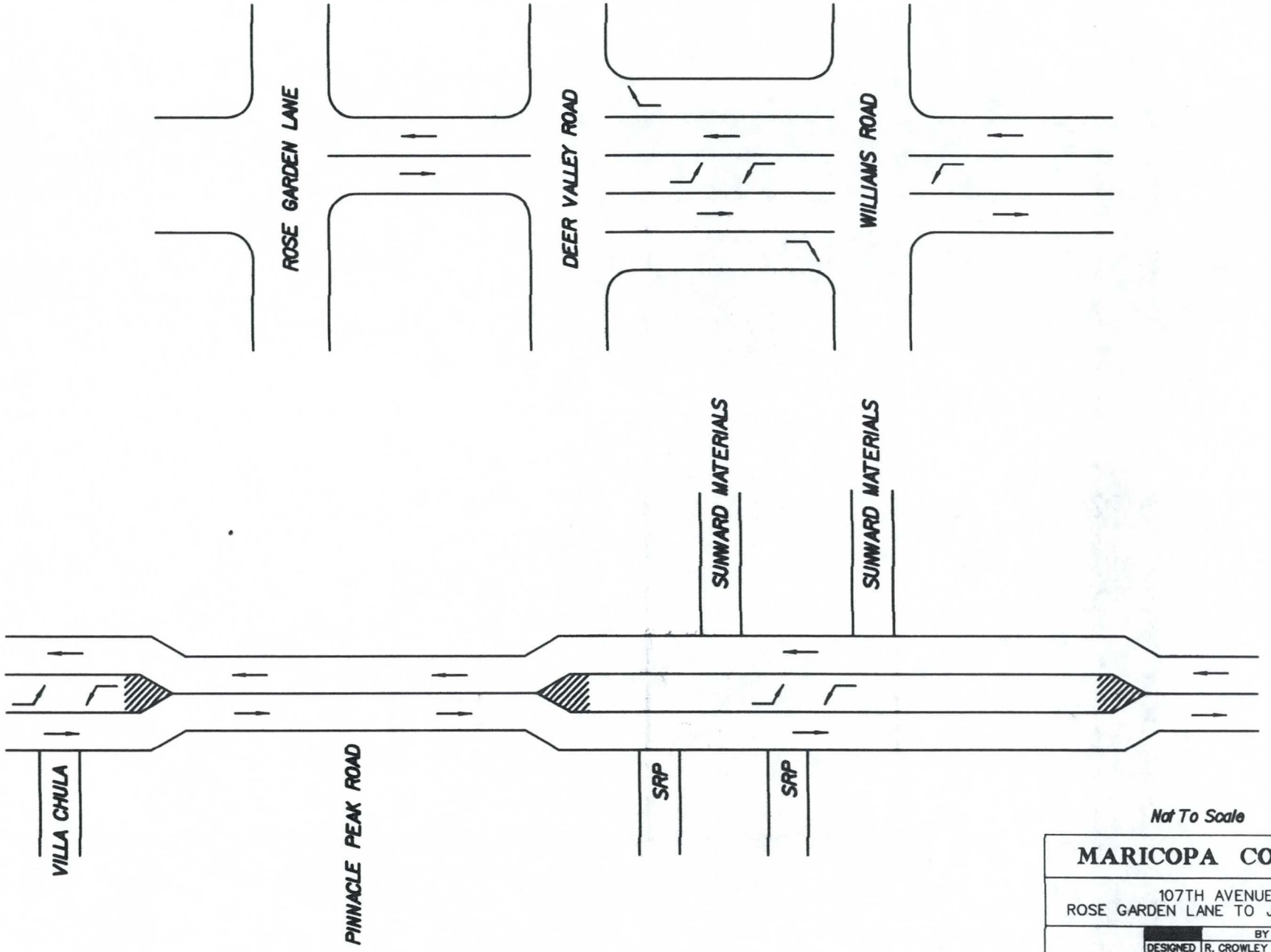

Not To Scale

FIGURE 10
INTERIM INTERSECTION AND LANE CONFIGURATIONS
(1 OF 2)

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
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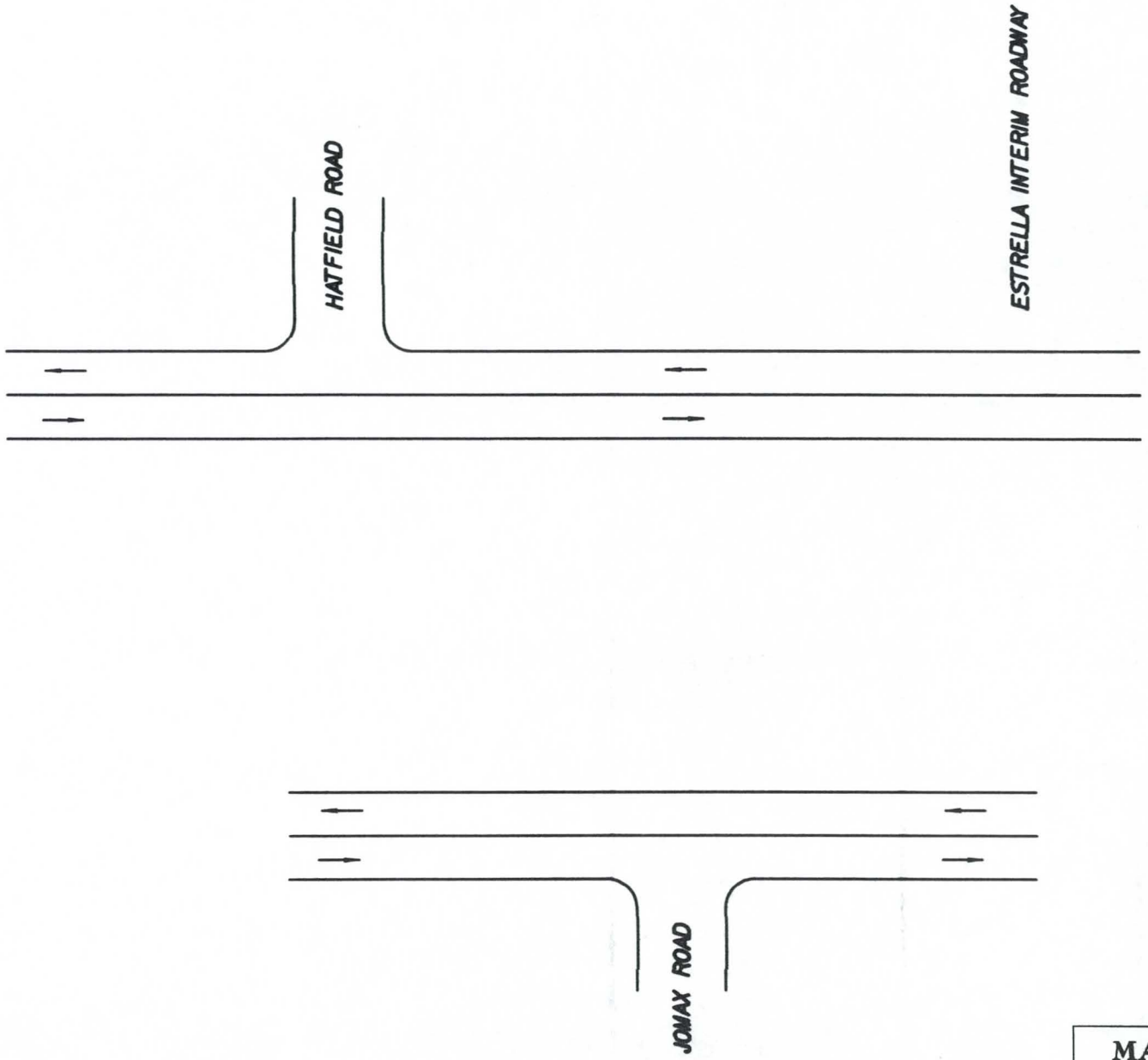
Connett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 2



Not To Scale

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
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DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Connett Fleming
ENGINEERS AND PLANNERS

SHEET 2 OF 2

FIGURE 10
INTERIM INTERSECTION AND LANE CONFIGURATIONS
(2 OF 2)

Section 5. ALTERNATIVE DEVELOPMENT AND ANALYSIS

5.1 Alternative Routes

Five alternatives shown in Figure 3 were studied. The Enhanced Maintenance Alternative was designated "A." Alternative "A" was adopted in total from the Candidate Assessment Report (CAR). Low/Reasonable Cost Improvement Alternatives were designated "B" through "E". No Full Improvement Arterial road alternatives were developed because the scope of work was restricted to Rural Minor Collector classification. All alternatives except "A" utilized a full pavement section plus culverts at cross drainages to avoid weaknesses associated with the CAR Low Cost Alternative. Alternative "B" through "E" replace the CAR Full Cost Alternative. The CAR Full Cost alternative assumed right-of-way could be obtained inside the future SRP Left Wing Substation. SRP considers the location essential to their operations. SRP dedicated 10.058 m (33') of right-of-way frontage along existing 107th Avenue in March 1997, but they are unwilling to release more property. All alternatives in this study are compatible with SRP requirements.

Alternatives "B", "C", and "E" are the same from Rose Garden Lane to Hatfield Road. From Hatfield Road to Jomax Road alternatives "B", "C", and "E" follow different routes. Alternative "B" crosses the Agua Fria floodplain. Alternative "C" crosses the second bench above the floodplain. Alternative "E" crosses the first bench above the floodplain. Alternatives "B", "C", and "E" have similar "T" intersections at Hatfield Road and Jomax Road.

The Low/Reasonable Cost Improvements will serve as an Interim roadway and will be classified as a Minor Collector. The 2021 design year traffic projection of 21,000 ADT indicates the roadway will evolve into a Minor Arterial during the next twenty years. MAG's long range build out traffic projection of over 50,000 ADT will require a Principal Arterial road. Nevertheless, the Rural Minor Collector classification will operate adequately with over ten times today's traffic volume of 500 ADT.

The Interim Roadway (Figure 10) will provide at least two lanes in both directions and will achieve all project goals (see subsection 1.2). The County will have the opportunity to extend the life of the Interim facility by adding turn lanes on an "as needed" basis. The Interim Roadway will eventually be replaced by a four lane Minor Arterial as explained earlier.

5.2 Enhanced Maintenance Alternative "A"

Alternative "A" consists of applying a penetration chip seal coat over the existing roadway alignment beginning 200 m (660') south of Pinnacle Peak Road alignment near the end of the Alta Vista improvements. The road will be a 8.534 m (28') wide Local Rural Road in accordance with the MCDOT Roadway Design Manual Figure 5.4. The dirt shoulder will be 20:1 with a special shoulder ditch on both sides of the road to remove water from the pavement area. No other drainage improvements are planned. About 13 power poles and about 3 telephone pedestals will need to be relocated. The pavement section of this

alternative will be weakened if the subgrade becomes wet. If loaded truck traffic travels the roadway when the subgrade is wet, the pavement will be damaged. This section will probably fail in a few years due to the truck traffic from Sunward materials. Also, the roadway at the wash near Happy Valley Road will wash away during a large storm event. This alternative is at best a temporary solution to the truck and dust problem and will require significant maintenance.

5.3 Improvement Alternatives "B, C, D, E"

Development and analysis of the Low Cost Improvement alternatives are best understood by breaking the project into the following segments:

- Rose Garden Lane to Deer Valley Road
- Deer Valley Road to Williams Road
- Williams Road to Pinnacle Peak Road
- Pinnacle Peak Road to Hatfield Road
- Hatfield Road to Jomax Road

Each segment has unique engineering, drainage, traffic, and right-of-way issues that can be used to compare the Improvement Alternatives B, C, and E.

Enhanced Maintenance Alternative "A" is significantly different from the other alternatives so it was addressed separately in the previous sub-section.

The location of Alternative "D" is shown in Figure 3. Alternative "D" was discarded early into the study due to the following:

- Location relative to existing houses and undeveloped lots was undesirable.
- A bridge at least 100m (300') in length was required.
- Earthwork volumes were much higher than other alternatives.
- Project cost was much higher than other alternatives.
- Future intersection at Pinnacle Peak would require 5 legs.

5.4 Rose Garden Lane to Deer Valley Road

5.4.1 Roadway:

Design and construction is by others as shown in Figure 4. City of Peoria has approved developer plans and construction is underway.

5.4.2 Traffic:

Signal conduits will be installed at Rose Garden Lane and Deer Valley Road. Pavement marking will provide one lane in each direction.

5.4.3 Drainage:

Design is by others. Drainage plans approved by the City of Peoria included constructing a concrete lined drainage ditch in the existing right-of-way east of the section line. The new ditch location may conflict with the existing El Paso Natural Gas Line facilities. The new ditch will be designed to serve two functions.

- Convey outlet discharge from detention basin at the northwest corner of Williams Road intersection to the drainage canal located on south side of Rose Garden Lane.
- Intercept sheet flow coming from undeveloped land east of the ditch.

5.4.4 Right-of-Way:

Existing 16.264 m (55') right-of-way west of the section line was obtained by dedication. The existing 10.058 m (33') right-of-way east of centerline will be used for drainage. Right-of-way is within City of Peoria. Additional future right-of-way will be obtained by dedication at some future date when the property is developed east of the section line.

5.5 Deer Valley Road to Williams Road

5.5.1 Roadway:

Design and construction is by others as shown in Figure 5. City of Peoria has approved developer plans and construction is underway.

5.5.2 Traffic:

Traffic signal conduits will be provided at Deer Valley Road and Williams Road. Pavement markings will provide two lanes in each direction, plus a continuous left turn lane. Pavement markings for 107th Avenue include a cross walk on the south side of Williams Road intersection. Pavement markings at Deer Valley Road and Williams Road will transition to one lane each direction.

5.5.3 Drainage:

Design is by others. City of Peoria has approved developer's drainage plan. Drainage includes two detention basins connected by drainage ditch.

5.5.4 Right-of-Way:

33.528 m (110') Required right-of-way has been obtained by dedication. Right-of-way is within City of Peoria and includes a drainage easement.

5.6 Williams Road to Pinnacle Peak Road

5.6.1 Roadway:

Alignment follows the section line as shown in Figure 6. City of Peoria is east of the section line and Maricopa County is west of the line. Roadway east of section line will be designed and constructed by others. City of Peoria has approved developer's plans. Typical section Figure 6 is used from Williams Road to 185.733 m (609.36') south of Pinnacle Peak Road, where it transitions to Figure 7.

5.6.2 Traffic:

Traffic signal conduits will be provided at Williams Road. Pavement markings will provide one lane each direction with continuous left turn lane. Pavement markings at north end will transition to two lanes in each direction.

5.6.3 Drainage:

Design for area east of section line is by others. City of Peoria has approved developer's drainage plans. Roadway drainage west of section line will sheet flow to west as it does today.

5.6.4 Right-of-Way:

16.764 m (55') Right-of-way east of section line has been obtained by dedication. 16.764 m (55') of new right-of-way is required west of section line. Right-of-way east of section line is in City of Peoria, right-of-way west of section line is in Maricopa County.

5.7 Pinnacle Peak Road to Hatfield Road

5.7.1 Roadway:

All alternatives except "D" utilize similar alignments and typical sections from 185.733 m (609.35') south of Pinnacle Peak Road to Hatfield Road. New 10.4 m (34') pavement per Figure 7 is constructed the full length of this segment. Pavement is widened per Figure 8 adjacent to Sunward Materials to provide left and right turn lanes for two plant entrances.

Starting south of Pinnacle Peak Road to the "S" curve north of Pinnacle Peak Road, the new roadway is centered on the section line. The tangent north of Pinnacle Peak is required to avoid a transmission tower and to provide a strait 100 m (330') approach to Pinnacle Peak intersection. The "S" curve is required to offset construction centerline 6.706 m (22') west of section line. The westward offset eliminates need to increase existing 10.058 m (33') right-of-way east of the section line. Please refer to Figure 8. SRP just dedicated the right-of-way east of section line in early 1997. They will resist further encroachment into the future East-Wind Substation, except in the floodplain. A critical transmission tower located right of Station 3+630 must be avoided.

A grade break was required where the roadway leaves the first bench and drops onto the Agua Fria floodplain near Hatfield. A crest vertical curve may replace the grade break when more accurate ground line is available.

Horizontal curves from alternatives "B", "C", and "E" on 107th Avenue at Hatfield Road provide at least 30 m (100') between the interim edge of pavement and the critical tower.

Intersection design of Pinnacle Peak Road should be coordinated with the future City of Peoria Candidate Assessment Report for Pinnacle Peak Road.

5.7.2 Traffic:

The Interim Roadway (Figure 10) will provide a left turn lane at Sunward Materials (Figure 8). Future projects may add a right turn lane at Sunward Materials and an intersection at Pinnacle Peak Road.

5.7.3 Drainage:

A wash at Pinnacle Peak Road will be relocated east of 107th Avenue from Station 2+470 to 2+540. Culverts are required at the Pinnacle Peak intersection and on 107th Avenue at Station 2+480. Offsite drainage sheet flows from east to west. The roadway embankment will redirect the flow southward to the wash at Pinnacle Peak and north to the Agua Fria floodplain.

5.7.4 Right-of-Way:

City of Peoria jurisdiction is east of the section line and Maricopa County jurisdiction is west of the section line south of Pinnacle Peak Road alignment. All alternative alignments north of Pinnacle Peak are in Maricopa County jurisdiction. 33.527 m (110') right-of-way is required, except along SRP frontage. In March 1997, SRP dedicated 10.058 m (33') east of the section line (see Figure 8). SRP may resist further encroachment into the future East-Wing Substation except in the Agua Fria floodplain. New right-of-way is centered on the section line up to Station 2+680. Right-of-way west of section line widens to 23.470 m (77') at Station 2+680. Right-of-way east of section line narrows to 10.058 m (33') at Station 2+740. At Station 3+550 right-of-way becomes 16.764 m (55') east and west of the section line. A 10.058 m (33') drainage easement is required east of new right-of-way from Station 2+450 to Station 2+580.

Maricopa County will purchase right-of-way within City of Peoria jurisdiction. The County should attempt to lower project cost by requesting right-of-way dedication from owners adjacent too the new roadway. Sunward Materials and Julius Kaprinyak (SE corner of Pinnacle Peak) are highly motivated at this time. Other owners may also see the benefit of dedicating right-of-way.

5.8 Hatfield Road to Jomax Road

5.8.1 Roadway:

Typical section, Figure 7 is used for Alternative B, C, and E. Retention basins were utilized for Alternative B, Figure 9 to balance earthwork. The retention basin dimensions can be varied to balance earthwork.

Several vertical and horizontal curves were required. A smooth grade line with gradual changes was utilized to avoid roller coaster profile. Vertical curves are at least 250 m (820') to be compatible with future "Arterial" road classification. The flatter profile did increase earthwork and right-of-way cost. Steeper grades will be considered during design when more accurate ground line is available.

The horizontal and vertical alignments were coordinated to avoid intersection sight distance problems, and other issues that reduce safety.

Horizontal curves in intersections were avoided and at least 100 m (330') tangents were provided. This is consistent with future arterial road classifications and permits transition of super elevation prior to the intersection. Hatfield Road "T" intersection was an exception. A horizontal curve was required on 107th Avenue to minimize floodplain impacts and a sag vertical curve was required to minimize earthwork. A horizontal curve was required on Hatfield to keep the intersection angle greater than 80 degrees. Vertical curves were required to match the new profile on 107th Avenue.
The horizontal alignment of Alternatives A, B, C, and E separate at Hatfield Road. Alternative "A" follows the existing road. Alternatives B, C, and E curve right (east) away from the Agua Fria floodplain.

Alternative "B" has the flattest horizontal curvature, best Hatfield intersection geometry, and greatest impact on the Agua Fria floodplain.

Alternative "C" has the sharpest horizontal curvature, worst Hatfield intersection geometry, and shortest impact on the Agua Fria floodplain. The sharp curve is closest to the critical transmission tower, but provides the most direct route to the second bench above the Agua Fria floodplain.

Alternative "E" curvature provides the most direct route to the first bench above the Agua Fria floodplain. Alternative "E" has less impact on the floodplain than "B", and more impact than "C." Hatfield geometry is worse than "B", and better than "C."

A large concrete box culvert (CBC) on 107th Avenue is the next topographic constraint. The CBC is located at a major drainage northeast of Hatfield Road. Grades were designed to minimize earthwork and provide sufficient cover over the box culvert. Horizontal alignments were designed to provide tangent over the box culvert and to minimize skew. The CBC's for Alternatives "B", "C", and "E" are skewed 15°, 45°, and 30° respectively. The larger the skew, the greater the CBC length and construction cost. Alternate "C" requires deep cuts and extensive excavation, while alternatives "B" and "E" require embankment between

Hatfield intersection and the CBC alternative. Alternative "B" was shifted east of the existing roadway to minimize length of training dikes required between the CBC and the historic canal. Alternative "E" requires training dikes, but they are shorter than those for alternative "B." Alternative "C" is east of the canal so it does not require dikes.

All Alternatives curve left after the CBC. From the CBC to the Interim Estrella intersection the difference in alternative alignments is relative to the Agua Fria floodplain. Alternative "A" crosses the floodplain at grade. Alternative "B" crosses the floodplain, on embankment at least 1.5 m (5') higher than 100 year flood elevation. Alternate "E" is in the first bench above the floodplain. Alternate "C" is located in the second bench above the floodplain.

Profile of the Interim Estrella roadway controls the at-grade 107th Avenue intersection elevation. The Interim Estrella profile is on 3% downgrade into the Agua Fria. It cuts through the second bench above the floodplain, daylights onto the first bench, then crosses a large embankment while dropping into the floodplain. Alternate "A" requires about 1.5 m (5') fill above the floodplain at the intersection. Alternate "B" intersection requires about 4.6 m (15') fill above the floodplain. Alternative "E" intersection is at ground level on the first bench above the floodplain. Alternative "C" intersection requires 12 m (40') cut.

Discussions with MCDOT project management indicated slopes for large cuts within the clear zone must be held at 1:4. Therefore, the Interim Estrella intersection is the primary factor that controls differences in earthwork and right-of-way between the alternatives. The large waste quantities and right-of-way for alternative "C" are directly related to the Interim Estrella profile grade. The majority of Alternate "B" embankment volume is due to the Interim Estrella profile grade.

Alignment "E" intersection angle with the Interim Estrella is 80 degrees. The angle was required to keep the horizontal alignment on the first bench above the floodplain. Alternate "E" has the least expensive earthwork since the Interim Estrella grade daylights at the first bench.

Alignment "E" may conflict with the future Estrella interchange. Future interchange ramps may require expensive bridges, large embankment, deep cuts, or realignment of 107th Avenue.

Cost of Alternate "B" can be reduced approximately $200,000 by coordinating the future Estrella bridge with the Interim Estrella at grade intersection. If the Interim Estrella grade was lowered from 4.6 m to 1.5 m (5') at the 107th Avenue Alternate "B" intersection, then embankment volumes will be reduced 30,000 to 40,000 meters cubed and future bridge clearance would be provided without changing grade on 107th Avenue. Future interchange ramps would require large embankments.

Alternative "C" is compatible with the future Estrella interchange. An overpass bridge could be constructed on the Estrella east of the future Agua Fria bridge. Ramps could be excavated and used to fill in cuts on the Interim 107th Avenue.

Grades were designed to minimize earthwork between the Interim Estrella intersection and Jomax Road intersection. The unit price for Alternate "B" earthwork is lower than Alternate "C" and "E" because haul distance is essentially zero. A linear retention basin on the east side of alignment "B" provides required borrow (Figure 9). Alternate "B" is the only alternative that can guarantee earthwork will balance since the retention basin dimensions can be varied.

Differences in horizontal alignment between Interim Estrella intersection and Jomax Road are relative to the floodplain and geometrics selected for Jomax intersection. Alternative "B" is on a tangent across the floodplain to the Jomax "T" intersection. Alternate "E" remains on a tangent until the first bench disappears, then it curves west and merges with alignment "C." From the Estrella, Alternate "C" continues on a tangent cut across the second bench until it daylights, then it curves west and beelines to the Jomax "T" intersection.

Jomax was designed to "T" into 107th Avenue, instead of vise versa, since it provided the safest intersection and minimized reconstruction on Jomax Road. The Design Year and ultimate build out traffic volumes are much lower on the Jomax leg than other intersection legs.

Existing Jomax Road is on a steep 8% downgrade and substandard horizontal curve. Jomax intersection leg for alternatives "C" and "E" eliminate the horizontal curve but have a shorter, steeper approach than Alternative "B." Alternative "B" provides 100 m (330') tangent into the intersection after a flat curve that connects to existing Jomax Road. All approaches to Jomax have excellent intersection site distances that mitigate the steep downgrade on the Jomax leg.

5.8.2 Traffic from Hatfield to Jomax Road:

The Interim Roadway (Figure 10) will provide tee intersections at Hatfield Road and Jomax road. Future projects may add left turn lanes at Hatfield Road, Estrella Interim Roadway, and Jomax Road. The Hatfield and Jomax turn lanes could be added when actual traffic volumes warrant it. The Estrella intersection and turn lanes will be designed and constructed as part of the Interim Estrella project. The Interim 107th Avenue (Figure 10) alignment and profile will facilitate construction of an at grade intersection with the Interim Estrella Roadway.

5.8.3 Drainage from Hatfield to Jomax Road:

Six minor washes and one major wash flow from east to west and terminate with alluvial fans on the Agua Fria floodplain. Sheet flow from alluvial fans on most minor washes is intercepted by the historic canal located on the east bank of the Agua Fria floodplain. Breaks in the canal allow water to sheet flow across the floodplain west of the canal. An exception is the major wash north of Hatfield Road where the water remains concentrated for some distance onto the floodplain before starting to sheet flow.

Drainage differences between the alternatives depends on alignment location relative to the floodplain, the canal and the major side drainage. Those three factors control location and size of culverts, training dikes, and rip rap. Alternates "A" and "B" are in the floodplain west

of the canal where water sheet flows, except at the major drainage. Alternate "A" has no drainage improvements. Alternate "B" has culverts, and a dike at the major drainage. Alternate "C" and "E" are east of the floodplain where drainage is concentrated in washes. Alternate "E" is west of the canal at the major wash, while "C" is east. Therefore, Alternate "E" requires a training dike, but "C" does not.

Alternative "B" and "E" require rip rap on the west side of the embankment placed in the Agua Fria floodplain. Alternate "E" exposure is limited too the area near Hatfield road. Alternate "B" requires rip rap from Hatfield Road to Jomax Road. See Figure 9 for typical rip rap detail.

Design, location, and size of culverts for alternative "C" and "E" are similar. Alternate "B" design is different than "C" and "E" since "B" is in the floodplain.

Alternate "B" drainage design includes retention basins east of the embankment per Figure 10. Retention basin locations are:

- Floodplain southeast of Interim Estrella intersection
- Floodplain northeast of Interim Estrella intersection

Retention basin overflow pipes prevent Alternate "B" roadway embankment from damming water flowing from either direction. The retention basins overflow west and the Agua Fria 100 year flood back flows east. The retention basin is compatible with the CAP Recharge Project located on the west bank of the floodplain. The retention basin area and anticipated infiltration rate will preclude need for wet wells. The retention basin must be maintained to prevent weeds, silting, erosion, and fence damage from degrading functionality.

A concrete box culvert (CBC) is required where the major drainage crosses 107th Avenue between Hatfield Road and the Interim Estrella. Different CBC sizes were selected for the alternatives,. Channel profile and height of roadway fill were the determining factors. Alternate "B" has the flattest channel profile and least fill height. Alternate "E" has a flat profile, and a fill height greater than "B." Alternate "C" has the greatest channel slope and fill height. Alternate "B", "C", and "E" are skewed.

CONCRETE BOX CULVERT SELECTION FOR MAJOR DRAINAGE SITE					
Alternative	**Station**	**Barrels**	**Width**	**Height**	**Skew**
A	None	N/A	N/A	N/A	N/A
B		4	3000 mm (10')	2400 mm (8')	15°
C		2	3600 mm (12')	3000 mm (10')	45°
E		2	3000 mm (10')	3000 mm (10')	30°

5.8.4 Right-of-Way from Hatfield Road to Jomax Road:

The right-of-way requirements for the various alternatives are related to roadway geometrics, slope ratio, roadway classification, drainage design, ultimate design of Estrella intersections, ultimate design of Jomax intersection, and assumptions about dedications by future developers. The contract scope of work is too limited to address all of these factors. This report only addresses right-of-way required for a Rural Minor Collector with an at-grade intersection with the Estrella Interim roadway. Right-of-way requirements for Arterial classification is beyond the scope of this report.

Right-of-way fence will be installed between Hatfield Road and Jomax Road to improve safety. All Terrain Vehicles (ATVs) utilize the Agua Fria floodplain and benches for off road recreation. The fence will prohibit ATVs from crossing the roadway at random locations and causing an accident.

All alternatives require a minimum of 16.764 m (55') new right-of-way left and right of centerline. Additional right-of-way, for slope and drainage easements is required.

Alternate "B" includes the standard 33.528 m (110') right-of-way and a drainage easement for the linear retention basins. A wide 30.480 m (100') drainage easement was assumed for this study. See Figure 10. A narrower easement could have been used if the retention basin depth was increased. The wider easement with shallow retention basins is preferred since it simplifies future widening required to upgrade roadway to Urban Minor Arterial classification.

Alternate "C" includes the standard 33.528 m (110') right-of-way plus large slope easements. Slope easement requirements will be reduced significantly if slope rates are increased. The current estimate is based on holding 1:4 slope ratio even in deep cuts and large fills.

Alternate "E" includes the standard 33.528 m (110') right-of-way and some slope easements. Slope easements are primarily due to fill slopes that could be steepened if guardrail was installed. Cost comparisons should be made during design to see which option is more desirable.

5.9 Earthwork Summary

Development and analysis of earthwork was explained in the previous subsections.

Earthwork Summary* m^3 (cy)			
Alternative	**Excavation**	**Embankment**	**Net**
A	0	0	0
B***	55,000 (72,000)	91,000 (119,000)	36,000 (47,000) Borrow**
C	580,000 (760,000)	64,000 (84,000)	516,000 (676,000) Waste
E	41,000 (54,000)	103,000 (135,000)	62,000 (81,000) Borrow

* *Meters cubed without shrink/swell*

** *Linear retention basin is borrow source*

***Earthwork balanced is guaranteed since retention basin dimensions can vary*

5.10 Right-of-Way Summary

Development and analysis of right-of-way was explained in the previous subsections. The table on the following page summarizes right-of-way takes and costs. See Appendix "D" and "E" for more detail.

5.11 Environmental Analysis of Alternatives

5.11.1 Description

Five alignment alternatives have been developed for the project, labeled A through E. All share a common first segment from Rose Garden Lane to just south of the Pinnacle Peak Road alignment. A portion of this first, shared alignment is already paved and is part of the development of new single-family subdivisions. Other new subdivisions are currently under construction. Therefore, the alignment is fixed south of the Pinnacle Peak alignment and is excluded from this analysis.

At the point of the first divergence, Alternate D swings east while the remainder stay on one alignment until they diverge at Hatfield Road. Alternate D takes the high road on the uplands until it intersects Jomax Road, the northern terminus of the project. The other study alignments, A, B, C, and E, take slightly different paths to Jomax to satisfy various project criteria.

5.11.2 Comparative Analysis

Alternate A essentially follows the existing gravel road north to Jomax. It is characterized by a long length of Agua Fria River floodplain, one wash crossing, an at-grade intersection with the planned Estrella Freeway, and little effect on upland vegetation. It would be subject to periodic closures and potential damage due to flooding. This Alternate would have an adverse effect on wildlife use of the Agua Fria River floodplain for migration or north/south movements. This alternative would be the least visible from a distance because it would sit the lowest on the land. The probability of affecting as yet unknown cultural resource sites is lowest for this Alternate.

Alternate B is similar in alignment to Alternate A except that diverges slightly east at the only wash crossing and would be constructed on enough fill to remove the roadway from the 100-year floodplain, thus eliminating closures and damage from flooding. However, this Alternate may require an individual Section 404 permit from the Corps of Engineers to construct. Preconsultation with the Corps indicated Nationwide 14 permits will probably be used, since floodway boundary best defines waters of the U.S. This Alternate would also have an adverse effect on wildlife use of the Agua Fria River floodplain for migration or north/south movements. The visual impact of this alignment alternative would be almost as low as for Alternate A, assuming that the roadway profile is not elevated on fill more than a few feet. The potential for encountering as yet unknown cultural resource sites is low, almost as low as for Alternate A except for the point of divergence near Hatfield Road where a cut would have to be made in the bluff.

Alternate C swings east toward higher ground immediately north of the SRP property. This Alternate would have an adverse effect on upland habitat (habitat loss and fragmentation) and would require a long crossing (probably a bridge) of the large wash located in the central portion of the project area. Alternate C would require two additional wash crossings and would not affect the Agua Fria River floodplain. One existing noise receptor, a single-family home, is within three hundred feet of this Alternate. This alignment would be visible in parts

at a distance where it reaches its highest elevation. The potential to encounter as yet unknown cultural resource sites on this alignment is moderate to high.

Alternate D is the easternmost of the study alignments. It traverses the upper bench and would affect the most upland habitat. It would also require five wash crossings. At least two noise receptors are within three hundred feet of the alignment; both of these are single-family homes. No portion of the Agua Fria River floodplain would be affected. This alignment would be the most visible from a distance due to its elevation on top of the highest ground of the study corridor. The potential to encounter as yet unknown cultural resource sites on this alignment is moderate to high.

The final Alternate is labeled E. Alternate E is a variation of Alternate C. It stays closer to the Agua Fria River without substantial floodplain impacts. It would traverse the first bench above the river and require four wash crossings. The large wash could be crossed with a series of box culverts rather than a bridge. This Alternate would affect less upland habitat than C or D and would not adversely affect wildlife movements through the floodplain of the Agua Fria River. The visibility of this alignment to the distance observer would be moderate as it mostly traverses the first bench above the river but not the highest ground. The potential for encountering previously unknown cultural resources is high.

5.11.3 Environmental Summary

Table 1
Summary of Likely Impacts

	Alternate A	Alternate B	Alternate C	Alternate D	Alternate E
Impacts					
Floodplain Involvement	highest	substantial	minimal	none	moderate
Noise	no receptors	no receptors	one receptor	two receptors	no receptors
Cultural Resources	lowest potential	low potential	moderate to high potential	moderate to high potential	highest potential
Wildlife Habitat and Movement	low habitat loss; movement impediment	low habitat loss; movement impediment	high habitat loss; no movement impediment	highest habitat loss; no movement impediment	Moderate habitat loss; no movement impediment
Wash Crossings	one	one	three	five	four
Visual Impacts– View from a distance	least visible	low visibility	moderate to high visibility	most visible from a distance due to elevation	moderate visibility
Hazardous Materials	none known	none known	none known	none known	none known

All alternatives have the same biological mitigation requirements. Project Special Provisions must contain desert tortoise requirements. See the "Guidelines" on the next page for details. No other biological mitigation is required.

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised August 7, 1996

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state.

Desert tortoises of the Sonoran population are those occurring south and east of the Colorado River. Tortoises encountered on short-term projects (less than one week) and not in a burrow, should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position at all times and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 105 degrees fahrenheit unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise should be moved no further than necessary, not to exceed 1000 feet from its original location. If a release site, or alternate burrow, is unavailable within 1000 feet and ambient air temperature exceeds 105 degrees fahrenheit, the Department should be contacted to place the tortoise into a Department-regulated desert tortoise adoption program. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting permit from the Department to facilitate temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mohave population of desert tortoises (north and west of the Colorado River). Mohave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.

- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect desert tortoises.

- Take, possession, or harassment of a desert tortoise is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

RAC:NLO:rc

Noise is a significant public concern. Approximately 20% of the public citizen comments expressed concern about truck traffic on 107th Avenue, and approximately 14% said issue was noise. This project will reduce truck noise by providing paved connections to the Interim Estrella and Jomax Road. Truck traffic generated by Sunward Materials will tend to turn north towards the new rural intersections, rather than south towards urban developments.

5.12 Cost Estimate Summary

A summary of the costs associated with each alternative is presented in the table on the following page. A detailed construction and utility cost estimate for each alternative is included in subsection 7.5 and the detailed right-of-way cost are included in subsection 5.10.

COST ESTIMATE SUMMARY

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)

WORK ORDER NO. 68932

Project Activity Description	Factors	Enhanced Maintenace of Existing Alignment (Alt. A)	New Alignment in Floodplain (Alt. B)	New Aligment East of Floodplain (Alt. C)	New Alignment on Bank of Floodplain (Alt. E)
Construction Cost					
MCDOT	N/A	$141,707	$2,115,817	$5,042,446	$2,118,483
City of Peoria	N/A	$0	$6,433	$6,433	$6,433
DCR, R/W & Design Cost	N/A	$249,449	$249,449	$249,449	$249,449
Construction Management					
MCDOT	15%	$21,256	$317,373	$756,367	$317,772
City of Peoria	15%	$0	$965	$965	$965
Right-of-Way	N/A	$844,100	$1,200,400	$2,279,400	$1,111,900
Utility Relocation	N/A	$0	$147,000	$140,000	$140,000
Administration	12%	$17,005	$254,670	$605,866	$254,990
Total Project Cost		**$1,273,516**	**$4,292,107**	**$9,080,926**	**$4,199,992**
MCDOT Total Cost		$1,273,516	$4,284,708	$9,073,527	$4,192,594
Peoria Total Cost		$0	$7,398	$7,398	$7,398

5.13 Alternatives Matrix

A comparison of alternatives is shown on the next page. The matrix summarizes the development and analysis of alternatives "A" through "E".

ALTERNATIVE MATRIX

107TH AVE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
Work Order No 68932 (GF Job No. 31510)

Alternative	A	B	C	D	E
Option	Enhanced Maintenance	Flood plain	Out of Food Plain	East of SRP	Edge of Food Plain
Location from Rose Garden Lane to Pinnacle Peak Road	Centered on section line	Centered on section line	Centered on section line	Centered on section line	Centered on section line
Location from Pinnacle Peak Road to Jomax Road	Follow existing alignment	West of SRP property, then across Agua Fria flood plain	West of SRP property, then east of flood plain and canal	East of SRP property, then due north to Jomax	West of SRP property, then follow edge of flood plain and canal
Pavement section	Penetration chip seal	100 mm (4") Asphalt C. 280 mm (11") Aggr.Base	100 mm (4") Asphalt C. 280 mm (11") Aggr.Base	100 mm (4") Asphalt C. 280 mm (11") Aggr.Base	100 mm (4") Asphalt C. 280 mm (11") Aggr.Base
Pavement width	8.5 m (28 ft.)	varies from 10.4 m (34 ft) to 19.5 (64 ft.)	varies from 10.4 m (34 ft) to 19.5 (64 ft.)	varies from 10.4 m (34 ft) to 19.5 (64 ft.)	varies from 10.4 m (34 ft) to 19.5 (64 ft.)
Drainage Structures	no improvements	1 CBC & 6 pipe culverts	1 CBC & 6 pipe culverts	1 bridge & 4 pipe culverts	1 CBC & 6 pipe culverts
Located in FEMA Flood Plain	yes	yes	no	no	no
Left turn lanes	no	yes	yes	yes	yes
Conduit @ intersections	no improvements	yes	yes	yes	yes
5 leg intersection required at Pinnacle Peak Road	no	no	no	yes	no
Culvert relocation maybe required at Pinnacle Peak	no	no	no	yes	no
Left turn lane at Sunward Materials driveway	no	yes	yes	yes	yes
Estrella intersection on grade	yes	yes	yes	yes	yes
Estrella intersection sight distance problem	no	no	yes	yes	maybe
Jomax road intersection sight distance problem	yes	no	no	yes	no
Obliterate Historic canal	no	no	some	no	some
Impact "Park & Open Space"	yes	yes	no	no	no
Private property takes	no	no	no	yes	no
Bridge required	no	no	no	yes	no
Air Quality Issues	yes	no	no	no	no
Noise issues	yes	no	yes	yes	no
404 permit required	no	yes	yes	yes	yes
Desert Tortoise Mitigation	no	yes	yes	yes	yes
Cultural Resource Issues	no	no	maybe	maybe	maybe
Total Project Cost	$1,273,516	$4,292,107	$9,080,926	$11,164,000	$4,199,992

Section 6. SELECTION OF PREFERRED ALTERNATIVE

6.1 Selection Matrix

The Alternative Development and Analysis section discussed differences between alternatives. The following selection matrix builds upon the analysis by assigning relative weights to important evaluation criteria.

Selection Matrix					
Evaluation Criteria	**Maximum Valve**	**A**	**B**	**C**	**E**
Public Input	10	0	10	5	10
Cultural and Biological Impacts	10	10	10	5	0
Air, Noise, and Water Quality	10	10	10	5	10
Agua Fria Floodplain	15	0	5	15	15
Impact on Adjacent Property	10	10	5	0	5
Future Linear Park	5	0	0	5	5
Future SRP Substation & Towers	10	10	10	10	10
Maintenance Cost	15	0	10	15	15
Sunward Materials Access	10	5	10	10	10
Future Estrella Interface	10	0	10	5	5
Safe Design	15	5	15	10	15
Off-Site and On-Site Drainage	10	0	5	10	10
Construction Cost	15	15	5	0	5
Total Score	145	65	105	95	115

6.2 Preferred Alternative

The recommended alternative is Alternate "E." This alternative avoids the Agua Fria floodplain and has the least expensive connection to the Interim Estrella Roadway. Alternative "E" reduces right-of-way cost by avoiding property with development potential.

Section 7. CONSTRUCTION ISSUES REPORT

7.1 Construction Traffic Management Evaluation

This project will require several construction traffic management scenarios since construction conditions vary on different project segments. Figure 10 shows the interim lane configurations for this project.

From Rose Garden Lane to 186 m (610') south of Pinnacle Peak, the road widening can be accomplished without detours. Existing pavement width is sufficient for two traffic lanes.

From 186 m (610') south of pinnacle Peak Road to Hatfield Road, the new pavement and culverts require stage construction or a detour. The existing alignment is narrow and crosses the new alignment.

From Hatfield Road to Jomax Road the project is on completely new alignment. It can be constructed without affecting existing traffic.

Jomax Road connection requires stage construction or a detour. Existing traffic volumes are low. The Jomax connection is on an 8% grade.

7.2 Construction Traffic Management Recommendation

Divide traffic management plan into four segments as follows:

- Maintain two lanes of traffic on existing pavement from Rose Garden Lane to Pinnacle Peak Road during construction. Use flagmen when installing signal conduits.

- Construct one side at a time from Pinnacle Peak Road to Hatfield Road. Have two lanes of traffic open at night. Open two traffic lanes during day when possible. Use one lane with flagmen when necessary. Do not detour traffic since volumes are low and available detour routes are long.

- Except for Road Closed signs, no traffic management is required from Hatfield Road to Jomax Road.

- Construct new portions of Jomax Connection while maintaining two lanes of traffic on existing pavement. Use one lane with flagmen while connecting existing to new pavement. Open two traffic lanes and obliterate unused old roadway.

107TH AVENUE - ROSE GARDEN LANE TO JOMAX ROAD

PRELIMINARY PROJECT SCHEDULE

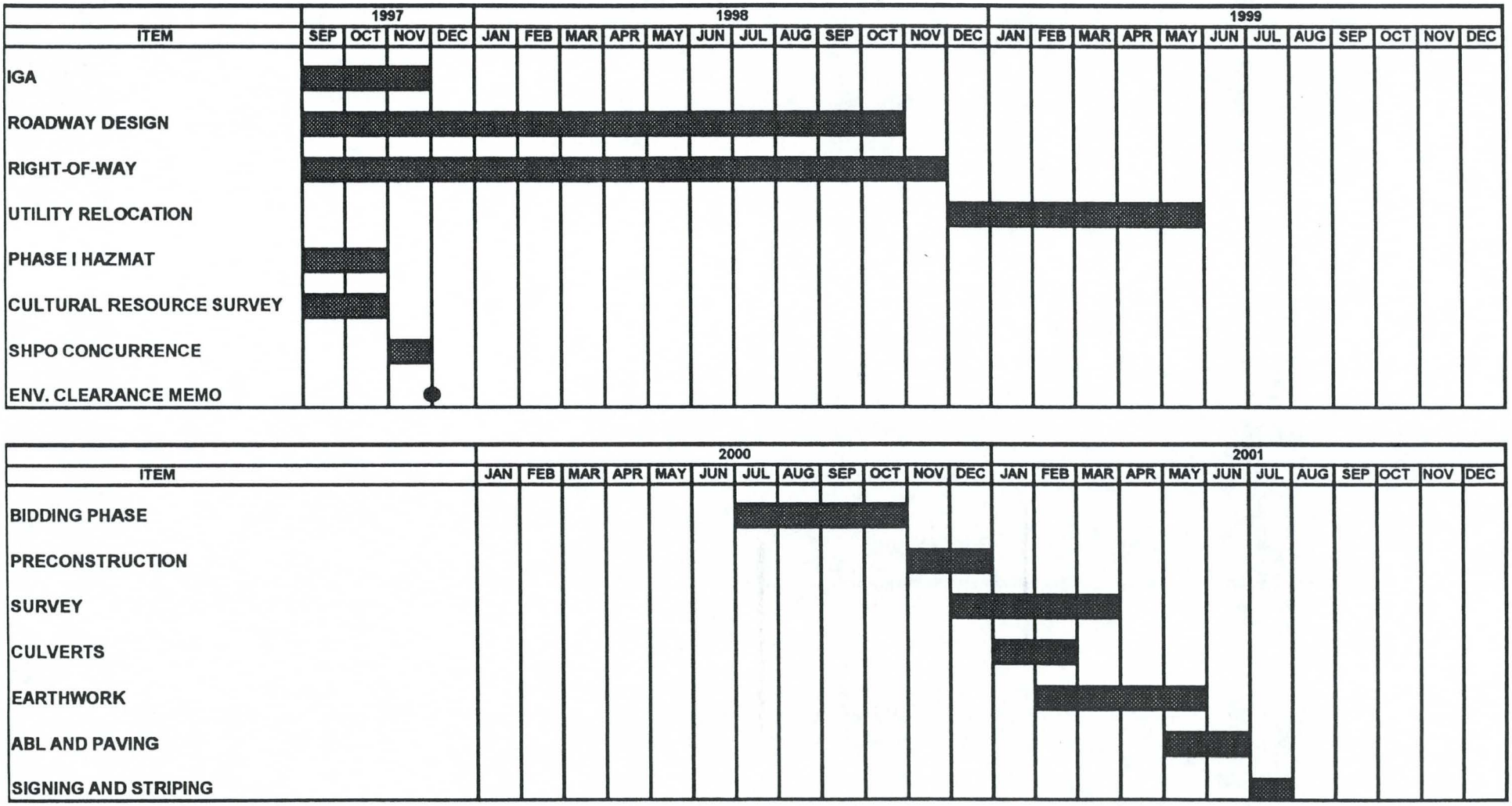


FIGURE 11

7.3 Utility Contacts

APS
Bob Bott
P.O. Box 53933, STA 4609
Phoenix, AZ 85072-3933
(602) 932-6736

SRP
Bill Phillips
P.O. Box 52025
Phoenix, AZ 85072-2025
(602) 236-8092

WAPA
Roy Watson
P.O. Box 6457
Phoenix, AZ 85005
(602) 352-2554

TUCSON ELECTRIC POWER CO
Al Winderling
3950 East Irvington Road
Tucson, AZ 85714
(520) 745-3353

US WEST
Bob Rice
10220 North 25th Ave, STA 100
Phoenix, AZ 85021
(602) 630-5486

SW GAS
Wade Patrick
9 South 43rd Ave
Phoenix, AZ 85009
(602) 484-5649

EL PASO NATURAL GAS CO
Bill Ward
7815 South 48th St
Phoenix, AZ 85044
(602) 438-4200

CITY OF PEORIA
Dan Nissen, P.E.
8401 West Monroe St
Peoria, AZ 85345
(602) 412-7210

7.4 Construction Schedule

This project is currently scheduled in the five year CIP for fiscal year 2001. Fiscal year 2001 begins in July 2000 and ends June 2001. Since this is a potential early construction project, the design must be completed as early as possible. The Preliminary Project Schedule, Figure 11 includes major tasks, durations, and estimated completion dates.

Culverts will be constructed first. The culvert at Pinnacle Peak Road must be constructed one side at a time. Earthwork between Hatfield Road and Jomax Road will be started first and completed with east half from Pinnacle Peak to Hatfield. Paving will start when grading starts from Rose Garden Lane to Pinnacle Peak. Grading the other side from Pinnacle Peak to Hatfield will be completed while paving Hatfield to Jomax Road. Traffic signal conduits will be installed prior to signing and striping.

7.5 Construction Cost Estimates

Detail construction cost estimates for each alternative are shown on the following pages. The utility relocation costs were included for each alternative.

ESTIMATED CONSTRUCTION and UTILITY COST

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
WORK ORDER NO. 68932
GF JOB NO. 31510

ALTERNATIVE "A" (Enhanced Maintenance)

Item#	Description	Unit	Quantity	Unit Price	Total
107.01100	N.P.D.E.S.	Lump Sum	1	$2,500.00	$2,500
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
205.03000	Roadway Excavation	Cubic Meter	2,984	$5.00	$14,918
301.02000	Subgrade Preparation	Square Meter	38,106	$1.80	$68,590
330.07100	Stone Chips	Metric Ton	372	$44.10	$16,405
330.07200	Liquid Asphalt	Metric Ton	48	$214.99	$10,320
350.01100	Removal of Existing Improvements	Lump Sum	1	$1,000.00	$1,000
420.00000	Fence, ADOT Type 1 Barbed Wire	Lineal Meter	4,890	$10.00	$48,900
450.00002	Traffic Signing & Striping (2 lane)	Lineal Meter	3664	$6.50	$23,816
				SUB TOTAL	$118,732
110.01000	Mobilization	Lump Sum	1	5%	$5,937
401.00000	Traffic Control	Lump Sum	1	3.5%	$4,156
				SUB TOTAL	$128,825
	Contingency	Lump Sum	1	10%	$12,882
				CONSTRUCTION COST	$141,707
	Relocate 12KV Utility Pole	Each	0	$7,000.00	$0
				UTILITY COST	$0

ESTIMATED CONSTRUCTION and UTILITY COST

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
WORK ORDER NO. 68932
GF JOB NO. 31510

ALTERNATIVE "B" (Low/Reasonable Cost Improvement)

Item#	Description	Unit	Quantity	Unit Price	Total
107.01100	N.P.D.E.S.	Lump Sum	1	$2,500.00	$2,500
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
205.03000	Roadway Excavation	Cubic Meter	55,000	$5.00	$275,000
215.03600	Channel Excavation	Cubic Meter	1200	$5.00	$6,000
215.03700	Detention Basin Exc.	Cubic Meter	38700	$4.00	$154,800
220.01400	Rip Rap Plain	Cubic Meter	2,628	$65.00	$170,820
301.02000	Subgrade Preparation	Square Meter	45,041	$1.80	$81,074
310.07100	Aggregate Base Course	Metric Ton	29292	$10.00	$292,920
321.02100	Asphaltic Concrete Pavement	Metric Ton	10822	$40.00	$432,880
333.07100	Fog Seal for Asphalt Concrete	Metric Ton	20	$220.00	$4,400
350.01100	Removal of Existing Improvements	Lump Sum	1	$1,000.00	$1,000
415.00000	Flexible Metal Guardrail	Lineal Meter	200	$40.00	$8,000
420.00000	Fence, ADOT Type 1 Barbed Wire	Lineal Meter	4,494	$10.00	$44,936
450.00002	Traffic Signing & Striping (2 lane)	Lineal Meter	3466	$6.50	$22,529
450.00003	Traffic Signing & Striping (3 lane)	Lineal Meter	2234	$10.00	$22,340
505.01000	Reinforcing Steel	kilogram	22000	$1.05	$23,100
505.03000	Class A Concrete	Cubic Meter	252	$250.00	$63,000
525.02100	Canal Lining (150mm)	Square Meter	840	$42.00	$35,280
622.00600	600 mm (24") CMP	Lineal Meter	90	$150.00	$13,500
622.00900	900 mm (36") CMP	Lineal Meter	30	$200.00	$6,000
622.01200	1200 mm (48") CMP	Lineal Meter	42	$245.00	$10,290
622.01350	1350 mm (54") CMP	Lineal Meter	48	$280.00	$13,440
622.01500	1500 mm (60") CMP	Lineal Meter	184	$325.00	$59,800
				SUB TOTAL	$1,748,609
110.01000	Mobilization	Lump Sum	1	5%	$87,430
401.00000	Traffic Control	Lump Sum	1	5%	$87,430
				SUB TOTAL	$1,923,470
	Contingency	Lump Sum	1	10%	$192,347
				CONSTRUCTION COST	$2,115,817
	Relocate 12KV Utility Pole	Each	21	$7,000.00	$147,000
				UTILITY COST	$147,000

ESTIMATED CONSTRUCTION and UTILITY COST

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
WORK ORDER NO. 68932
GF JOB NO. 31510

ALTERNATIVE "C" (Low/Reasonable Cost Improvement)

Item#	Description	Unit	Quantity	Unit Price	Total
107.01100	N.P.D.E.S.	Lump Sum	1	$2,500.00	$2,500
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
205.03000	Roadway Excavation	Cubic Meter	580,000	$5.00	$2,900,000
215.03600	Channel Excavation	Cubic Meter	1200	$5.00	$6,000
220.01400	Rip Rap Plain	Cubic Meter	248	$65.00	$16,146
301.02000	Subgrade Preparation	Square Meter	47,544	$1.80	$85,579
310.07100	Aggregate Base Course	Metric Ton	30920	$10.00	$309,200
321.02100	Asphaltic Concrete Pavement	Metric Ton	11424	$40.00	$456,960
333.07100	Fog Seal for Asphalt Concrete	Metric Ton	21	$220.00	$4,620
350.01100	Removal of Existing Improvements	Lump Sum	1	$1,000.00	$1,000
415.00000	Flexible Metal Guardrail	Lineal Meter	200	$40.00	$8,000
420.00000	Fence, ADOT Type 1 Barbed Wire	Lineal Meter	4,975	$10.00	$49,750
450.00002	Traffic Signing & Striping (2 lane)	Lineal Meter	3707	$6.50	$24,096
450.00003	Traffic Signing & Striping (3 lane)	Lineal Meter	2234	$10.00	$22,340
505.01000	Reinforcing Steel	kilogram	24000	$1.05	$25,200
505.03000	Class A Concrete	Cubic Meter	353	$250.00	$88,250
525.02100	Canal Lining (150mm)	Square Meter	840	$42.00	$35,280
622.01200	1200 mm (48") CMP	Lineal Meter	160	$245.00	$39,200
622.01350	1350 mm (54") CMP	Lineal Meter	48	$280.00	$13,440
622.01500	1500 mm (60") CMP	Lineal Meter	230	$325.00	$74,750
				SUB TOTAL	$4,167,311
110.01000	Mobilization	Lump Sum	1	5%	$208,366
401.00000	Traffic Control	Lump Sum	1	5%	$208,366
				SUB TOTAL	$4,584,042
	Contingency	Lump Sum	1	10%	$458,404
				CONSTRUCTION COST	$5,042,446
	Relocate 12KV Utility Pole	Each	20	$7,000.00	$140,000
				UTILITY COST	$140,000

ESTIMATED CONSTRUCTION and UTILITY COST

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
WORK ORDER NO. 68932
GF JOB NO. 31510

ALTERNATIVE "E" (Low/Reasonable Cost Improvement)

Item#	Description	Unit	Quantity	Unit Price	Total
107.01100	N.P.D.E.S.	Lump Sum	1	$2,500.00	$2,500
107.09200	Community Relations	Allowance	1	$5,000.00	$5,000
205.03000	Roadway Excavation	Cubic Meter	41,000	$5.00	$205,000
210.04200	Borrow Excavation	Cubic Meter	61940	$5.00	$309,700
215.03600	Channel Excavation	Cubic Meter	1200	$5.00	$6,000
220.01400	Rip Rap Plain	Cubic Meter	372	$65.00	$24,180
301.02000	Subgrade Preparation	Square Meter	46,574	$1.80	$83,833
310.07100	Aggregate Base Course	Metric Ton	30289	$10.00	$302,890
321.02100	Asphaltic Concrete Pavement	Metric Ton	11191	$40.00	$447,640
333.07100	Fog Seal for Asphalt Concrete	Metric Ton	21	$220.00	$4,620
350.01100	Removal of Existing Improvements	Lump Sum	1	$1,000.00	$1,000
415.00000	Flexible Metal Guardrail	Lineal Meter	200	$40.00	$8,000
420.00000	Fence, ADOT Type 1 Barbed Wire	Lineal Meter	4,788	$10.00	$47,885
450.00002	Traffic Signing & Striping (2 lane)	Lineal Meter	3613	$6.50	$23,485
450.00003	Traffic Signing & Striping (3 lane)	Lineal Meter	2234	$10.00	$22,340
505.01000	Reinforcing Steel	kilogram	22400	$1.05	$23,520
505.03000	Class A Concrete	Cubic Meter	276	$250.00	$69,000
525.02100	Canal Lining (150mm)	Square Meter	840	$42.00	$35,280
622.01200	1200 mm (48") CMP	Lineal Meter	100	$245.00	$24,500
622.01350	1350 mm (54") CMP	Lineal Meter	48	$280.00	$13,440
622.01500	1500 mm (60") CMP	Lineal Meter	280	$325.00	$91,000
				SUB TOTAL	$1,750,812
110.01000	Mobilization	Lump Sum	1	5%	$87,541
401.00000	Traffic Control	Lump Sum	1	5%	$87,541
				SUB TOTAL	$1,925,894
	Contingency	Lump Sum	1	10%	$192,589
				CONSTRUCTION COST	$2,118,483
	Relocate 12KV Utility Pole	Each	20	$7,000.00	$140,000
				UTILITY COST	$140,000

107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
WORK ORDER NO. 68932
GF JOB NO. 31510

CITY OF PEORIA PORTION

Item#	Description	Unit	Quantity	Unit Price	Total
402.01310	75 mm PVC Conduit, Schedule 40	Lineal Meter	159	$16.50	$2,617
403.01700	#7 - Pull Box	Each	9	$300.00	$2,700
				SUB TOTAL	$5,317
110.01000	Mobilization	Lump Sum	1	5%	$266
401.00000	Traffic Control	Lump Sum	1	5%	$266
				SUB TOTAL	$5,849
	Contingency	Lump Sum	1	10%	$585
				CONSTRUCTION COST	$6,433
	Relocate 12KV Utility Pole	Each	0	$7,000.00	$0
				UTILITY COST	$0

APPENDIX A

Public Participation Plan Results
(Citizen and Agency Comments)

Open House Public Meeting

Hosted by the Maricopa County Department of Transportation

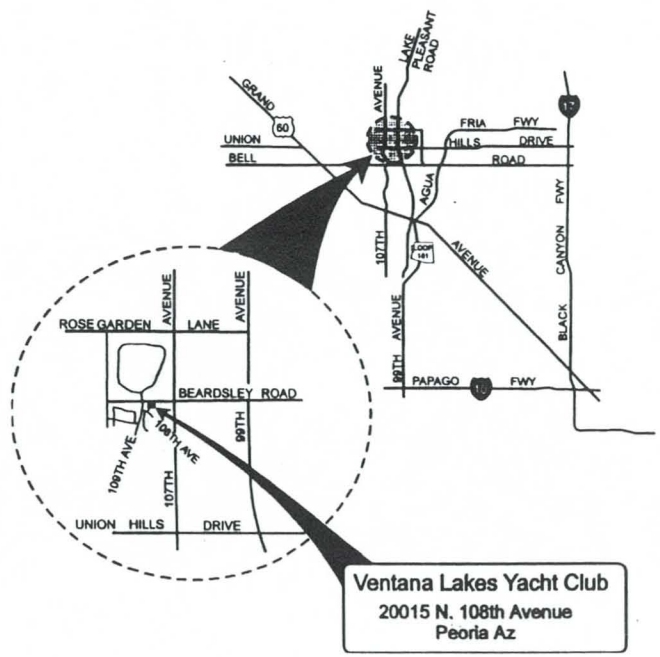
When: Thursday, June 5, 1997, 6-8 p.m.

Where: Ventana Lakes Yacht Club, 20015 N. 108th Avenue, Peoria, AZ

Why: To discuss improvements to 107th Avenue from Rose Garden Lane to Jomax Road. Work includes widening, realigning, grading, and draining to provide a sound paved roadway.

For more information, contact Kent McLain, project manager, at 506-8623.

107TH AVENUE PROJECT



107th Avenue, Rose Garden Lane to Jomax Road
MCDOT Project Number 68932

Summary of Citizen Comments

On June 5, 1997 more than 20 people attended a public meeting to discuss the 107th Avenue project. Comment cards were distributed to all those that attended the meeting. The following information is a summary of the respondents' comments:

Results

As of June 17, MCDOT received feedback from 15 citizens. Of those who responded 31 percent said they supported the project. Roughly eight percent said they were opposed to the project.

Twenty percent of the respondents expressed concern with truck traffic on 107th Avenue. Approximately 14 percent were concerned with noise and one citizen was concerned with increased pollution.

With regard to the meeting, a sampling of the comments included:

- "We are 100% supporting the paved roadway..."
- "I hope this project gets top priority with the County and is completed as soon as possible."

107th Avenue, Rose Garden Lane to Jomax Road
MCDOT Project Number 68932

Summary of Citizen Comments

Comments	Number of Respondents
Staff very knowledgeable	13
Staff somewhat knowledgeable	2
Staff very helpful	6
Staff somewhat helpful	1
Information presented in an understandable manner	15
Questions answered	14
Requested future information	10
Future information not needed	2
Heard about the meeting from:	
Newspaper	1
Flyers	10
Trail Signs	4
Other	1

Gannett Fleming
ENGINEERS AND PLANNERS

GANNETT FLEMING, INC.
Suite 130
3001 East Camelback Road
Phoenix, AZ 85016-4498
Fax: (602) 553-8816
Office: (602) 553-8817

DATE: June 2, 1997 **THIS IS PAGE 1 OF** 2

TO/FIRM:	Mr. Duane Shroufe/AZ Game & Fish Dept.	**FAX. NO.**	789-3299
TO/FIRM:	Mr. Jay Das/AZ Dept. of Environmental Quality	**FAX. NO.**	207-4674
TO/FIRM:	Mr. Richard Duarte/AZ Dept. of Transportation	**FAX. NO.**	407-3066
TO/FIRM:	Mr. Larry Flatau/US Army Corps of Engineers	**FAX. NO.**	640-5382
TO/FIRM:	Mr. Leigh Johnson/Sunward Materials	**FAX. NO.**	566-8677
TO/FIRM:	Mr. Dan Nissen/City of Peoria	**FAX. NO.**	412-7211
TO/FIRM:	Mr. William Phillips/Salt River Project	**FAX. NO.**	236-8069
TO/FIRM:	Mr. Mark Keller/AZ State Land Dept.	**FAX. NO.**	542-2590
TO/FIRM:	Mr. Joe Albo/AZ Dept. of Public Safety	**FAX. NO.**	223-2917
TO/FIRM:	Mr. Steve Thomas/Federal Highway Admin.	**FAX. NO.**	379-3608
TO/FIRM:	Mr. Sam Spiller/US Fish & Wildlife Service	**FAX. NO.**	640-2730
TO/FIRM:	Mr. James Garrison/Arizona State Parks	**FAX. NO.**	542-4180
TO/FIRM:	Mr. Kofi Awumah, Flood Control District	**FAX. NO.**	506-4601
TO/FIRM:	Mr. Terry Johnson/MAG TPO	**FAX. NO.**	~~254-6308~~ 506-6008

FROM: Robert L. Crowley, P.E.

SUBJECT: Public Meeting Announcement

___ Original Sent By Mail ___ Return Material to Originator ___ Discard

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000

Mesa Office, 7200 E. University, Mesa, Arizona 85207 (602) 981-9400

May 30, 1997

Mr. Robert L. Crowley, P.E.
Project Manager
Gannett Fleming, Inc.
3001 East Camelback Road
Suite 130
Phoenix, Arizona 85016-4498

Re: Design Concept Report, 107th Avenue (Rose Garden Lane to Jomax Road), Work Order # 68932 (GF #31510)

Dear Mr. Crowley:

The Arizona Game and Fish Department (Department) has reviewed the above referenced Design Concept Report. The Department provides the following comments concerning this application.

The Department's Heritage Data Management System has been accessed and current records show that the special status species listed below have been documented as occurring in the project vicinity.

COMMON NAME	SCIENTIFIC NAME	STATUS
black-bellied whistling duck	Dendrocygna autumnalis	**WC,S**
greater western mastiff bat	Eumops perotis californicus	**S**
Sonoran desert tortoise	Gopherus agassizii	**WC,S**

STATUS DEFINITIONS

WC - Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Department's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.). Species included in WSCA are currently the same as those in **Threatened Native Wildlife in**

Arizona (1988).

S - Sensitive. Species classified as **"sensitive"** by the Regional Forester when occurring on lands managed by the U.S.D.A. Forest Service.

The Department recommends that the above mentioned special status species are considered in the planning and implementation of this project. We further recommend that the Department's "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects" are used in the instance that a tortoise or its burrow is located during project implementation. A copy of these guidelines has been enclosed for your information.

The Department does not anticipate any significant impacts to fish, wildlife, or their habitats as a result of implementation of this project. However, our recommendation for road placement would be Alternative "A", which would utilize an existing road alignment. This option would minimize the impact to wildlife habitat in the project area. We appreciate the opportunity to comment on this project, and look forward to continued cooperation in the evaluation of future proposals.

Sincerely,

Timothy Wade
Habitat Evaluation Specialist

TPW:tw

cc: Kelly Neal, Regional Supervisor, Region VI
Russell Haughey, Habitat Program Manager, Region VI
David L. Walker, Project Evaluation Program Supervisor, Habitat Branch
Shelly Shepherd, Wildlife Manager, NW Phoenix\Lake Pleasant District

enclosure

AGFD# 5-14-97(11)

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS

Arizona Game and Fish Department
Revised August 7, 1996

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state.

Desert tortoises of the Sonoran population are those occurring south and east of the Colorado River. Tortoises encountered on short-term projects (less than one week) and not in a burrow, should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position at all times and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 105 degrees fahrenheit unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise should be moved no further than necessary, not to exceed 1000 feet from its original location. If a release site, or alternate burrow, is unavailable within 1000 feet and ambient air temperature exceeds 105 degrees fahrenheit, the Department should be contacted to place the tortoise into a Department-regulated desert tortoise adoption program. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting permit from the Department to facilitate temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mohave population of desert tortoises (north and west of the Colorado River). Mohave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.

- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect desert tortoises.

- Take, possession, or harassment of a desert tortoise is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

RAC:NLO:rc

Gannett Fleming
ENGINEERS AND PLANNERS

MEMORANDUM OF TELEPHONE CONVERSATION

RECORDED BY: BOB	JOB NO.: 31510
SPOKE WITH: TIM WADE	COMPANY NAME: AZ GAME & FISH
TELEPHONE NUMBER: 981-9400	DATE: 6-5-97 TIME: 9:10A
SUBJECT: Wildlife on 107th	

ITEM(S) DISCUSSED:

Include turtoise spec in Special Provisions. No other requirements

Their officer inspected site and decided no real impact. They just used can spec for area

COPIES TO:	ACTION:
COPY JOB FILE NUMBER:	

rli:1/22/93

THE STATE OF ARIZONA

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000

Governor
Fife Symington

Commissioners:
Chairman, Nonie Johnson, Snowflake
Michael M. Golightly, Flagstaff
Herb Guenther, Tacna
Fred Belman, Tucson
M. Jean Hassell, Scottsdale

Director
Duane L. Shroufe

Deputy Director
Thomas W. Spalding

Mesa Office, 7200 E. University, Mesa, Arizona 85207 (602) 981-9400

April 2, 1997

Mr. Mark W. Larson
Senior Environmental Planner
Larson & Company
7757 North Via De La Sombre
Scottsdale, Arizona 85258

Re: 107th Avenue, Rose Garden Lane to Jomax; Environmental Overview for the Roadway Design Concept Report

Dear Mr. Larson:

The Arizona Game and Fish Department (Department) received your request for comments on the Environmental Overview for the Realignment of 107th Ave. More specific information regarding future activities occurring in the area is needed to evaluate impacts to wildlife or wildlife habitat. However, a site visit was conducted on March 26, 1997 and the Department provides the following comments for the overview:

The Department's Heritage Data Management System has been accessed and current records show that the special status species listed below have been documented as occurring in the project vicinity.

COMMON NAME	SCIENTIFIC NAME	STATUS
***greater western mastiff bat**	Eumops perotis californicus	**WC,S**
***Sonoran desert tortoise**	Gopherus agassizii	**WC,S**

STATUS DEFINITIONS

S - Sensitive. Species classified as **"sensitive"** by the Regional Forester when occurring on lands managed by the U.S.D.A. Forest Service.

WC - Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known or perceived threats or population declines, as described by the Department's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.) October 1996 Draft.

The Department recommends that the special status species noted above be considered during the planning stages of this proposed project. The Department is interested in providing additional recommendations regarding these species prior to the development of any lands in the area.

The Department agrees with your statement that the project area contains considerable open space and relatively undisturbed desert habitat. The vegetation in the vicinity of the proposed project includes Sonoran Desert vegetation dominated by palo verde, saguaro, creosote, and bursage. The habitat supports a variety of reptile, bird, and mammal species including game species such as mule deer, javelina, desert cottontail, skunk, raccoon, Gambel's quail and mourning and white-winged dove. Numerous non-game species also inhabit the project area. Also, a known pair of bald eagles's territory, located to the north, may extend into this stretch of the Agua Fria.

The existing 107th Avenue is an improved road in good condition and we recommend that it is used in place if possible. The area east of 107th Avenue is upland Sonoran desert with ephemeral drainages running west. The Agua Fria River is west and adjacent to the project area, however, no riparian vegetation was found in the river bottom or in the upland project area.

The Department recommends that the loss of wildlife habitat associated with the extension or realignment of the road be the minimum amount possible. If removal of vegetation cannot be avoided, plant species protected under the Arizona Native Plant Law, ARS Title 3, chapter 7 should be relocated to an appropriate revegetation site.

Also, solely for your information, there are more homes and existing roads on the mesa east of the existing 107th Avenue than are indicated on the map you provided. One resident commented at the site visit that he was completely unaware and concerned that a road was proposing to be built close to his property. Also, the area marked "APS" is SRP property.

The Department appreciates the opportunity to comment on the 107th Avenue, Rose Garden Lane to Jomax; Environmental Overview for the Roadway Design Concept Report. We look forward to continued cooperation in the planning of this project.

Sincerely,

Natalie Robb
Habitat Specialist

NJR:SS:nr

cc: Kelly Neal, Regional Supervisor, Region VI
David L. Walker, Project Evaluation Program Supervisor, Habitat Branch
Sam Spiller, Ecological Services, US Fish and Wildlife Service
James McGinnis, Manager, Native Plant Law, Arizona Department of Agriculture
Shelly Shepherd, Wildlife Manager, Central Phoenix District

AGFD# 3-10-97(06)

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 760
PHOENIX, ARIZONA 85012-1936

REPLY TO
ATTENTION OF:

May 14, 1997

Office of the Chief
Regulatory Branch

Maricopa County Department of Transportation
C/O Gannet Fleming, Inc.
ATTN: Mr. Robert L. Crowley
3001 E. Camelback Road, Suite 130
Phoenix, Arizona 85016-4498

File Number: 974-0394-LSF

Dear Mr. Crowley:

This is in response to your May 9, 1997 letter regarding Maricopa County Department of Transportation's plan to reduce dust produced by Sunward Material's haul trucks on 107th Avenue, between Rose Garden Lane and Jomax Road, in the unnamed washes at (Section 5, 6, 7, 8, 17, 18, 19, & 20, T4N, R1E), Maricopa County, Arizona.

This activity may require a Department of the Army permit issued under Section 404 of the Clean Water Act. A Section 404 permit is required for the discharge of dredged or fill material into the "waters of the United States," including adjacent wetlands. Examples of activities requiring a permit are placing bank protection, temporary or permanent stock-piling of excavated material, grading roads, grading (including vegetative clearing operations) that involves the filling of low areas or leveling the land, constructing weirs or diversion dikes, constructing approach fills, and discharging dredged or fill material as part of any other activity.

Enclosed you will find a permit application form and a pamphlet that describes our regulatory program. If you have questions, please contact Larry S. Flatau at (602) 640-5385 x 225. Please refer to file number 974-0394-LSF in your reply.

Sincerely,

Cindy Lester

Cindy Lester
Chief, Arizona Section
Regulatory Branch

Enclosure(s)

107TH AVE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
Work Order No 68932 (GF Job No. 31510)

Location: U.S. Army Corps of Engineers

Date & Time: June 11, 1997 @ 1:30 PM

Attendance: Kent McLain, Mike Smith - MCDOT
Robert Crowley - G.F.
Larry Flatau - US Army Corps of Engineers

Subject: 404 Pre-Consultation & Delineation Meeting

Gannett Fleming present aerial photos of the project showing alternative alignments A, B, C, & E. The aerial photos were supplement with on-site photos. The Army Corps described the general permit process. Project specific discussions and decisions were as follows;

- Sunward Materials had already been delineated

- Agua Fria 100 year floodway boundary shown on the most current FEMA map revision appears to correspond to "Waters of the US". The area between the 100 yr. floodway boundary and the 100 yr. floodplain boundary appears to be outside the "Waters of the US", since it is normally subject to sheet flow.

- Side drainage's with defined channels (not sheet flow) are "Waters of the US", until they terminate at an alluvial fan in the 100 year floodplain. Alluvial fans in the floodplain are not considered "Waters of the US" since vegetation indicates sheet flow.

- The historic Marnette Heading Canal is no longer an active drainage feature, but should be cleared by the State Historic Preservation Office.

- Dikes do not required 404 permits if outside "Waters of US"

- Gannett Fleming will prepare a "Delineation Request" package for MCDOT. MCDOT will submit the package to the Corps. The package will contain the following items;
    - Written request for delineation showing the Corps file number
    - Gannet Fleming delineation of "waters of US" on blue line aerial (1:2000 scale) "Ordinary high water" mark will be red, and water coarse will be highlighted.
    - Two unmarked blue lines aerial photo showing alternates (1:2000 scale).
    - Aerial photos of the Agua Fria from Sunward Materials to Jomax showing both east and west bank
    - Documentation of 100 year event used for FEMA map revision by FCDMC.

- Nationwide 14 permits seem applicable for all side drainage's on this project. There is no limit to the number of nationwide permits that can be used on a project, when they are not used in conjunction with Nationwide 26. The Nationwide 26 is not applicable to this project since it expires prior to the project bid date.

- After the Corps approves delineation, Gannett Fleming will prepare NWP 14 documents and transmit them to MCDOT. MCDOT will submit the applications to the Corps. Each item listed on the attached Nationwide permit 14, and General Conditions sheets will be addressed. Each cross drainage will require a separate application, but all applications can be shown on one spreadsheet.

SALT RIVER PROJECT
P. O. Box 52025
Phoenix, AZ 85072-2025
(602) 236-5900

May 20, 1997

Mr. Robert L. Crowley
Gannett Fleming, Inc.
3001 East Camelback Suite 130
Phoenix, Arizona 85016-4498

RE: MCDOT - 107th Avenue (Rose Garden Lane to Jomax Road - Design Concept Report
Impact on SRP's Future Eastwing Substation Site and Various Transmission Lines

Dear Mr. Crowley:

This is in reply to your 5/9/97 letter regarding the subject.

SRP is concerned with any possible impact which the proposed road construction may have on any of our property or transmission lines. In our 3/6/97 meeting, I provided you with extensive information regarding same (see attached meeting notes). I look forward to working closely with you on this project and await your submittal of preliminary plans when they become available.

Please feel free to contact me at 236-8092 with any questions.

Sincerely,

Bill Phillips

Bill Phillips, Senior Engineer
Transmission Line Design

Gannett Fleming
ENGINEERS AND PLANNERS

GANNETT FLEMING, INC.
Suite 130
3001 East Camelback Road
Phoenix, AZ 85016-4498
Fax: (602) 553-8816
Office: (602) 553-8817

MEETING MINUTES
107TH AVENUE (ROSE GARDEN LANE TO JOMAX ROAD)
MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
Work Order No. 68932 (GF Job No. 31510)

Location: SRP Crosscut Facility (Admin. Building)

Date & Time: March 6, 1997 @ 9:00 a.m.

In Attendance: Kent McLain, Wayne Butch - MCDOT
George Flanagan, Robert Crowley - Gannett Fleming
William Phillips - SRP

Geo Flanagan

Subject: SRP Station Layout on 107th Avenue

The purpose of this meeting was to review the status of SRP's parcel of land north of Pinnacle Peak Road and east of 107th Avenue. Mr. Phillips provided us with a Station Layout Plan and topographic map of the area. Issues identified included:

- A critical WAPA Tower is located in the northwest corner of the SRP property adjacent to the floodplain. We must avoid it (located south of the ¼ section line);
- SRP has a 330' east-west easement located adjacent to the ¼ section line (south side);
- WAPA has a 330' east-west easement adjacent to the SRP easement (south side);
- We need to stay at least 100' from any towers to provide an adequate pad area for construction equipment and cranes;
- Tower relocations could cost up to $300,000 each;
- SRP wants to maintain the 2 gates at the south side of their property, they do not need the ~~north~~ NW gate; * Maintain All Gates except at NW corner.
- There is a power line easement up the east side of the triangular parcel (parallel to the sloping east side); Some is easement, some is fee owned. Alt D must Remain to East.
- Tucson Electric has a 345 kv line crossing the Agua Fria River mid-way through the SRP site;
  (It turns south to the west of 107TH Ave.
  Does not cross SRP Eastwing Site.)

- A contact for WAPA is: Roy Watson (602) 352-2554;
- A contact at APS Land Department is Mike Chatham at 371-6949 (fax 372-6586). Mike has previously identified this parcel as an SRP site;
- The planned SRP Station is an estimated 25 to 30 years in the future; → No planned date! Plans flexible.
- Maricopa County has a 33' roadway easement along the west side of the SRP parcel.

pc: Attendees

Arizona
State Land Department
1616 WEST ADAMS
PHOENIX, ARIZONA 85007

FIFE SYMINGTON
GOVERNOR

J. DENNIS WELLS
STATE LAND COMMISSIONER

RIGHTS OF WAY SECTION

TO: **Robert L. Crowley, P.E.**

FROM: **Mark Keller**

SUBJECT: **MDOT Work Order No. 68932 (GF #31510)**

DATE: **May 23, 1997**

The above referenced project:

☐ Will not impact State Trust Land ***(NO FURTHER ACTION REQUIRED)***

☒ Will impact State Trust Land ***(FURTHER ACTION REQUIRED)***

Should the proposed project impact State Trust land, a Right of Way application is enclosed for your convenience. Please direct all questions and correspondence to:

Mark Keller
Rights of Way Administrator
Arizona State Land Department
1616 West Adams
Phoenix, Az. 85007
(602)542-2134

Thank you for your attention to this matter.

ACTION.MEM

"Managing and conserving natural, cultural, and recreational resources"

June 2, 1997

Robert L. Crowley, P.E., Project Manager
Gannett Fleming, Inc.
3001 East Camelback Road, Suite 130
Phoenix, AZ 85016-4498

RE: Design Concept Report; 107th Avenue (Rose Garden Lane to Jomax Road);
W.O. No. 68932; MCDOT

Arizona © State Parks

Dear Mr. Crowley:

Thank you for consulting with this office about Gannett Fleming's Design Concept Report for Maricopa County Department of Transportations's (MCDOT) proposed project along 107th Avenue. Your letter requests that SHPO provide input on any concerns this office might have for cultural resources that may be present in the proposed project corridor.

A review of our cultural resources files indicates that several archaeological surveys have been conducted near or adjacent to the project corridor: Arizona State Trust Land east of 107th Avenue between Rose Garden Lane and Deer Valley Road has been surveyed, as has what appears to be the 107th Avenue Right-of-Way (ROW) between Pinnacle Peak Road and Jomax Road. One prehistoric site has been located in the project ROW southeast of the intersection of 107th Avenue and Pinnacle Peak Road, and another west of 107th Avenue halfway between Pinnacle Peak Road and Happy Valley Road. In addition, the historic Marnett Canal is crossed by 107th Avenue at Williams Road and again between Pinnacle Peak Road and Happy Valley Road.

Because a number of prehistoric and historic cultural resources have been identified in or near the project area, we recommend that the unsurveyed portion of the 107th Avenue corridor between Deer Valley and Pinnacle Peak Road be surveyed to identify and evaluate cultural resources that may be present. A list of consultants that could do the work is enclosed. Once the survey has been conducted, a report prepared by the archaeologist should be submitted to Brian Kenny at MCDOT for his review and comment.

We greatly appreciate the efforts expended by Gannett Fleming, Inc. and the Maricopa County Department in considering the impacts of County sponsored projects on historic preservation. If you have any questions or concerns, please contact me at 542-7142.

Sincerely,

Jo Anne Miller
Compliance Specialist/Archaeologist
State Historic Preservation Office

Enclosure

cc: Brian W. Kenny, Maricopa County Department of Transportation

1300 West Washington
Phoenix, Arizona 85007

Tel & TTY: 602-542-4174
http://www.pr.state.az.us

General Fax:
602-542-4180

Director's Office Fax:
602-542-4188

ARIZONA SHPO ARCHAEOLOGICAL AND ETHNOGRAPHIC CONSULTANTS LIST

(Revised March 24, 1997)

--THIS LIST IS NOT A COMPREHENSIVE LIST OF QUALIFIED CONSULTANTS IN THE STATE OR AN OFFICIAL ENDORSEMENT BY THE SHPO--

CRITERIA FOR INCLUSION ON THIS LIST:

1) Firm or individual must be based in or have an office in Arizona.
   Note: The SHPO does maintain a file on out-of-state firms that is available to the public upon request.
2) Firm or individual must meet the Secretary of Interior's Standards for professional qualifications.
3) Firm or individual must have successfully completed a project reviewed by the SHPO within the last 5 years.
4) Firm or individual must have submitted a written request to be on the list and documentation of professional qualifications to the SHPO.

Archaeological Consulting Services, Ltd., Attn: Margerie Green, Ph.D.
424 W. Broadway Road, Tempe, AZ 85282. Phone: (602) 894-5477.
Fax: (602) 894-5478.

Archaeological Research Services, Inc., Attn: Lyle M. Stone, Ph.D.
2124 S. Mill Avenue, Tempe, AZ 85282. Phone: (602) 966-3508.
Fax: (602) 303-0080.

James E. Ayres, Archaeologist
1702 East Waverly, Tucson, AZ 85719. Phone: (520) 325-4435 -or-
(520) 620-1480.

Aztlan Archaeology, Inc., Attn: Laurie V. Slawson, Ph.D.
P.O. Box 44068, Tucson, AZ 85733-4068. Phone: (520) 620-1480.
Fax: (520) 620-1432.

Belagana Research Institute
P.O. Box 44068, Tucson, AZ 85733-4068. Phone: (520) 620-1480.
Fax: (520) 620-1432.

David S. Boloyan, Archaeologist/Ethnologist
1323 West Laird Street, Tempe, AZ 85281. Phone: (602) 858-9563.

Andrew L. Christenson, Archaeological Consultant
746 Redondo Road, Prescott, AZ 86303. Phone: (520) 445-7341.

Cultural & Environmental Systems, Inc., Attn: Mary Lou Heuett
P.O. Box 2324, Tucson, AZ 85702-2324. Phone: (520) 622-2782.
(Same as Phone #) Fax: (520) 622-2782.

Dames & Moore, Inc., Attn: J. Simon Bruder, Ph.D.
7500 N. Dreamy Draw Drive, Suite 145, Phoenix, AZ 85020.
Phone: (602) 371-1110.
Fax: (602) 861-7431.

Desert Archaeology, Inc., Attn: William H. Doelle, Ph.D.
3975 N. Tucson Boulevard, Tucson, AZ 85716. Phone: (520) 881-2244.
Fax: (520) 881-0325.

Gila River Indian Community, Cultural Resource Management Program
Post Office Box E, Sacaton, AZ 85247. Phone: (520) 562-3301.
Fax: (520) 562-4008.

Howard Archaeological Surveys, Jerry B. Howard, Principal
3302 N. Salida del Sol, Chandler, AZ 85224. Phone: (602) 345-2185, and/or
(602) 644-3428.

Kinlani Archaeology Ltd, Cultural Resource Consultants, Attn: Deborah Dosh
P. O. Box 67, Flagstaff, AZ 86002. Phone: (520) 526-9797.
Fax: (520) 527-9797.

Robert A. Larkin, M.S., M.A., SFC Engineering
7776 Pointe Parkway West, Suite 290, Phoenix, AZ 85044. Phone: (602) 438-2200.
Fax: (602) 431-9562.

Northland Research, Inc.,
(Flagstaff) P.O. Box 1401, Flagstaff, AZ 86002. Phone: (520) 774-5057.
Attn: William S. Marmaduke, Ph.D. Fax: (520) 774-3089.

(Tempe) 2308 S. Rural Road, Tempe, AZ 85282-2425. Phone: (602) 894-0020.
Attn: Ms. Johna Hutira Fax: (602) 894-0957.

Old Pueblo Archaeology Center, Attn: Allen Dart, Executive Director
1000 E. Fort Lowell Road, Tucson, AZ. Phone: (520) 798-1201.
Fax: (520) 798-1966.
Mailing Address: P.O. Box 40577, Tucson, AZ 85717-0577.

P.A.S.T. - Professional Archaeological Services & Technologies
5036 Golder Ranch Road, Tucson, AZ 85739-9602. Phone: (520) 825-3536.
Fax: (520) 825-2636.

Pima Community College, Archaeology Centre, Attn: David V.M. Stephen, Director/Professor
2202 W. Anklam Road, Tucson, AZ 85709-0001. Phone: (520) 884-6022.

Plateau Mountain Desert Research, Attn: Donald E. Weaver, Jr.
P.O. Box 3463, Flagstaff, AZ 86003. Phone: (520) 779-3274.

Dr. Glen E. Rice, Head, OCRM/Department of Anthropology
Arizona State University, Box 872402, Tempe, AZ 85287-2402. Phone: (602) 965-7181.

Rincon Archaeology/SEC. Inc., Attn: Noel Logan/Sarah Horton
(Rincon) - P.O. Box 2783, Sedona, AZ 86339. Phone: (520) 282-1544.

(SEC) - 20 Stutz Bearcat #6, Sedona, AZ 86336. Phone: (520) 282-7787.
Fax: (520) 282-0731.

(OVER)

THE UNIVERSITY OF
ARIZONA®
TUCSON ARIZONA

Arizona State Museum

Tucson, Arizona 85721-0026
(520) 621-6281
FAX (520) 621-2976

March 26, 1997

Mr. Mark W. Larson
Senior Environmental Planner
LARSON & COMPANY
7757 North Via De La Sombre
Scottsdale, AZ 85258

Dear Mr. Larson:

Thank you for your letter of March 5th requesting an archaeological site file check for property located at T4N R1E Secs 5, 7, 8, 17, 17, 19, and 20. This is for the 107th Avenue Environmental Overview.

The Archaeological Site Survey Files at the State Museum have been consulted with the following results. There have been eight archaeological survey projects in the study area and they are: 1964-4, 1983-122, 1986-51, 1987-179; 1988-203, 1994-36, 1995-157, and 1995-375. There are also 23 known sites (AZ T:7:6, 7, 20, 26, 27, 28, 83-86, 88-98, 123, and 139) along with some petroglyphs that have been reported for the area. The map you sent has been copied, and on it were plotted sites and surveys (which is being returned for your use). This will give you site density and survey coverage. Did not at this time Xerox all of the information that goes along with these numbers, but if you need it, just let us know and it can be copied. Of course the material can not be released for public viewing.

The Museum would recommend that areas not covered by survey projects, were surveyed prior to any ground modification activities. By the same token, all cultural remains that would be impacted by the construction should have a data recovery program (which may include: monitoring, testing, and/or excavation) well in place prior to development.

If you have any questions please feel free to contact me at 520/621-4011. (I will be out of the office March 31st through April 10th, but Regina should be here and will be able to copy materials for you.) Billing for this file check is here in enclosed.

Sincerely,

Sharon F. Urban (Miss)
Public Archaeologist

Encl. (1)
sfu

Central Arizona Project

23636 North Seventh Street, Phoenix, Arizona 85024-3899 (602) 870-2333

June 10, 1997

Mr. Bob Crowley
Project Manager
Gannett-Fleming
3001 E. Camelback Road, Suite 130
Phoenix, Arizona 85016-4498

Subject: Final Report on the Agua Fria Recharge Project Feasibility Assessment, Conceptual Design, and Hydrologic Investigation

Dear Mr. Crowley:

As you requested in our phone call yesterday, I am enclosing a copy of the subject report prepared for CAP by Integrated Water Technologies, Inc. Please note that the plates provided in this copy were reproduced using a monochrome copier. Due to the cost of color reproduction, we are unable to provide multi-color copies with this submittal, however, the original multi-color plates are available for viewing at our office. If you have any questions about the report or the project in general, please call me at 870-2672.

Sincerely,

Clifford A. Neal
Engineer/Hydrologist

/can
Enclosure

Gannett Fleming
ENGINEERS AND PLANNERS

MEMORANDUM OF TELEPHONE CONVERSATION

RECORDED BY: BOB CROWLEY	JOB NO.: 31510
SPOKE WITH: CLIFF NEIL	COMPANY NAME: CAP
TELEPHONE NUMBER: 870-2672	DATE: 6-9-97 TIME: 5:45 PM

SUBJECT: 107th AVE & CAP RECHARGE PROJECTS

ITEM(S) DISCUSSED:

CAP recharge project starts 4 miles north of Tomax at CAP canal. Water will be discharged from canal into Agua Fria and flow to recharge basins located between Hatfield Rd and Tomax road on the west bank of the Agua Fria. A structure would intercept Agua Fria and redirect flow to a canal above Tomax. Flow would cross Tomax in pipe or canal.

Only a "Conceptual Report" has been prepared. Cliff will mail me a copy

Gave Cliff Kent McLAIN's and John R. Koch's phone numbers so he could coordinate Estrella project.

Recharge project may influence HEC II analysis of floodplain, but will not directly effect alignment alternatives since recharge basins are on opposite bank.

COPIES TO:	ACTION:
KENT MCLAIN @ MCDOT	
MCDOT FAX 506-5969	
COPY JOB FILE NUMBER:	

rli:1/22/93

APPENDIX B

Drainage Report

107th AVENUE
Rose Garden Lane to Jomax Road

PRELIMINARY DRAINAGE REPORT

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
Work Order No. 68932

June 30, 1997

Gannett Fleming
ENGINEERS AND PLANNERS

TABLE OF CONTENTS

PREFACE

Gannett Fleming Inc. (GFI), was contracted by the Maricopa County Department of Transportation (MCDOT) to provide engineering services for the development of the Design Concept Report for 107th Avenue, from Rose Garden Lane to Jomax Road. This project evaluates several alignment alternatives providing recommendations for future planning efforts. The roadway lies within Maricopa County, in the State of Arizona.

As part of this project GFI was required to develop this drainage report. The purpose of this drainage report is to develop hydrologic data, perform preliminary hydraulic analyses and design preliminary cross drainage structures to convey flow for a 50 year storm, 100 year if economically feasible, while minimizing the impact on the natural drainage areas crossed by the construction of the roadway. The hydrologic data and hydraulic analyses were based on design criteria established by MCDOT. This report was completed in ***metric*** units.

This drainage report evaluates results obtained with the the results from the "CAR" for the portion of the project north of Chulla Vista Road. Other developer's drainage reports were reviewed and utilized south of Chulla Vista Road.

The Appendices attached to this report include tabulated hydrologic and hydraulic computations and preliminary construction estimates for the proposed improvements.

LOCATION AND TERMINI

The project is located in the City of Peoria, northwest of Phoenix. The Beginning of Project (BOP) is located at the intersection of 107th Avenue and Rose Garden lane. The End of Project (EOP) is located at Jomax Road. All of the alignment alternatives follow the existing roadway from Rose Garden Lane north to just south of Hatfield Road. From this point five distinct alignment alternatives were investigated. The number of alternatives was reduced to four in the early stages of this project. The remaining alignments are shown in **Figure 1-1**, on the following page. Typical roadway sections are provided in **Appendix A**.

For simplicity, the project is divided into two sections, namely north and south, with Chulla Vista Road as the division line for this report.

SITE CONDITIONS

The existing natural topography in the vicinity of the project drains generally in the northeast to southwest direction to the Agua Fria River. The existing roadway, between Hatfield and Jomax is located within the Federal Emergency Management Agency (FEMA) 100-year flood plain. The Agua Fria flows at approximately 880 m^3/s (31,000 cfs) for the 100-year flood event at this location. This flow has been modified to reflect the Waddle Dam Project.

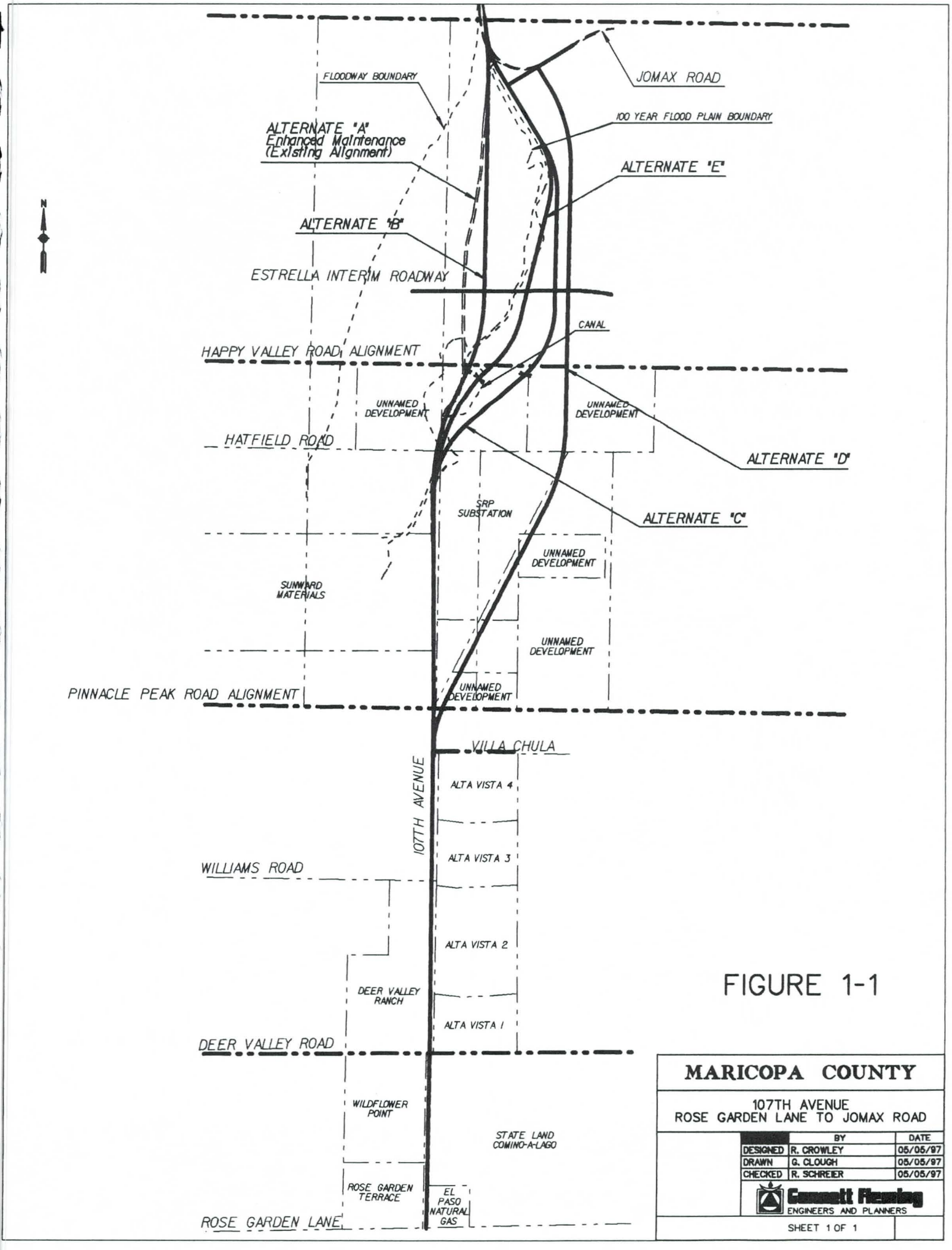


FIGURE 1-1

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	05/05/97
DRAWN	G. CLOUGH	05/05/97
CHECKED	R. SCHREIER	05/05/97

Cannett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 1

There are several washes which cross the existing roadway alignment. The more prominent washes are located near Pinnacle Peak Road and Happy Valley Road. There is no drainage structure located at the wash near Pinnacle Peak Road. A 1830 mm (72-inch) CMP is located at the Happy Valley Road drainage crossing.

There is a historic canal located between Rose Garden Lane and Williams Road which collects and conveys overland flow east of 107th Avenue and prevents the flow from crossing the roadway. Roadway flow in this area is conveyed by curb and gutter in a north to south direction. A lined channel parallel to the south side of Rose Garden Lane intercepts this flow conveying the runoff west for ultimate discharge into the Agua Fria. The lined channel crosses 107th Avenue via four 600 mm (24-inch) concrete pipes.

HYDROLOGIC ANALYSIS

North Section

Drainage basins were delineated for the north section of the project as shown in **Figure 1-2**, on the following page. Furthermore, the basins were modified for each proposed alignment alternative.

The projected peak flow rates for each drainage basin within the 107th Avenue project limits were analyzed using the rational method as presented in the Drainage Design Manual for Maricopa County, Arizona, Volume 1, Hydrology (DDMMC). Also, the U.S. Army Corps of Engineers HEC-1 flood hydrograph software was used for basin "D", which had an drainage area of over (1700 acres).

The peak discharge for all drainage basins, Q_{50} and Q_{100} are derived from the 50 and 100 year, 6 hour storm events, in accordance with DDMMC design criteria. **Figure 1-3** (page 5) summarizes the hydrologic data with the design peak flow rates for each drainage basin. The 10-year design storm was used for the design of the roadside ditches.

South Section

Existing drainage reports for subdivsions adjacent to 107th Avenue were used as references for this report. The hydrology developed in the referenced reports was used to determine street carrying capacity of the future roadway section. The roadside channel and storm drain pipe is assumed as existing for the purpose of this report.

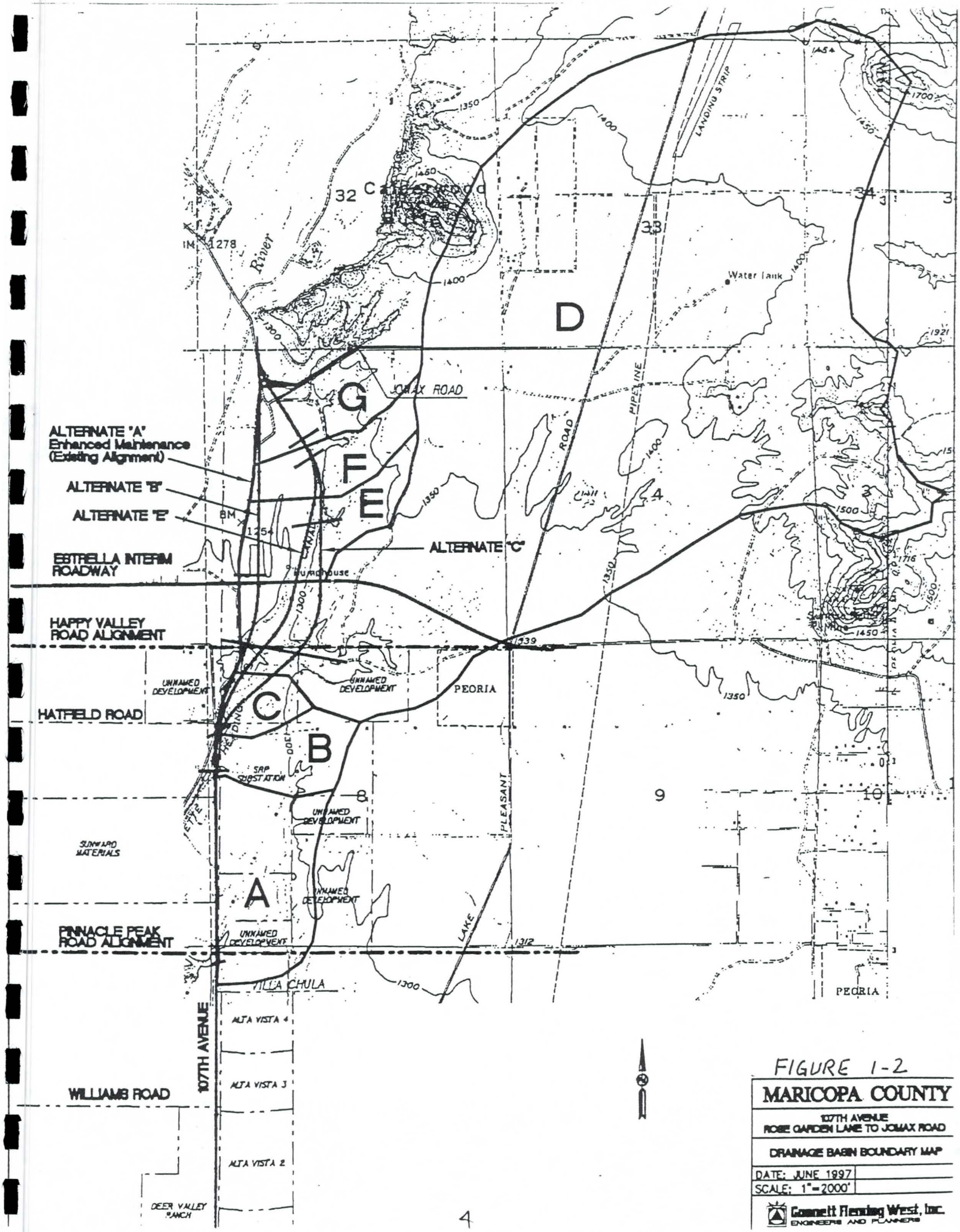


FIGURE 1-2

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

DRAINAGE BASIN BOUNDARY MAP

DATE: JUNE 1997
SCALE: 1"=2000'

Gannett Fleming West, Inc.
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107TH AVENUE

MARICOPA COUNTY

HYDROLOGY AND PRELIMINARY DRAINAGE STRUCTURES

Date: 06/10/97

ALTERNATE "B"

BASIN	AREA, acres	METHOD*	PEAK DISCHARGE, m^3/s				
			Q5	Q10	Q25	Q50	Q100
A 2+540	128	R	3.9	5.3	6.9	9.2	11.4
B 3+460	58	R	1.8	2.4	3.5	4.3	5.6
C	30.2	R	1.5	1.9	2.3	2.8	3.2
D	1769.5	HEC-1	31.6	44.5	65.5	77.8	94.0
E	72.5	R	2.2	2.8	4.0	4.9	6.5
F	58.6	R	2.0	2.4	3.4	4.2	5.0
G	75.9	R	2.7	3.3	4.4	5.5	6.7

ALTERNATE "C"

BASIN	AREA, acres	METHOD*	PEAK DISCHARGE, m^3/s				
			Q5	Q10	Q25	Q50	Q100
A 2+540	128	R	3.9	5.3	6.9	9.2	11.4
B 3+460	58	R	1.8	2.4	3.5	4.3	5.6
C	22.1	R	0.7	0.9	1.3	1.8	2.1
D	1732.9	HEC-1	29.7	41.9	61.7	73.4	88.6
E	37.3	R	1.3	1.6	2.2	3.2	3.6
F	39.9	R	1.5	1.8	2.5	3.1	3.8
G	60.1	R	2.3	2.6	3.8	4.7	5.7

ALTERNATE "E"

BASIN	AREA, acres	METHOD*	PEAK DISCHARGE, m^3/s				
			Q5	Q10	Q25	Q50	Q100
A 2+540	128	R	3.9	5.3	6.9	9.2	11.4
B 3+460	58	R	1.8	2.4	3.5	4.3	5.6
C	28	R	1.5	1.9	2.3	2.8	3.2
D	1753.4	HEC-1	29.9	42.1	62.0	73.8	89.1
E	45.8	R	1.6	2.0	2.4	4.0	4.4
F	40.9	R	1.5	1.8	2.5	3.1	3.8
G	60.1	R	2.3	2.6	3.8	4.7	5.7

* R =Rational Method per Maricopa County Drainage Design Manual

FIGURE 1-3

FLOODPLAIN ANALYSIS

As previously mentioned, the existing roadway alignment of 107th Avenue is located within the FEMA 100-year flood plain. One of the new alignment alternatives, namely Alternate B, has a significant portion of the alignment located within the floodplain. Near Hatfield Road, all of the Alignments cross the fringe of the floodplain.

The Alternate B alignment is to the east of the existing alignment. Floodplain analysis was performed to determine if the construction of the new roadway would raise the water surface profile more than the allowable amount of one (1) vertical foot.

The existing HEC-2 model of the Agua Fria for the 100-year flood was provided by the Flood Control District of Maricopa County (FCDMC). Both the proposed footprint of Alternate B and the proposed Estrella Interim Roadway, were inserted into the existing hydraulic model of the Agua Fria River.

Another project, the Central Arizona Project (CAP) Agua Fria Recharge Project, is located along the west bank of the Agua Fria River adjacent to between Hatfield Road and Jomax Road. The CAP Recharge Project consists of several retention basins designed to recharge local aquifers by intercepting river flow north of Jomax Road. It is estimated that approximately 800 cfs will be intercepted, on average, at the inlet works. The CAP Recharge Project will impact Alternative "A" and "B" by constricting the width of the Agua Fria floodplain and thereby raising the water surface profile.

Within the floodplain, the conceptual design of Alternate B includes a retention pond which will intercept the runoff generated in drainage basins E, F and G. The retention basin, located between the proposed roadway alignment and the eastern edge of the 100-year floodplain, will be sized to retain 100 % of the 100-year, 2-hour storm event. Several culverts will be installed along Alternate B for overflow and cross drainage. This concept is similar the to CAP Recharge Project since the retention basins will also recharge acquifers.

The results of the floodplain analysis showed that with the additional embankment for Alternate B, the Estrella Interim Roadway embankment and CAP Recharge Project basins, the 100-year water surface elevation rose a maximum of 0.012 m (0.04 ft).

HYDRAULIC CRITERIA

New proposed CMP and CBC structures are designed with sufficient capacity to convey the Q_{50} flow with headwater elevations no higher than the roadway subgrade elevation. The subgrade elevation was assumed to be 0.6 m (2 ft) below the roadway centerline elevation.

Headwater depth calculations are based on beveled culvert inlets with an entrance loss coefficient of 0.5. A Manning's "n" of 0.013 for concrete box structures and 0.024 for the CMP's. With the moderate channel slopes crossed with the proposed 107th Avenue alignment, the majority of the recommended structures are sized with headwater inlet control.

Table 1-1(con't)
Summary of Proposed Cross Drainage Structures

Alternate "E"

Station	Description	Q_{50}, m^3/s	HW_{50}, m	Q_{100}, m^3/s	HW_{100}, m
2+480	2 - 1500 mm x 50 m CMP, 45° LT FWD 2 - 1500 mm x 42 m CMP	9.2	1.9	11.4	2.3
3+470	1 - 1350 mm x 48 m CMP, NORMAL	4.3	1.7	5.6	2.2
3+700	1 - 1200 mm x 42 m CMP, NORMAL	1.8	1.6	3.2	1.8
4+140	2 - 3600 mm x 3000 mm x 24 m CBC, 30° LT FWD	73.8	3.5	89.1	3.8
4+980	1 - 1500 mm x 50 m CMP, 45° RT FWD	4.0	1.6	4.4	1.8
5+325	1 - 1200 mm x 58 m CMP, 30° LT FWD	3.1	1.8	3.8	2.2
5+580	1 - 1500 mm x 46 m CMP, NORMAL	4.7	1.9	5.7	2.3

EROSION CONTROL AND SEDIMENT TRANSPORT

With the high velocities occurring in the existing channels, sediment transport for the structures is a perceived problem. The sedimentation problem appears to be consistent throughout the project area. During peak runoff, channel flow velocities easily capable of sediment transport will decrease substantially at culvert inlets. Sediment will then be deposited at the structure inlets further restricting the culvert capacities.

It is recommended that all structures receive wire-enclosed riprap erosion control pads at both the inlet and outlet. The inlet erosion controls pads should be sufficiently sloped to help reduce inlet velocities and provide a location for sediment to drop out prior to reaching the structure. Outlet pads should be long enough to minimize scour due to high pipe exit velocities.

SUMMARY AND RECOMMENDATIONS

The drainage report analyzed drainage crossing structures for several roadway alignment alternatives. At the time of this report a final alternative was not selected. However, it is recommended that the proposed drainage structures for the selected alternative be constructed to safely convey the 50 and 100-year event without crossing the future roadway pavement. Each culvert location has an established floodplain upstream so no drainage easements are required. Preliminary construction cost estimates are provided in **Appendix B.**

Wire-enclosed riprap erosion control structures are recommended at the culvert outlets where velocities exceed 1.5 m/sec (5 ft./sec). Flared riprap inlet structures and embankment slope protection are needed in locations where the existing channel is narrowed to match the geometry of the new structure inlet.

(1)

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SUBJECT 107th AVE, ROSE GARDEN TO JOMAX Rd MARICOPA COUNTY
BY WC DATE 6/8/97 CHKD. BY JCM DATE 6/8/97

SHEET NO. 1 OF 19
JOB NO. 31510

(A)

Area = 128 ac $K_b = -0.01375 \log 128 + 0.093$

$K_b = 0.051026$

L = 2,500ft = 0.473mi S = 40'/0.473mi

$\Delta E = 1300 - 1260 = 40'$

S = 84.48 ft/mi = 0.016 ft/ft

$T_c = 11.4 L^{0.5} K_b^{0.52} S^{-0.31} i^{-0.38}$

$T_c = 11.4 (0.473mi)^{0.5} (0.051026)^{0.52} (84.48)^{-0.31} i^{-0.38}$

$T_c = 0.42200323 i_{100}^{-.38}$

$T_c = 20$ $i_p = 5$ $i_{100} = 5\left(\frac{2.0}{2.07}\right) = 4.8309$

$T_c = 0.422(4.83)^{-.38} = 0.2319 = 13.92$ min

$T_c = 10$ $i_p = 7$ $i_{100} = 7\left(\frac{2.0}{2.07}\right) = 6.76$

$T_c = 0.422(6.76)^{-0.38}$ $T_c = 0.204119 = 12.25$ min

$T_c = 15$ $i_p = 6$ $i_{100} = 5.797$ $T_c = 0.422(5.797)^{-0.38} = 12.98$ min

$T_c = 17$ $i_p = 5.5$ $i_{100} = 4.8309$ $T_c = 0.422(4.8309)^{-0.38} = 13.9$ min

$T_c = 12$ $i_p = 6.5$ $i_{100} = 6.28$ $T_c = 0.422(6.28)^{-0.38} = 12.59$

$T_{c,100} = 12$ $i_{100} = 6.28$

$Q = C_{100} i_{100} A \rightarrow = 0.50(6.28)(128ac)$ $Q_{100} = 401.92$ cfs

50

$T_c = 0.422 i_{50}^{-0.38}$

$T_c = 10$ $i_p = 6.3$ $i_{50} = 6.086$ $T_c = 0.422(6.086)^{-0.38} = 12.747$

$T_c = 12$ $i_p = 5$ $i_{50} = 4.83$ $T_c = 13.916$

$T_c = 13$ $i_p = 5.5$ $i_{50} = 5.314$ $T_c = 13.42$

$T_{c_{50}} = 13$ $i_{50} = 5.314$ $Q_{50} = 0.48(5.314)(128)$ $Q_{50} = 326.49$ cfs

(2)

25 $T_c = 0.422\, i_{25}^{-0.38}$

$T_c = 10$ $i_p = 5.5$ $i_{25} = 5.314$ $T_c = 13.42$ min
$T_c = 15$ $i_p = 4.5$ $i_{25} = 4.347$ $T_c = 14.48$ min

$T_{c25} = 15$ $i_{25} = 4.347$ $Q_{25} = 0.44(4.347)(128)$ $Q_{25} = 244.82$ cfs

$T_c = 0.422\, i_{10}^{-0.38}$

10 $T_c = 15$ $i_p = 3.8$ $i_{25} = 3.67$ $T_c = 15.446$ min

$T_{c10} = 15$ $i = 3.67$ $Q_{10} = 0.4(3.67)(128)$ $Q_{10} = 187.90$ cfs
$C = 0.40$

$T_c = 0.422\, i_5^{-0.38}$

5 $T_c = 16$ $i_p = 3.2$ $i_5 = 3.0917$ $T_c = 16.29$

$T_{c5} = 16$ $i_5 = 3.0917$ $Q_5 = 0.35(3.09)(128)$ $Q_5 = 138.51$ cfs
$C = 0.35$

(B)

$A = 58$ ac $K_b = -0.01375 \log 58 + 0.08$
$K_b = 0.1042$
$L = 1000$ ft $= 0.189$ mi $S = 20'/0.189$ mi
$\Delta E = 1270' - 1250' = 20'$
$S = 105.6$ ft/mi

$T_c = 11.4\, L^{0.5} K_b^{0.52} S^{-0.31} i^{-0.38}$
$T_c = 11.4(0.189)^{0.5}(0.1042)^{0.52}(105.6)^{-0.31} i^{-0.38}$
$T_c = 0.36103\, i^{-0.38}$

100 $T_c = 20$ $i_p = 5$ $i_{100} = 4.8309$ $T_{c100} = 11.905$
$T_c = 10$ $i_p = 7$ i_{100} 6.76 $T_{c100} = 10.476$

$T_{c100} = 10$ $i_{100} = 6.76$ $Q = 0.50(6.76)(158)$ $Q_{100} = 196.04$ cfs

50 $T_c = 0.36\, i^{-0.38}$

$T_c = 10$ $i_p = 6.2$ $i_{50} = 5.99$ $T_{c50} = 10.97$ min
$T_c = 12$ $i_p = 5.7$ $i_{50} = 5.507$ $T_{c50} = 11.327$ min

$T_{c_{50}} = 12$ $i_{50} = 5.507$ $Q = 0.48(5.507)(58)$ $Q_{50} = 153.32$ cfs

25 $T_c = 0.36103\, i^{-0.38}$

$T_c = 15$ $i_p = 4.5$ $i_{25} = 4.347$ $T_{c25} = 12.39$ min
$T_c = 13$ $i_p = 5$ $i_{p5} = 4.83$ $T_{c25} = 11.9$ min

$T_{c_{25}} = 13$ $i_{25} = 4.83$ $Q = 0.44(58)(4.83)$ $Q_{25} = 123.26$ cfs

10 $T_c = 0.36103\, i^{-0.38}$
$T_c = 15$ $i_p = 3.7$ $i_{10} = 3.57$ $T_{c10} = 13.349$ min
$T_c = 14$ $i_p = 3.8$ $i_{10} = 3.67$ $T_{c10} = 13.214$ min

$T_{c_{10}} = 14$ $i_{10} = 3.67$ $Q = 0.4(3.67)(58)$ $Q_{10} = 85.144$ cfs

$T_c = 0.36103\, i^{-0.38}$
5 $T_c = 15$ $i_p = 3.3$ $i_5 = 3.188$ $T_{c5} = 13.94$ min

$T_{c_5} = 15$ $i_5 = 3.188$ $Q = (0.35)(3.188)(58)$ $Q_5 = 64.726$ cfs

$T_c = 0.36103\, i^{-0.38}$
2 $T_c = 15.5$ $i_p = 2.3$ $i_2 = 2.22$ $T_{c2} = 15.99$ min

$T_{c_2} = 15.5$ $i_2 = 2.22$ $Q = 0.3(2.22)(58)$ $Q_2 = 38.67$ cfs

(C) Alt C

$A = 22.1$ ac $K_b = -0.01375 \log 22.1\text{ac} + 0.08$
$K_b = 0.0615$
$L = 2000$ ft $= 0.3788$ mi
$\Delta E = 1320 - 1250 = 70'$
$S = 184.8$ ft/mi

$T_c = 11.4\, L^{0.5} K_b^{0.52} S^{-0.31} i^{-0.38}$
$T_c = 11.4(0.3788\text{mi})^{0.5}(0.0615)^{0.52}(184.8)^{-0.31} i^{-0.38}$
$T_c = 0.326\, i^{-0.38}$

(A)

$T_c = 0.3263 i^{-0.38}$

100

$T_c = 10$ $i_p = 7$ $i_{100} = 6.76$ $T_{c100} = 9.45$ min

$T_{c100} = 10$ $i_{100} = 6.76$ $Q = 0.5(6.76)(22.1)$ $Q_{100} = 74.69$ cfs

50 $T_c = 0.3263 i^{-0.38}$

$T_c = 12$ $i_p = 5.7$ $i_{50} = 5.507$ $T_{c50} = 10.237$ min
$T_c = 13$ $i_p = 5.2$ $i_{50} = 5.024$ $T_{c50} = 10.60$ min
$T_c = 11$ $i_p = 6$ $i_{50} = 5.797$ T_{c50} 10.04 min

$T_{c50} = 11$ $i_{50} = 5.797$ $Q = 0.48(5.797)(22.1)$ $Q_{50} = 61.5$ cfs

25 $T_c = 0.3263 i^{-0.38}$

$T_c = 12$ $i_p = 5$ $i_{25} = 4.83$ $T_{c25} = 10.76$ min

$T_{c25} = 12$ $i_{25} = 4.83$ $Q = 0.44(4.83)(22.1) =$ $Q_{25} = 46.97$ cfs

$T_c = 0.3263 i^{-0.38}$

10 $T_c = 13$ $i_p = 4$ $i_{10} = 3.86$ $T_{c10} = 11.7$ min

$T_{c10} = 13$ $i_{10} = 3.86$ $Q = 0.4(3.86)(22.1) =$ $Q_{10} = 32.53$ cfs

5 $T_c = 14$ $i_p = 3.3$ $i_5 = 3.188$ $T_{c5} = 12.6$ min

$T_{c5} = 14$ $i_5 = 3.188$ $Q = 0.35(3.188)(22.1)$ $Q_5 = 24.66$ cfs

2 $T_c = 14.5$ $i_p = 2.9$ $i_2 = 2.8$ $T_{c2} = 13.23$ min

$T_{c2} = 14.5$ $i_2 = 2.8$ $Q = 0.3(2.8)(22.1)$ $Q_2 = 18.56$ cfs

(C) AA - E/B

$A = 8.08 ac + 22.1 = 30.18$ $S = 184.8$ ft/mi
$K_0 = 0.033.02$
$L = 2000 ft = 0.3788$ mi
$\Delta E = 1320 - 1250 = 70$

(5)

$T_c = 0.2362 i^{-.038}$

100 $T_c = 8$ $i_p = 7.5$ $i_{100} = 7.25$ $T_{c100} = 6.677$ min
$T_c = 7.5$ $i_p = 7.7$ $i_{100} = 7.44$ $T_{c100} = 6.61$ min

$T_{c100} = 7.5$ $i_{100} = 7.44$ $Q = 0.5(7.44)(30.18)$ $Q_{100} = 112.27$ cfs

50 $T_c = 7$ $i_p = 7$ i_{50} 6.76 $T_{c50} = 6.85$

$T_{c50} = 7$ $i_{50} = 6.76$ $Q = 0.48(6.76)(30.18)$ $Q_{50} = 97.93$ cfs

25 $T_c = 6.5$ $i_p = 6.5$ $i_{25} = 6.28$ $T_{c25} = 7.05$ min
$T_c = 6.9$ $i_p = 6.2$ $i_{25} = 5.99$ $T_{c25} = 7.1779$ min

$T_{c25} = 6.9$ $i_{25} = 5.99$ $Q = 0.44(5.99)(30.18)$ $Q_{25} = 79.54$ cfs

10 $T_c = 6.7$ $i_p = 5.3$ $i_{10} = 5.12$ $T_{c10} = 7.618$ min
$T_c = 6.9$ $i_p = 5.7$ $i_{10} = 5.51$ $T_{c10} = 7.4109$

$T_c = 6.9$ $i_{10} = 5.5$ $Q = 0.4(5.5)(30.18)$ $Q_{10} = 66.39$ cfs

5 $T_c = 7$ $i_p = 5.3$ $i_5 = 5.12$ $T_{c5} = 7.618$
$Q = 0.35(5.12)(30.18)$ $Q_5 = 54.08$ cfs

2 $T_c = 7.2$ $i_p = 3.8$ $i_2 = 3.67$ $T_{c2} = 8.65$ min
$T_c = 7.5$ $i_p = 3.5$ i_2 3.38 T_{c2} 8.92 min
$T_c = 9$ $i_p = 3$ $i_2 = 2.89$ $T_{c2} = 9.45$ min
$T_c = 14$ $i_p = 2.5$ 2.415 $T_{c2} = 10.13$
$T_c = 11$ $i_p = 2.8$ 2.705 9.709

$T_c = 11$ $i = 2.705$ $Q = 0.3(2.705)\ 30.18$ $Q_2 = 24.5$ cfs

(E) ALT B

AREA = 72.5 ac $K_c = -0.01375 \log(72.5) + 0.08 = 0.0544$

LENGTH = 3800' = 0.72 mi

$\Delta E = 1365 - 1254 = 111'$

$S = 0.0292$ ft/ft $\Rightarrow$ 154.2 ft/mi

$T_c = 11.4 (0.72)^{.5} (0.0544)^{0.52} (154.2)^{-0.31} * i^{-.38}$

$T_c = 0.446\, i^{-.38}$

100 YR

$T_c = 20$ $i_p = 5$ $i_{100} = 5 \frac{(2.0)}{2.07} = 4.83$

$T_c = 0.446 (4.83)^{-.38} = 0.245 hr = 14.7$ min

$T_c = 15$ $i_p = 6$ $i_{100} = 6 \frac{(2.0)}{2.07} = 5.80$

$T_c = 0.446 (5.80)^{-.38} = 0.23 hr = 13.7$ min

$T_c = 13$ $i_p = 6.5$ $i_{100} = 6.5 \frac{(2)}{2.07} = 6.3$

$T_c = 0.446 (6.3)^{-.38} = 0.22 hr = 13.3$ min

$i_{100} = 6.3$

$Q_{100} = CIA = (0.5)(6.3)(72.5) =$ **228.4 cfs**

50 YR

$T_c = 10$ $i_p = 6.2$ $i_{50} = 5.99$ $T_{c_{50}} = 0.446 (5.99)^{-.38} = 0.226 hr$
$= 13.6$ min

$T_c = 13$ $i_p = 5.5$ $i_{50} = (5.5)\frac{(2.0)}{(2.07)} = 5.314$ $T_{c_{50}} = (0.446)(5.314)^{-.38} = 0.24 hr$
$= 14.2$ min

$T_c = 14$ $i_p = 5.5$ $i_{50} = 5.314$ $T_{c_{50}} = 14.2$ min

$Q_{50} = (0.45)(5.314)(72.5) =$ **173.4 cfs**

(1)

(E) ACT B (CON'T)

25 YR

$T_c = 15$, $i_p = 4.5$ $\quad i_{25} = (4.5)\frac{(2.0)}{2.07} = 4.35$

$T_c = 0.446(4.35)^{-.38} = 0.26$ hr

$= 15.3$ ✓

$Q_{25} = (0.44)(4.35)(72.5) =$ **140.7 cfs**

10 YR

$T_c = 17$, $i_p = 3.5$ $\quad i_{10} = (3.5)\left(\frac{2.0}{2.07}\right) = 3.38$

$T_c = 0.446(3.38)^{-.38} = 0.28$ hr

$= 16.9$ min ✓

$Q_{10} = (0.40)(3.38)(72.5) =$ **98.02 cfs**

5 YR

$T_c = 19$, $i_p = 2.8$ $\quad i_5 = (2.8)\left(\frac{2.0}{2.07}\right) = 2.71$

$T_c = 0.446(2.71)^{-.38} = 0.31$ hr

18.5 min ✓

$Q_5 = (0.4)(2.71)(72.5) =$ **78.6 cfs**

2 YR

$T_c = 20$ $\quad i_p = 2.0$ $\quad i_2 = (2.0)\frac{(2.0)}{2.07} = 1.93$

$T_c = 0.446(1.93)^{-.38} = 0.35$ hr

$= 20.5$ min

$Q_2 = (0.4)(1.93)(72.5) =$ **55.97** cfs

(E) ALT E

AREA = 45.8 ac $K_b = -0.01375 \log(45.8) + .08 = 0.0572$

LENGTH = 2800' = 0.53 mi

ΔE = 1365 - 1260 = 105'

S = 105'/0.53mi = 198'/mi

$T_c = 11.4(0.53)^{.5}(0.0572)^{.52}(198)^{-.31}(L)^{-.38}$

$= 0.364 L^{-.38}$

100 YR

$T_c = 12$, $i_p = 6.5$ $i_{100} = 6.5\left(\frac{2.0}{2.07}\right) = 6.28$

$T_c = 0.364(6.28)^{-.38} = 0.18 \text{ hr} = 10.8 \text{ min}$

$T_c = 10 \text{ min}$ $i_p = 7$ $i_{100} = 7\left(\frac{2.0}{2.07}\right) = 6.76$

$T_c = 0.364(6.76)^{-.38} = 0.176 \text{ hr} = 10.5 \text{ min}$

$Q_{100} = (0.5)(6.76)(45.8) =$ **154.8 cfs**

50 YR

$T_c = 12$ $i_p = 6.5$ $i_{50} = 6.5\left(\frac{2.0}{2.07}\right) = 6.28$

$T_c = 0.364(6.28)^{-.38} = 0.18 \text{ hr} = 10.8 \text{ min}$

$T_c = 11$ $i_p = 6.75$ $i_{50} = 6.75\left(\frac{2.0}{2.07}\right) = 6.52$

$T_c = 0.364(6.52)^{-.38} = 0.18 \text{ hr} = 10.8 \text{ min}$ ✓

$Q_{50} = (0.48)(6.52)(45.8) =$ **143.3 cfs**

25 YR

$T_c = 12$ $i_p = 5.10$ $i_{50} = 4.83$ $T_c = 0.364(4.83)^{-.38} = 0.20 \text{ hr}$

$= 12 \text{ min}$ ✓

$Q_{25} (0.44)(4.83)(45.8) =$ **88.5 cfs**

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT 107th AVE. ROSE GARDEN LN TO JOMAX Rd
MARICOPA COUNTY
BY WC DATE 6/6/97 CHKD. BY JCM DATE 6/6/97

SHEET NO. 9 OF 19
JOB NO. 31510

(E) ALT E (CONT)

10 YR

$T_c = 13$ $\quad i_p = 4.0 \quad i_{10} = 4.0 \frac{2.0}{2.07} = 3.86$

$T_c = 0.364 (3.86)^{-.38} = 0.22 \text{ hr}$
$= 13 \text{ min}$ ✓

$Q_{10} = (0.4)(3.86)(45.8) = \underline{70.7 \text{ cfs}}$

5 YR

$T_c = 14 \quad i_p = 3.25, \quad i_5 = (3.25)\left(\frac{2.0}{2.07}\right) = 3.14$

$T_c = 0.364 (3.14)^{-.38} = 0.23 \text{ hr}$
$= 14.1 \text{ min}$ ✓

$Q_5 = (0.4)(3.14)(45.8) = \underline{57.5 \text{ cfs}}$

2 YR

$T_c = 15 \quad i_p = 2.4 \quad i_2 = (2.4)\left(\frac{2.0}{2.07}\right) = 2.32$

$T_c = 0.364 (2.4)^{-.38} = 0.26 \text{ hr}$
$= 15.5 \text{ min}$ ✓

$Q_2 = (0.4)(2.4)(45.8) = \underline{43.97 \text{ cfs}}$

(E) ALT C

AREA = 37.3 ac K_b = 0.0584
LENGTH = 2500' = 0.473 mi
ΔE = 1365 - 1280 = 85'
S = 85'/0.473 mile = 179.5 '/mi

$T_c = 11.4(0.473)^{.5}(0.0584)^{.52}(179.5)^{-.31} * i^{-.38}$

$T_c = 0.358\, i^{-.38}$

100 YR

T_c = 12 min, i_p = 6.5 $i_{100} = 6.5\left(\frac{2.0}{2.07}\right) = 6.28$

$T_c = 0.358(6.28)^{-.38} = 0.178$ hr = 10.7 min

T_c = 10 min, i_p = 7 $i_{100} = 7\left(\frac{2}{2.07}\right) = 6.76$

$T_c = 0.358(6.76)^{-.38} = 0.173$ hr = 10.4 min ✓

$Q_{100} = (0.50)(6.76)(37.3) =$ 126.1 cfs

50 YR

T_c = 10 min, i_p = 6 $i_{50} = 6\left(\frac{2}{2.07}\right) = 5.80$

$T_c = 0.358(5.80)^{-.38} = 0.18$ hr = 11 min

T_c = 11 min, i_p = 6.5 $i_{50} = 6.5\left(\frac{2}{2.07}\right) = 6.28$

$T_c = 0.358(6.28)^{-.38} = 0.18$ hr = 10.8 min ✓

$Q_{50} = (0.46)(6.28)(37.3) =$ 112.4 cfs

(E) ACT C (CONT)

25 YR

$T_c = 12$ min, $i_p = 5$ $\quad i_{25} = 5\left(\frac{2.0}{2.07}\right) = 4.83$

$T_c = 0.358(4.83)^{-.38} = 0.20$ hr
$= 12$ min

$Q_{25} = (0.44)(4.83)(37.3) =$ 79.3 cfs

10 YR

$T_c = 13$ min, $i_p = 4$ $\quad i_{10} = 4\left(\frac{2.0}{2.07}\right) = 3.86$

$T_c = 0.358(3.86)^{-.38} = 0.214$ hr
$= 12.9$ min ✓

$Q_{10} = (0.4)(3.86)(37.3) =$ 57.6 cfs

5 YR

$T_c = 14$ min $\quad i_p = 3.25$ $\quad i_5 = 3.25\left(\frac{2.0}{2.07}\right) = 3.14$

$T_c = 0.358(3.14)^{-.38} = 0.23$ hr
$= 13.9$ min ✓

$Q_5 = (0.4)(3.14)(37.3) =$ 46.8 cfs

2 YR

$T_c = 15$ min $\quad i_p = 2.4$ $\quad i_2 = 2.4\left(\frac{2}{2.07}\right) = 2.32$

$T_c = 0.358(2.32)^{-.38} = 0.26$ hr
$= 15.5$ min ✓

$Q_2 = (0.4)(2.32)(37.3) =$ 34.6 cfs

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SUBJECT 107th AVE. ROSE GARDEN LN TO TOMAH Rd
MARICOPA COUNTY
BY WL DATE 6/8/07 CHKD. BY JCM DATE 6/8/07

SHEET NO. 12 OF 19
JOB NO. 31570

(F) ALT B

AREA 58.6 ac $K_b = 0.0557$
LENGTH 3500' = 0.66 mi
ΔE = 1370 - 1255 = 115'
S = 115'/0.66 mi = 174'/mi

$$T_c = 11.4(0.66)^{.5}(0.0557)^{.52}(174)^{-.31} i^{-.38}$$

$$T_c = 0.417\, i^{-.38}$$

100 YR

T_c = 15 min i_p = 6 $i_{100} = 6\frac{2.0}{2.07} = 5.80$

$T_c = 0.417(5.80)^{-.38}$ = 0.213 hr = 12.8 min

T_c = 13 min i_p = 6.25 $i_{100} = 6.25\left(\frac{2.0}{2.07}\right) = 6.04$

$T_c = 0.417(6.04)^{-.38}$ = 0.21 hr = 12.8 min ✓

$Q_{100} = (0.5)(6.04)(58.6)$ = **176.97 cfs**

50 YR

T_c = 13 in i_p = 5.5 $i_{50} = 5.5\left(\frac{2.0}{2.07}\right) = 5.314$

$T_c = 0.417(5.314)^{-.38}$ = 0.22 hr = 13.2 min ✓

$Q_{50} = (0.48)(5.314)(58.6)$ = **149.5 cfs**

25 YR

T_c = 14 min i_p = 4.75 $i_{25} = 4.75\left(\frac{2.0}{2.07}\right) = 4.60$

$T_c = 0.417(4.60)^{-.38}$ = 0.234 hr = 14 min ✓

$Q_{25} = (0.44)(4.60)(58.6)$ = **118.6 cfs**

(F) ACT B (CON'T)

10 YR

T_c = 15 min L_p = 3.75 $L_{10} = 3.75 \frac{2.0}{2.07} = 3.62$

$T_c = 0.417 (3.62)^{.38} = 0.255$ hr

$= 15.3$ min ✓

$Q_{10} = (0.4)(3.62)(58.6) =$ **84.9 cfs**

5 YR

T_c = 16 min L_p = 3.1 $L_5 = 3.10 \frac{2.0}{2.07} = 3.0$

$T_c = 0.417 (3.0)^{.38} = 0.27$ hr

$= 16.4$ min ✓

$Q_5 = (0.4)(3.0)(58.6) =$ **70.3 cfs**

2 YR

T_c = 17 min L_p = 2.25 $L_2 = 2.25 \left(\frac{2.0}{2.07}\right) = 2.17$

$T_c = 0.417 (2.17)^{.38} = 0.31$ hr

$= 18.6$ min

T_c = 19 min L_p = 2.1 $L_2 = 2.1 \left(\frac{2.0}{2.07}\right) = 2.03$

$T_c = 0.417 (2.03)^{.38} = 0.32$ hr

$= 19.1$ min ✓

$Q_2 = (0.4)(2.03)(58.6) =$ **47.6 cfs**

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SUBJECT 107th AVE, ROSE GARDEN LN TO JOMAX Rd
MARICOPA COUNTY
BY WC DATE 6/6/97 CHKD. BY JCM DATE 6/6/97

SHEET NO. 14 OF 19
JOB NO. 31510

(E) ALT C & E

AREA = 40.0 ac K_D = 0.0580
LENGTH = 2600' = 0.49 mi
ΔE = 1370 - 1260 = 110'
S = 110'/0.49 mi = 224.5 '/mi

$$T_c = 11.4(0.49)^{.5}(0.0580)^{.52}(224.5)^{-.31} i^{-.38}$$

$$T_c = 0.339 i^{-.38}$$

100 YR

T_c = 11 min i_p = 6.5 $i_{100} = 6.5\left(\frac{2.0}{2.07}\right) = 6.28$

$T_c = 0.339(6.28)^{-.38}$ = .17 hr
= 10.1 min

T_c = 10 min i_p = 7 $i_{100} = 7\left(\frac{2}{2.07}\right)$ 6.76

$T_c = 0.339(6.76)^{-.38}$ = 0.164 hr
= 9.9 min ✓

$Q_{100} = (0.5)(6.76)(40.0)$ = 135.2 cfs

50 YR

T_c = 11 min i_p = 6 $i_{50} = 6\left(\frac{2.0}{2.07}\right)$ = 5.80

$T_c = 0.339(5.80)^{-.38}$ = 0.17 hr
= 10.5 min ✓

$Q_{50} = (0.45)(5.80)(40)$ = 111.4 cfs

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT 107TH AVE, ROSE GARDEN LN TO JOMAX Rd
MARICOPA COUNTY
BY WC DATE 6/6/07 CHKD. BY JCM DATE 6/6/07

SHEET NO. 15 OF 19
JOB NO. 31510

(F) ALT C & E (CONT)

25 YR

$T_c = 11$ min $i_p = 5.1$ $i_{25} = 5.1\left(\frac{2.0}{2.07}\right) = 4.93$

$T_c = 0.339(4.93)^{-.35} = 0.185$ hr
$= 11$ min ✓

$Q_{25} = (0.44)(4.93)(40) =$ **86.8 cfs**

10 YR

$T_c = 12$ min $i_p = 4.0$ $i_{10} = 4\left(\frac{2.0}{2.07}\right) = 3.86$

$T_c = 0.339(3.86)^{-.38} = 0.20$ hr
$= 12$ min ✓

$Q_{10} = (0.4)(3.86)(40) =$ **61.8 cfs**

5 YR

$T_c = 13$ min $i_p = 3.5$ $i_5 = 3.5\left(\frac{2.0}{2.07}\right) = 3.38$

$T_c = 0.339(3.38)^{-.38} = 0.22$ hr
$= 13$ min ✓

$Q_5 = (0.4)(3.38)(40) =$ **54.1 cfs**

2YR

$T_c = 14$ min $i_p = 2.5$ $i_2 = 2.5\left(\frac{2}{2.07}\right) = 2.42$

$T_c = 0.339(2.42)^{-.38} = 0.24$ hr
14.4 min ✓

$Q_2 = (0.4)(2.42)(40) =$ **38.7 cfs**

(G) ALT B

AREA = 75.9 ac $K_p = 0.0541$
LENGTH 3,200' = 0.61 mi
$\Delta E = 1380 - 1258 = 122'$
$S = 122'/0.61 mi = 201.3'/mi$

$$T_c = 11.4(0.61)^{.5}(0.0541)^{.52}(201.3)^{-.31} i^{-.38}$$

$$T_c = 0.377 i^{-.38}$$

100 YR

$T_c = 12$ $i_p = 6.5$ $i_{100} = 6.5\left(\frac{2.0}{2.07}\right) = 6.28$

$T_c = 0.377(6.28)^{-.38} = 0.19 hr$
$= 11.6 min$ ✓

$Q_{100} = (0.5)(6.28)(75.9) = \underline{238.3 cfs}$

50 YR

$T_c = 12$ $i_p = 5.5$ $i_{50} = 5.5\left(\frac{2.0}{2.07}\right) = 5.314$

$T_c = 0.377(5.314)^{-.38} = 0.20 hr$
$= 12 min$

$Q_{50} = (0.48)(5.314)(75.9) = \underline{193.6 cfs}$

25 YR

$T_c = 13$ $i_p = 4.8$ $i_{25} = 4.8\left(\frac{2.0}{2.07}\right) = 4.64$

$T_c = 0.377(4.64)^{-.38} = 0.22 hr$
$= 13 min$ ✓

$Q_{25} = (0.44)(4.64)(75.9) = \underline{154.96 cfs}$

(17)

(G) ALT 2 (CONT)

10 YR

$T_c = 14$ min $\quad i_p = 3.9 \quad i_{10} = 3.9\left(\frac{2.0}{2.07}\right) = 3.77$

$T_c = 0.377\,(3.77)^{-.38} = 0.23$ hr
$= 13.8$ min ✓

$Q_{10} = (0.4)(3.77)(75.9) = \underline{114.5 \text{ cfs}}$

5 YR

$T_c = 14$ min $\quad i_p = 3.25 \quad i_5 = 3.25\left(\frac{2.0}{2.07}\right) = 3.14$

$T_c = 0.377\,(3.14)^{-.38} = 0.24$ hr
$= 14.4$ min ✓

$Q_5 = (0.4)(3.14)(75.9) = \underline{95.3 \text{ cfs}}$

2 YR

$T_c = 16$ min $\quad i_p = 2.4 \quad i_2 = 2.4\left(\frac{2.0}{2.07}\right) = 2.32$

$T_c = 0.377\,(2.32)^{-.38} = 0.27$ hr
$= 16.3$ min ✓

$Q_2 = (0.4)(2.32)(75.9) = \underline{70.4 \text{ cfs}}$

(B)

(G) ALT C & E

AREA = 60.1 ac K_p = 0.0555
LENGTH = 2800' = 0.53 mi
ΔE = 1380 - 1260 = 120'
S = 120'/0.53 mi = 226.3 ft/mi

$$T_c = 11.4(0.53)^{.3}(0.0555)^{.52}(226.3)^{-.31} i^{-.38}$$

$$T_c = 0.344 i^{-.38}$$

100 YR

T_c = 10 min i_p = 7 i_{100} = 6.76

$$T_c = 0.344(6.76)^{-.38} = 0.17 \text{ hr}$$
$$= 9.9 \text{ min} \checkmark$$

$$Q_{100} = (0.5)(6.76)(60.1) = \underline{203.1 \text{ cfs}}$$

50 YR

T_c = 11 min i_p = 6.0 i_{100} = 5.80

$$T_c = 0.344(5.80)^{-.38} = 0.18 \text{ hr}$$
$$= 10.8 \text{ min} \checkmark$$

$$Q_{50} = (0.46)(5.80)(60.1) = \underline{167.2 \text{ cfs}}$$

25 YR

T_c = 11 min i_p = 5.25 i_{100} = 5.07

$$T_c = 0.344(5.07)^{-.38} = 0.185 \text{ hr}$$
$$= 11.1 \text{ min} \checkmark$$

$$Q_{25} = (0.44)(5.07)(60.1) = \underline{134.1 \text{ cfs}}$$

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SUBJECT 107th AVE, ROSE GARDEN LN TO JOMAX Rd
MARICOPA COUNTY
BY WC DATE 6/6/97 CHKD. BY JCM DATE 6/8/97

SHEET NO. 19 OF 19
JOB NO. 31510

(G) ALT C & E (CONT)

10 YR

$T_c = 12$ min $\quad i_p = 4.0 \quad i_{100} = 3.86$

$T_c = 0.344 (3.86)^{-.38} = 0.20$ hr
$= 12$ min

$Q_{10} = (0.4)(3.86)(60.1) = \underline{92.8 \text{ cfs}}$

5 YR

$T_c = 13$ min $\quad i_p = 3.5 \quad i_5 = 3.38$

$T_c = 0.344 (3.38)^{-.38} = 0.22$ hr
$= 13$ min ✓

$Q_5 = (0.4)(3.38)(60.1) = \underline{81.3 \text{ cfs}}$

2 YR

$T_c = 14$ min $\quad i_p = 2.5 \quad i_2 = 2.42$

$T_c = 0.344 (2.42)^{-.38} = 0.24$ hr
14.4 min ✓

$Q_2 = (0.4)(2.42)(60.1) = \underline{58.2 \text{ cfs}}$

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SUBJECT 107th AVENUE, ROSE GARDEN LANE TO JOMAX ROAD, MARICOPA COUNTY
BY WC DATE 6/8/97 CHKD. BY JCM DATE 6/9/97

SHEET NO. 1 OF 2
JOB NO. 31520

Volume Calculations

RETENTION BASIN — ALT B

100 YR - 2 hour depth, P = 2.75"

RUNOFF COEFF, C = 0.50

~~INTENSITY~~

DRAINAGE AREA, AC = 72.5 + 58.6 + 75.9
= 207 ac

VOLUME OF RUNOFF, $V = C\left(\frac{P}{12}\right)A$

$$V = (0.5)\left(\frac{2.75}{12}\right)207$$

$$= 23.7 \text{ ac-ft}$$

THIS IS THE APPROXIMATE STORAGE VOLUME REQ'D TO RETAIN 100% RUNOFF FROM DRAINAGE BASINS E, F & G

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SUBJECT 107th AVENUE, ROSE GARDEN LANE TO TOMAX ROAD, MARICOPA COUNTY
BY WC DATE 6/6/87 CHKD. BY JCM DATE 6/6/87

SHEET NO. 2 OF 2
JOB NO. 31510

AVAILABLE STORAGE

RETENTION BASIN – ALT B

MIN. ROADWAY EMBANKMENT = 5'

∴ RETENTION BASIN DEPTH, d = 5'

LENGTH, L = 5+600 – 4+200 = 1400 m
WIDTH, W = 300 m

AREA = L x W/2 (MODELED AS two triangles)

= (1400)(300)/2 = 210,000 m²

= 52 ac.

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 2+480, 2-1500 mm x 50 m CMP 45d LT FWD

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	5.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	164.0
Culvert Slope (feet per foot)	0.0200

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
163.0	0.00	6.13	4.83	3.28	3.66	3.28	11.93
202.0	0.00	7.46	7.06	4.15	4.05	4.15	11.59

==========

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 3+470, 1-1500 mm x 48 m CMP Normal

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	5.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	160.0
Culvert Slope (feet per foot)	0.0200

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
153.0	0.00	5.66	4.36	3.36	3.55	3.36	10.91
197.0	0.00	7.26	6.75	4.03	4.01	4.03	11.61

==========

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 3+700, 1-1200 mm x 42 m CMP Normal

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	4.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	138.0
Culvert Slope (feet per foot)	0.0200

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
98.0	0.00	5.12	4.33	2.94	3.00	2.94	9.90
112.0	0.00	5.77	5.53	3.36	3.20	3.36	9.94

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 5+050 (C), 1-1200 mm x 46 m CMP 30d LT FWD

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	4.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	150.0
Culvert Slope (feet per foot)	0.0200

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
112.0	0.00	5.77	5.54	3.36	3.20	3.36	9.94
126.0	0.00	6.57	6.94	4.00	3.37	3.37	11.16

==========

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 5+420 (C), 1-1200 mm x 72 m CMP 45d LT FWD

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	4.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	236.0
Culvert Slope (feet per foot)	0.0200

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
111.0	0.00	5.72	5.47	3.28	3.18	3.28	10.06
135.0	0.00	7.13	8.76	4.00	3.46	3.46	11.68

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 5+680 (C), 1-1500 mm x 46 m CMP Normal

==========

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	5.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	151.0
Culvert Slope (feet per foot)	0.0200

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
167.0	0.00	6.28	5.12	3.50	3.70	3.50	11.38
203.0	0.00	7.50	7.11	4.20	4.06	4.20	11.53

==========

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 4+980 (E), 1-1500 mm x 50 m CMP 45d RT FWD

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	5.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	164.0
Culvert Slope (feet per foot)	0.0200

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
143.0	0.00	5.38	3.84	3.13	3.43	3.13	11.05
155.0	0.00	5.75	4.42	3.32	3.57	3.32	11.21

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 5+325 (E), 1-1200 mm x 58 m CMP 30d LT FWD

PROGRAM INPUT DATA:

DESCRIPTION	VALUE
Culvert Diameter (feet)	4.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	190.0
Culvert Slope (feet per foot)	0.0200

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
111.0	0.00	5.72	5.45	3.28	3.18	3.28	10.06
135.0	0.00	7.13	8.31	4.00	3.46	3.46	11.68

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

July 1, 1997
107th Avenue, Peoria, Arizona
Maricopa County
Sta 5+580 (E), 1-1500 mm x 46 m CMP Normal

==========

PROGRAM INPUT DATA:

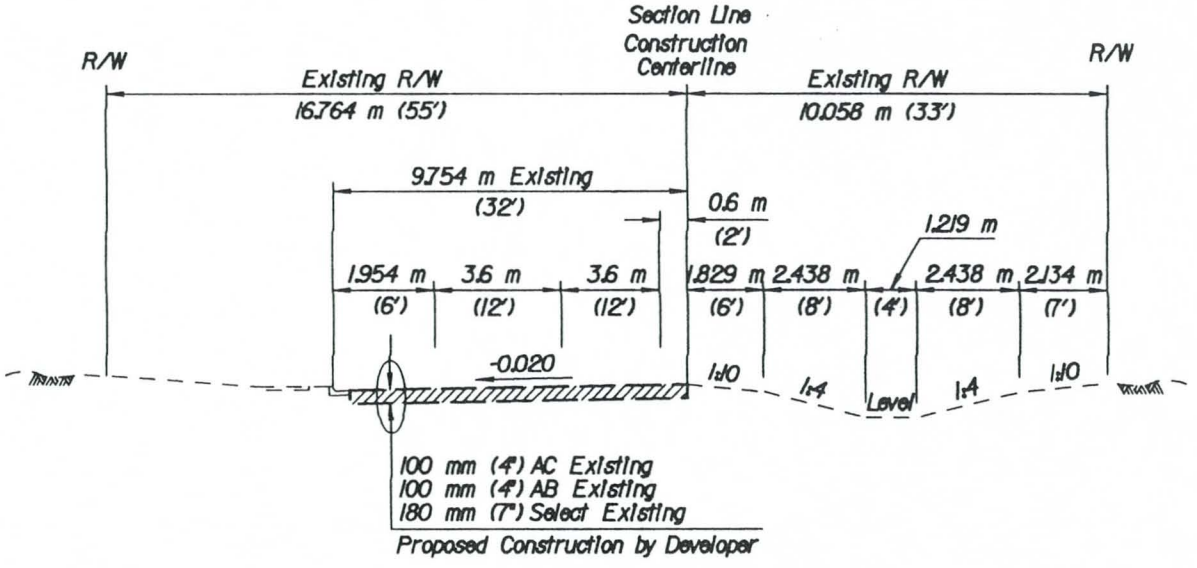
DESCRIPTION	VALUE
Culvert Diameter (feet)	5.00
FHWA Chart Number (1,2 or 3)	2
Scale Number on Chart (Type of Culvert Entrance)	1
Manning's Roughness Coefficient (n-value)	0.0240
Entrance Loss Coefficient of Culvert Opening	0.50
Culvert Length (feet)	151.0
Culvert Slope (feet per foot)	0.0200

==========

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater (ft) Inlet Control	Headwater (ft) Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
83.5	0.00	3.76	1.72	2.26	2.59	2.26	9.68
167.0	0.00	6.28	5.12	3.50	3.70	3.50	11.38
203.0	0.00	7.50	7.11	4.20	4.06	4.20	11.53

==========



TYPICAL SECTION
107TH AVENUE

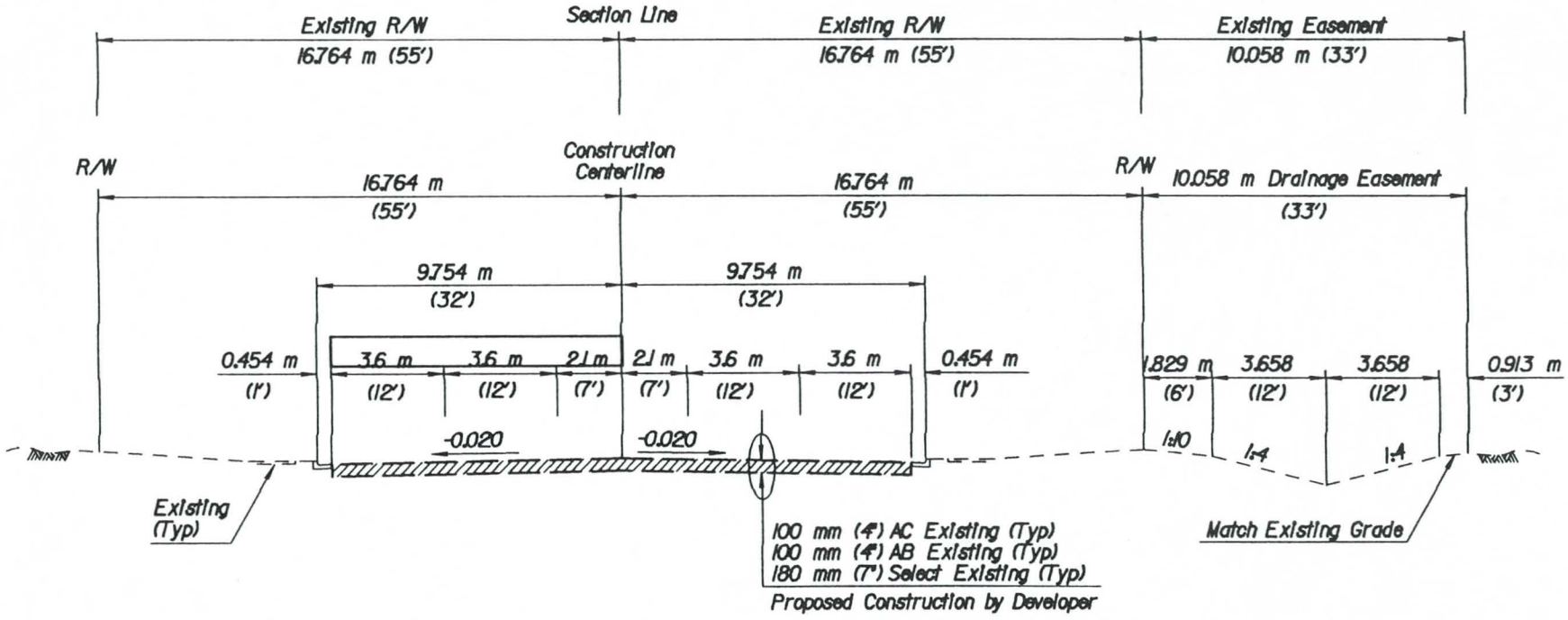
Rose Garden Lane to Deer Valley Road
Sta 0+097.000 to 0+913.000

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Connell Fleming
ENGINEERS AND PLANNERS



TYPICAL SECTION
107TH AVENUE

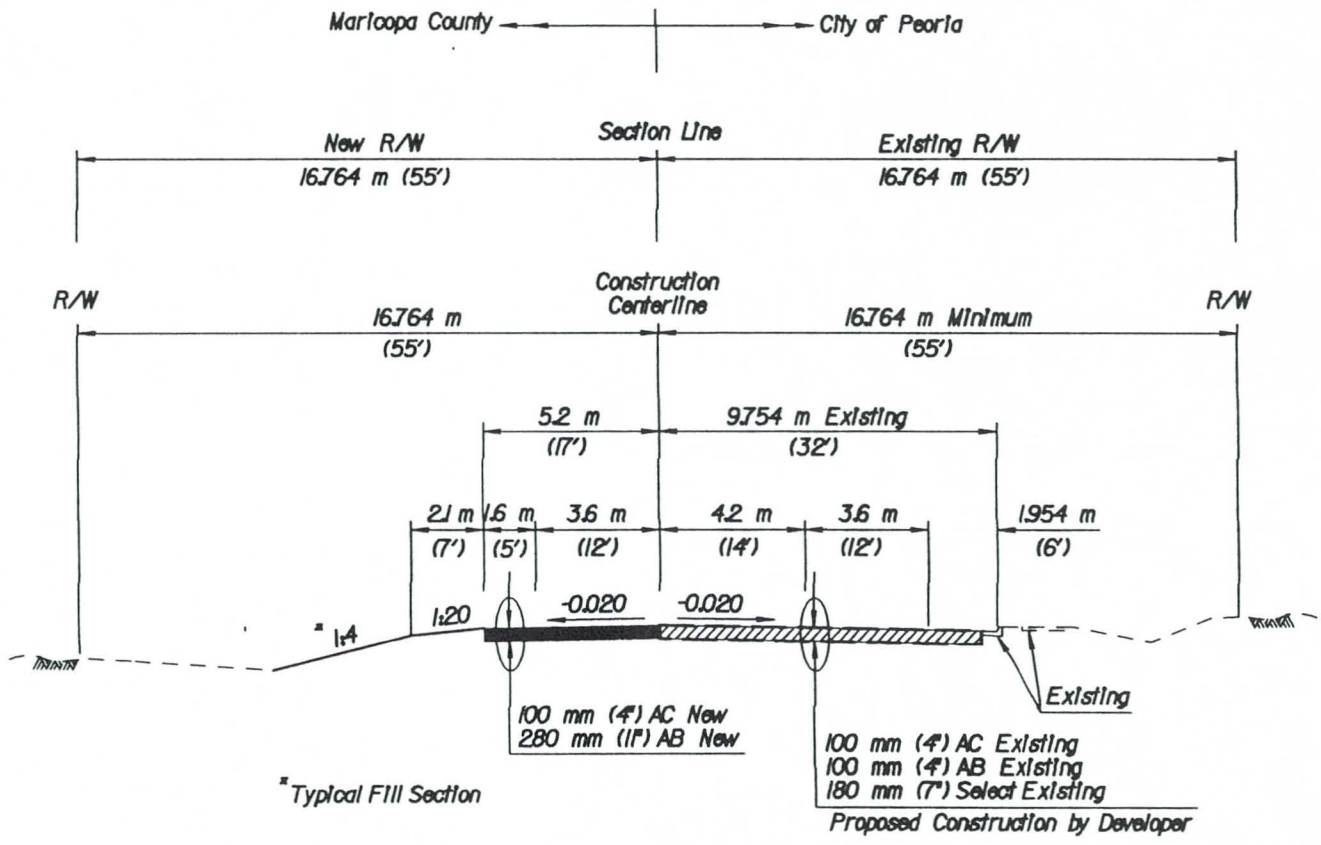
Deer Valley Road to Williams Road
Sta 0+913.000 to 1+724.000

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS



TYPICAL SECTION
107TH AVENUE

Williams Road to Pinnacle Peak Road
Sta 1+724.000 to 2+347.267=

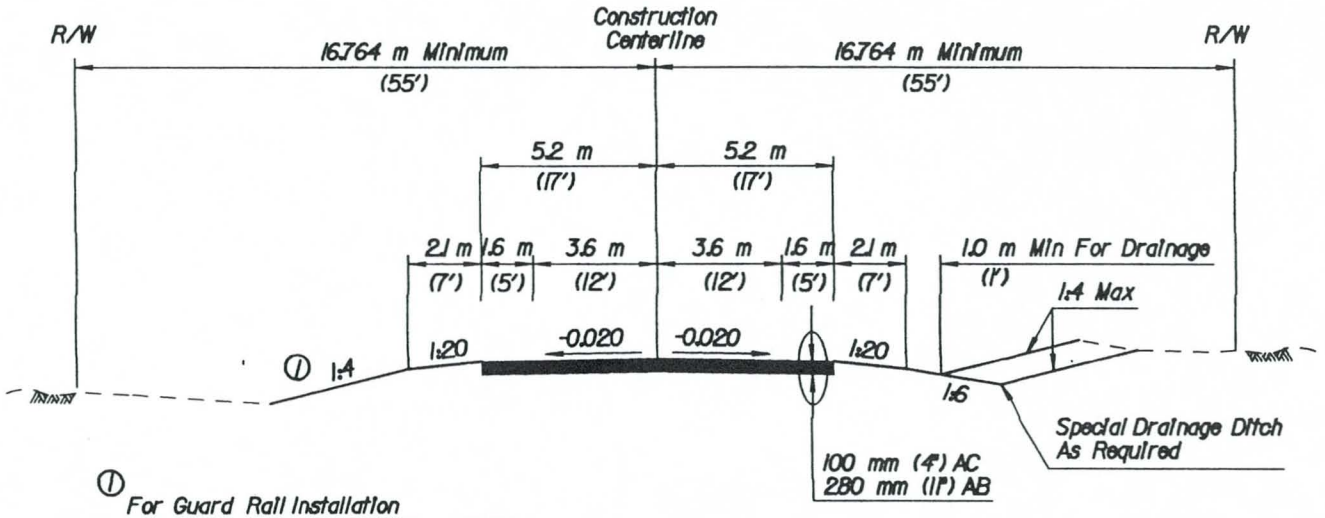
= 185.733 m (609.36') South of Pinnacle Peak Road Alignment

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS



① For Guard Rail Installation
See MCDOT Std Detail 2036 or 2037

TYPICAL SECTION
107TH AVENUE

Pinnacle Peak Road to Jomax Road
Alternate "B" Sta 2+347.267≈ to 5+796.823
Alternate "C" Sta 2+347.267≈ to 6+037.510
Alternate "E" Sta 2+347.267≈ to 5+944.230

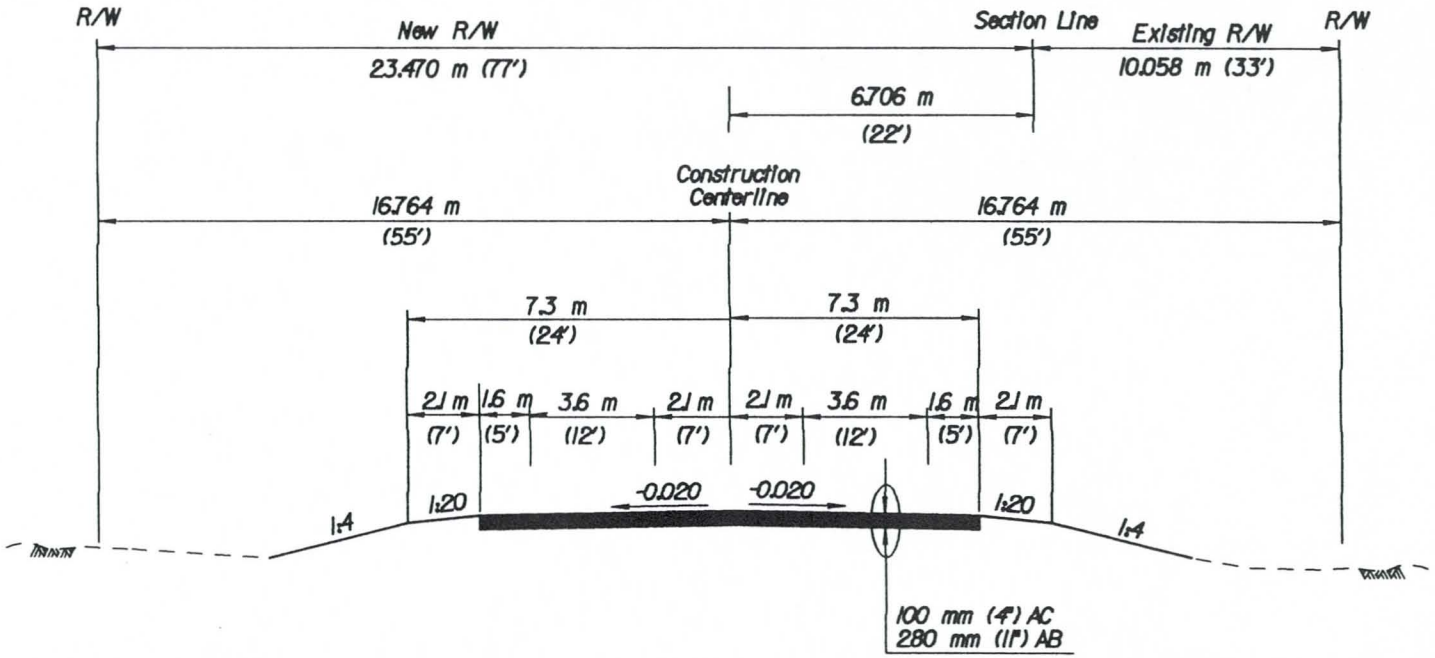
≈ 185.733 m (609.36')
South of Pinnacle Peak
Road Alignment

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS



WIDENED SECTION FOR LEFT TURN LANES

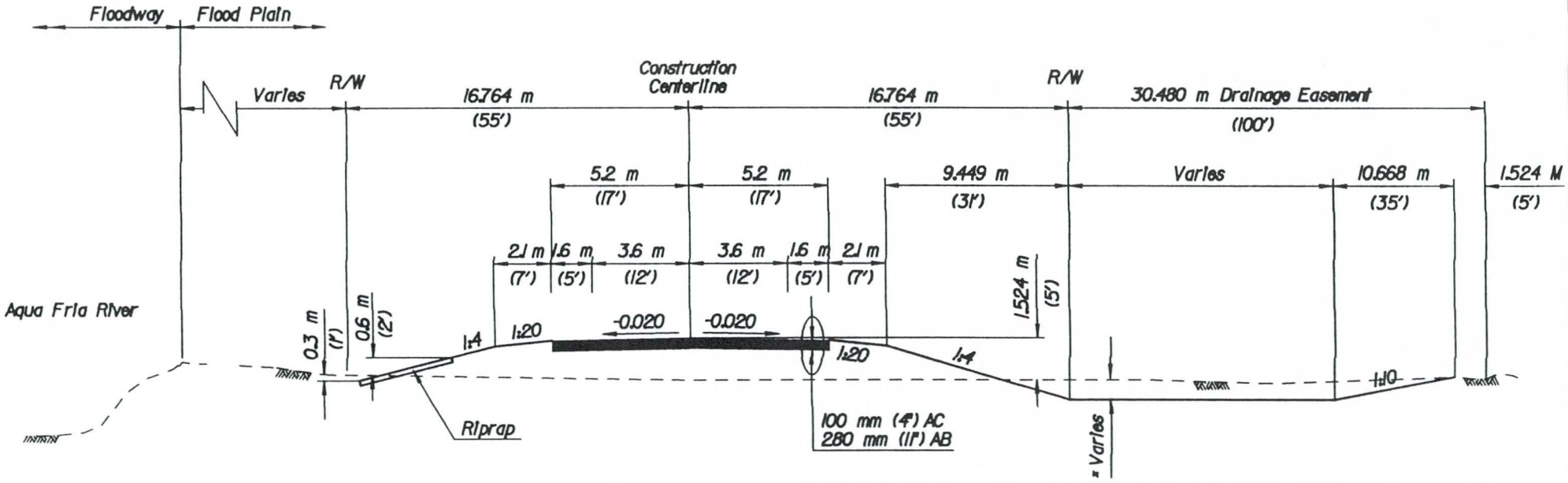
107 th Avenue @ Sunward Materials
Sta 2+781.000 to 3+339.000

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS



* Use depth required to balance earthwork

FLOOD PLAIN TYPICAL SECTION

Alternate "B" From Happy Valley Road to Jomax Road
Sta 4+169.000 to 5+796.823

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS

APPENDIX B

PRELIMINARY CONSTRUCTION COST ESTIMATES

DRAINEST

107TH AVENUE

Rose Garden to Jomax

MARICOPA COUNTY

PRELIMINARY CONSTRUCTION COST ESTIMATE FOR DRAINAGE IMPROVEMENTS

ALTERNATE "B"

Date: 7/1/97

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	600 mm CMP, including trenching, backfill and compaction, complete.	m	90	$150.00	$13,500.00
2	900 mm CMP, including trenching, backfill and compaction, complete.	m	30	$200.00	$6,000.00
3	1200 mm CMP, including trenching, backfill and compaction, complete.	m	42	$245.00	$10,290.00
4	1350 mm CMP, including trenching, backfill and compaction, complete.	m	48	$280.00	$13,440.00
5	1500 mm CMP, including trenching, backfill and compaction, complete.	m	184	$325.00	$59,800.00
6	Steel, for concrete reinforcement, complete.	kg	22000	$1.05	$23,100.00
7	Concrete for box culverts, end sections, wingwalls and aprons, complete.	m^3	252	$250.00	$63,000.00
8	Dumped rip rap (H=0.3 m), roadway, complete	m^3	2268	$65.00	$147,420.00
9	Dumped rip rap, dike (H=3.0m), complete	m^3	360	$65.00	$23,400.00
10	Dike (100L x 3H), earthen, including all required excavation, hauling, placement and grading, complete.	m^3	3900	$5.00	$19,500.00
11	Concrete Channel Lining (150 mm)	m^2	840	$42.00	$35,280.00
12	Channel Excavation	m^3	1200	$5.00	$6,000.00

Subtotal:	$420,730.00
10% Cont.	$42,073.00
Total:	$462,803.00

107TH AVENUE

Rose Garden to Jomax

MARICOPA COUNTY

PRELIMINARY CONSTRUCTION COST ESTIMATE FOR DRAINAGE IMPROVEMENTS

ALTERNATE "C"

Date: 7/1/97

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1200 mm CMP, including trenching, backfill and compaction, complete.	m	160	$245.00	$39,200.00
2	1350 mm CMP, including trenching, backfill and compaction, complete.	m	48	$280.00	$13,440.00
3	1500 mm CMP, including trenching, backfill and compaction, complete.	m	230	$325.00	$74,750.00
4	Steel, for concrete reinforcement, complete.	kg	24000	$1.05	$25,200.00
5	Concrete for box culverts, end sections, wingwalls and aprons, complete.	m^3	353	$250.00	$88,250.00
6	Dumped rip rap (H=0.3 m), roadway, complete	m^3	248	$65.00	$16,120.00
7	Concrete Channel Lining (150 mm)	m^2	840	$42.00	$35,280.00
8	Channel Excavation	m^3	1200	$5.00	$6,000.00

Subtotal:	$298,240.00
10% Cont.	$29,824.00
Total:	$328,064.00

DRAINEST

107TH AVENUE

Rose Garden to Jomax

MARICOPA COUNTY

PRELIMINARY CONSTRUCTION COST ESTIMATE FOR DRAINAGE IMPROVEMENTS

ALTERNATE "E"

Date: 7/1/97

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	1200 mm CMP, including trenching, backfill and compaction, complete.	m	100	$245.00	$24,500.00
4	1350 mm CMP, including trenching, backfill and compaction, complete.	m	48	$280.00	$13,440.00
5	1500 mm CMP, including trenching, backfill and compaction, complete.	m	280	$325.00	$91,000.00
6	Steel, for concrete reinforcement, complete.	kg	22400	$1.05	$23,520.00
7	Concrete for box culverts, end sections, wingwalls and aprons, complete.	m^3	276	$250.00	$69,000.00
8	Dumped rip rap (H=0.3 m), roadway, complete	m^3	292	$65.00	$18,980.00
9	Dumped rip rap, dike (H=3.35m), complete	m^3	80	$65.00	$5,200.00
10	Dike (20L x 3.65H), earthen, including all required excavation, hauling, placement and grading, complete.	m^3	1140	$5.00	$5,700.00
11	Concrete Channel Lining (150 mm)	m^2	840	$42.00	$35,280.00
12	Channel Excavation	m^3	1200	$5.00	$6,000.00

Subtotal:	$292,620.00
10% Cont.	$29,262.00
Total:	$321,882.00

APPENDIX C
REFERENCES

REFERENCES

Inca Engineering, Inc., CAR Drainage Report, Peoria Arizona. Prepared for Maricopa County.

Standage & Associates, Consulting Engineers, 1995, Final Drainage Report for Wildflower Point, Peoria, Arizona. Prepared for DDP Development, Scottsdale, Arizona

CMX Group, Inc., 1995, Drainage Report for Alta Vista Estates, Units 1 & 2, Peoria, Arizona. Prepared for Capital - Deer Valley, LLC.

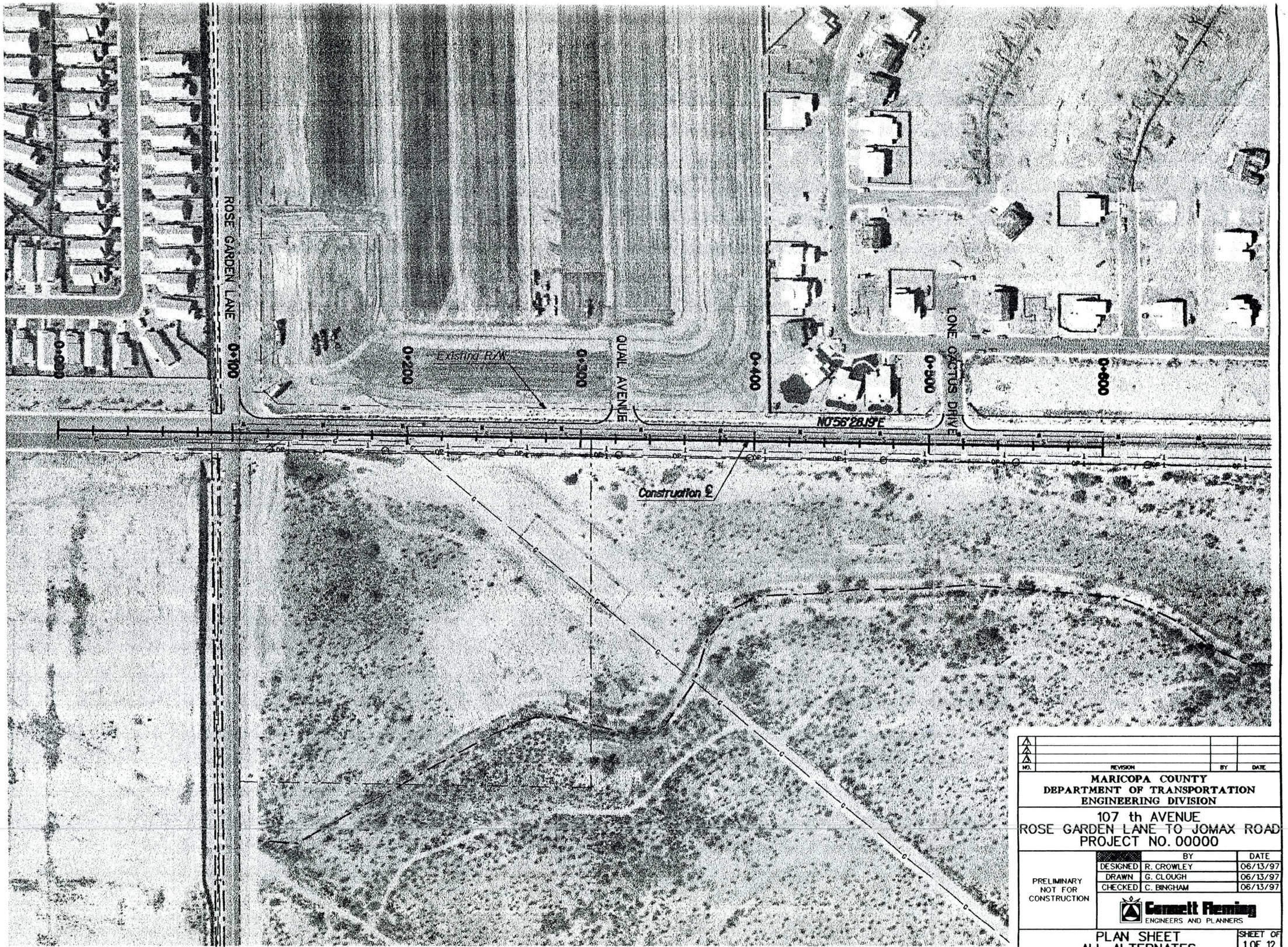
CMX Group, Inc., 1995, Drainage Report for Alta Vista Estates, Units 3 & 4, Peoria, Arizona. Prepared for Capital - Deer Valley, LLC.

CMX Group, Inc., 1997, Drainage Report for Rose Garden Acres, Northwest Corner of 107th Avenue and Rose Garden Lane, Peoria, Arizona.

Integrated Water Technologies, Inc., 1997, Agua Fria Recharge Project, Feasibility Assessment, Conceptual Design and Hydrologic Investigation for CAP.

APPENDIX C

Concept Design Plans



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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALL ALTERNATES

SHEET OF
1 OF 12

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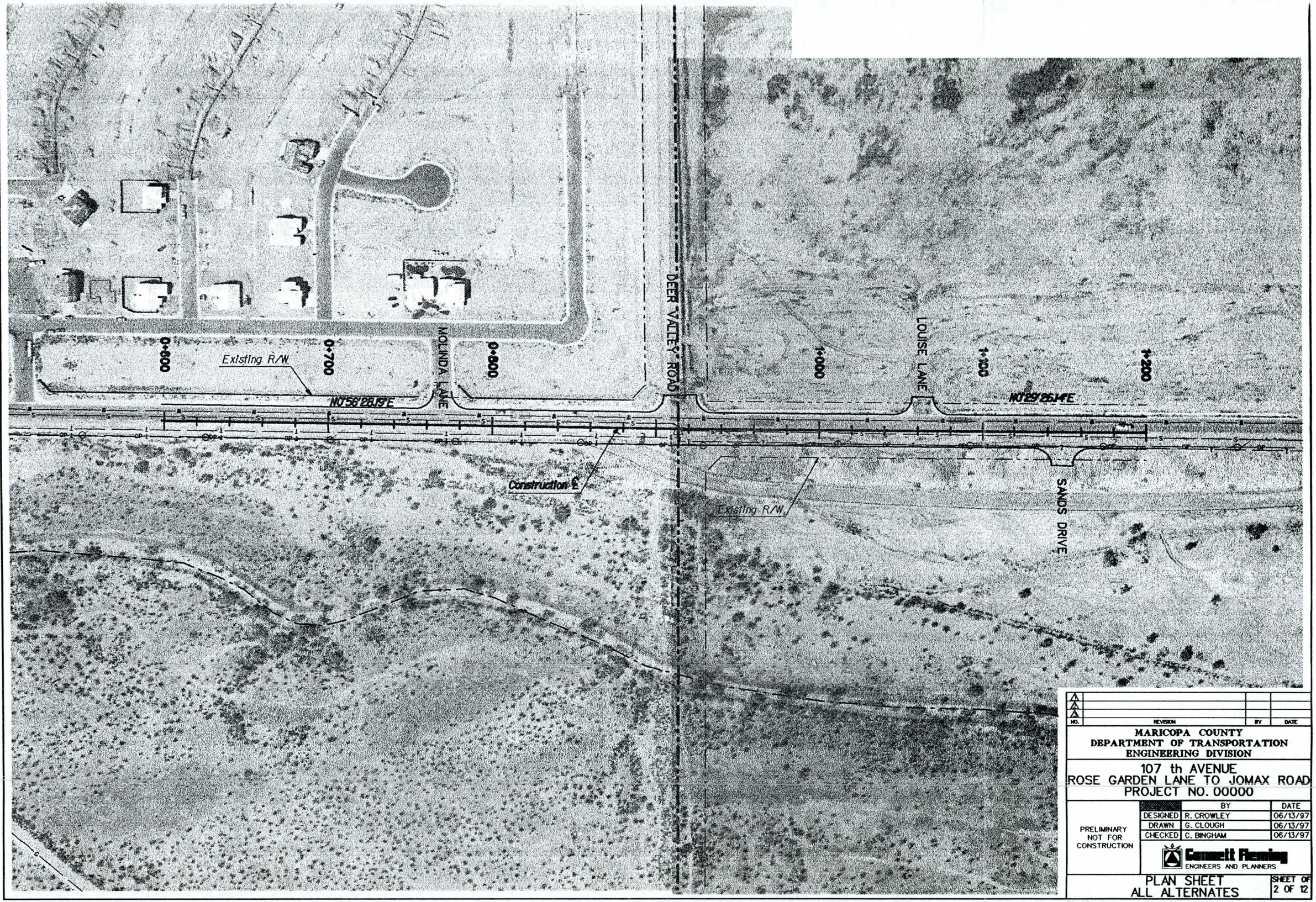

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
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PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALL ALTERNATES

SHEET OF
2 OF 12

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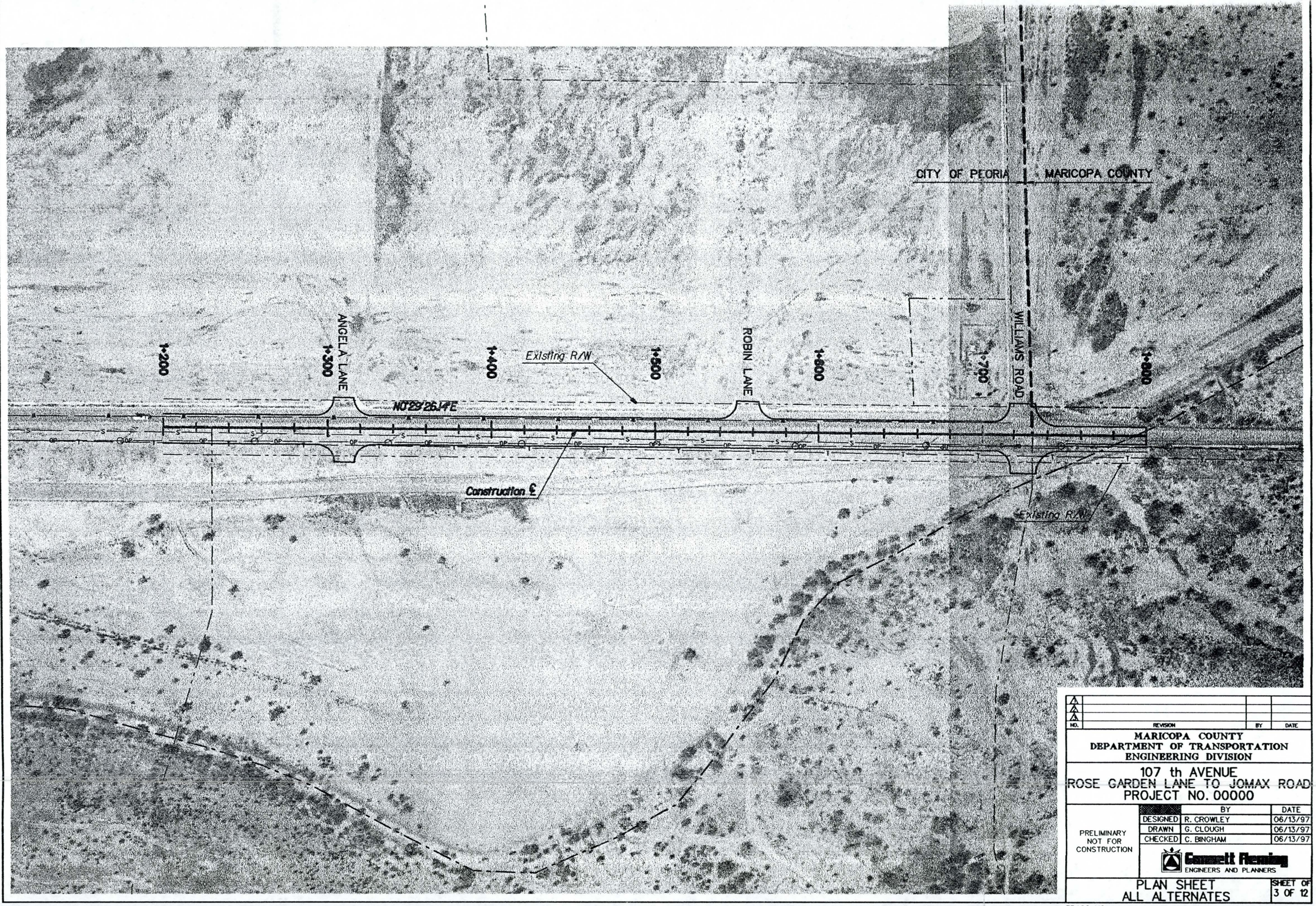

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALL ALTERNATES

SHEET OF
3 OF 12

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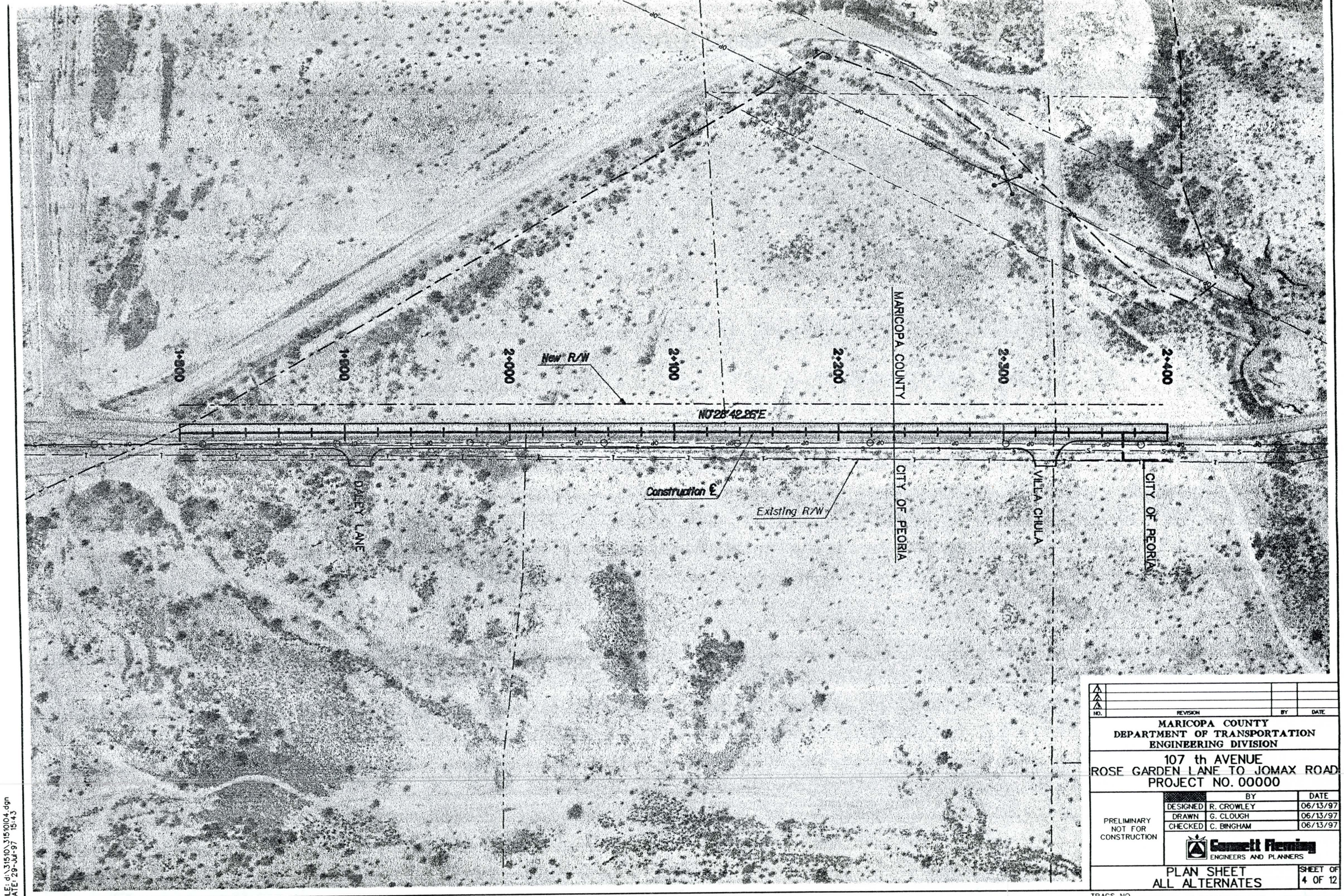

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALL ALTERNATES

SHEET OF
4 OF 12

TRACS NO.

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DATE: 29-Jul-97 15:43

PINNACLE PEAK ROAD ALIGNMENT

MARICOPA COUNTY

CITY OF PEORIA

CITY OF PEORIA

MARICOPA COUNTY

TUCSON ELECTRIC POWER 345 KV

APS 230 KV

SUNWARD MATERIALS

New R/W

Existing R/W

New R/W

Construction ℄

Sta 2+460
2-1500mmx50m (60"x15') Pipe Culvert
Skew 45° Lt

Rt Sta 2+534
1500mmx42m (60"x138') Pipe Culvert

WAPA 230 KV

SRP 230 KV (East Circuit)

2+400 2+500 2+600 2+700 2+800 2+900 3+000

N01°14'05.20"W

N51°11'15.66"W

N01°18'24"E

CURVE DATA

PI Sta= 2+756.541
Δ= 8° 38' 01"
R= 440.000
T= 33.213
L= 66.301
Ext= 1.252
Super= 0.071

CURVE DATA

PI Sta= 2+278.543
Δ= 8° 23' 53"
R= 440.000
T= 32.304
L= 64.493
Ext= 1.184
Super= 0.071

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALL ALTERNATES

SHEET OF
5 OF 12

TRACS NO.

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SUNWARD MATERIALS

3+000 3+100 3+200 3+300 3+400 3+500 3+600

New R/W

NOT4057FW

Construction ℄

Existing R/W

STA 3+340
BEGIN ALTERNATIVE ALIGNMENTS

Sta 3+470
1350mmx48m (54"x57") Pipe Culvert

WAPA 230 KV

POST 230 KV

POST 3+558.06

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX RO
PROJECT NO. 00000

	BY	DAT
DESIGNED	R. CROWLEY	06/1
DRAWN	G. CLOUGH	06/1
CHECKED	C. BINGHAM	06/1

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALTERNATES "A", "B", "C", "E"

SHEET
6 OF

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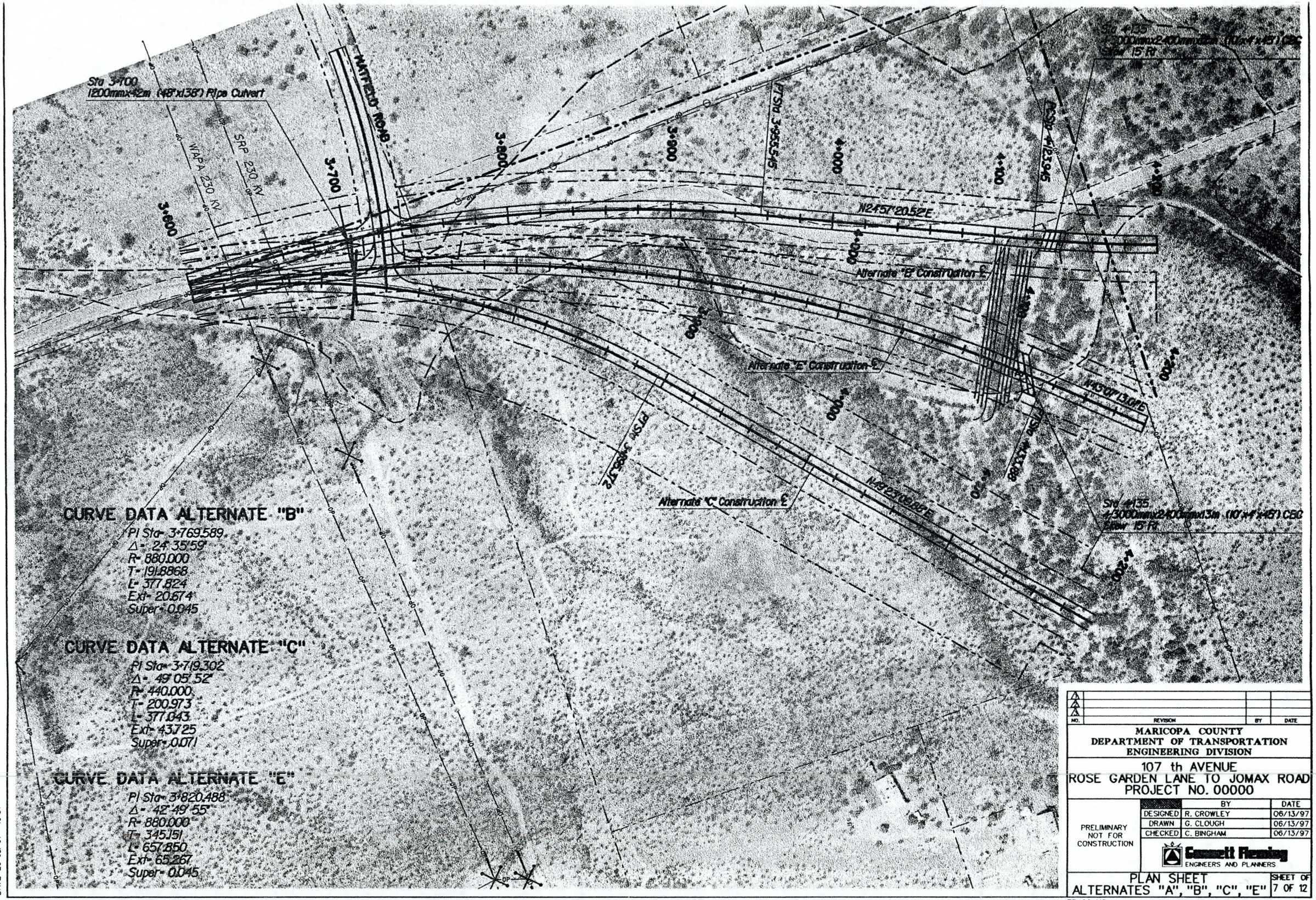

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PI Sta= 3+769.589
Δ= 24°35'59"
R= 880.000
T= 191.8868
L= 377.824
Ext= 20.674
Super= 0.045

CURVE DATA ALTERNATE "C"

PI Sta= 3+719.302
Δ= 49°05'52"
R= 440.000
T= 200.973
L= 377.043
Ext= 43.725
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 3+820.488
Δ= 42°49'55"
R= 880.000
T= 345.151
L= 657.850
Ext= 65.267
Super= 0.045

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF
7 OF 12

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CURVE DATA ALTERNATE "B"
PI Sta= 4+313.204
Δ= 24°16'30"
R= 820.000
T= 189.259
L= 347.838
Ext= 20.122
Super= 0.045

CURVE DATA ALTERNATE "E"
PI Sta= 4+363.240
Δ= 33°17'22"
R= 440.000
T= 131.566
L= 255.686
Ext= 19.249
Super= 0.071

CURVE DATA ALTERNATE "C"
PI Sta= 4+333.186
Δ= 48°37'09"
R= 440.000
T= 198.755
L= 373.367
Ext= 42.808
Super= 0.071

Sta 4+513.009 Alternate "B"-
46+702.937 Estrella Interim Roadway

Sta 4+513.009 Alternate "E"-
46+702.937 Estrella Interim Roadway

Sta 4+684.330 Alternate "C"-
47+031.712 Estrella Interim Roadway

Sta 4+400
600mmx30m (24"x98') Pipe Culvert

Sta 4+420
600mmx30m (24"x98') Pipe Culvert

Sta 4+260
3000mmx3000mmx19m (10'x10'x62') CBC
Skew 45° LT

PI Sta 4+486.783
PI Sta 4+488.360
PC Sta 47+056.27
PI Sta 4+607.719

N0°40'50.3"E
N3°49'31.45"E
N46°01.45"E
N43°01'13.0"E
N42°25'09.8"E

New R/W
Alternate "B" Construction ℄
Estrella Interim Roadway Construction ℄
Alternate "E" Construction ℄
Alternate "C" Construction ℄
100 YEAR FLOOD PLAIN BOUNDARY
CANAL
HUEY VALLEY ROAD ALIGNMENT

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Gannett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF 8 OF 12

TRACS NO.

FILE: d:\31510\31510108.dgn
DATE: 29-Jul-97 16:53

Existing 107th Avenue

New R/W

4+700 4+800 4+900 5+000 5+100 5+200 5+300

N0°40'50.3"E

Alternate "B" Construction ℄

Sta 4+900
600mmx30m (24"x98') Pipe Culvert

New R/W

CURVE DATA ALTERNATE "C"

PI Sta= 5+264.840
Δ= 32° 24' 11"
R= 440.000
T= 127.844
L= 248.837
Ext= 18.197
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 5+232.816
Δ= 41° 34' 39"
R= 440.000
T= 167.041
L= 319.292
Ext= 30.641
Super= 0.071

PT Sta 5+385.052

100 YEAR FLOOD PLAIN BOUNDARY

5+500 5+400 5+300

N37°38'09.05"W

Alternate "E" Construction ℄

New R/W

POSta 5+136.986

POSta 5+065.774

4+800 4+900 5+000 5+100 5+200 5+300

N9°49'31.45"E

CANAL

Sta 4+980
1500mmx50m (60"x164') Pipe Culvert

4+900 5+000 5+100 5+200

N0°46'01.45"E

Alternate "C" Construction ℄

New R/W

Sta 5+050
1200mmx46m (48"x151') Pipe Culvert

Sta 5+325
1200mmx58m (48"x190') Pipe Culvert

NO.	REVISION	BY	DATE
1			
2			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
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DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
ALTERNATES "A", "B", "C", "E"

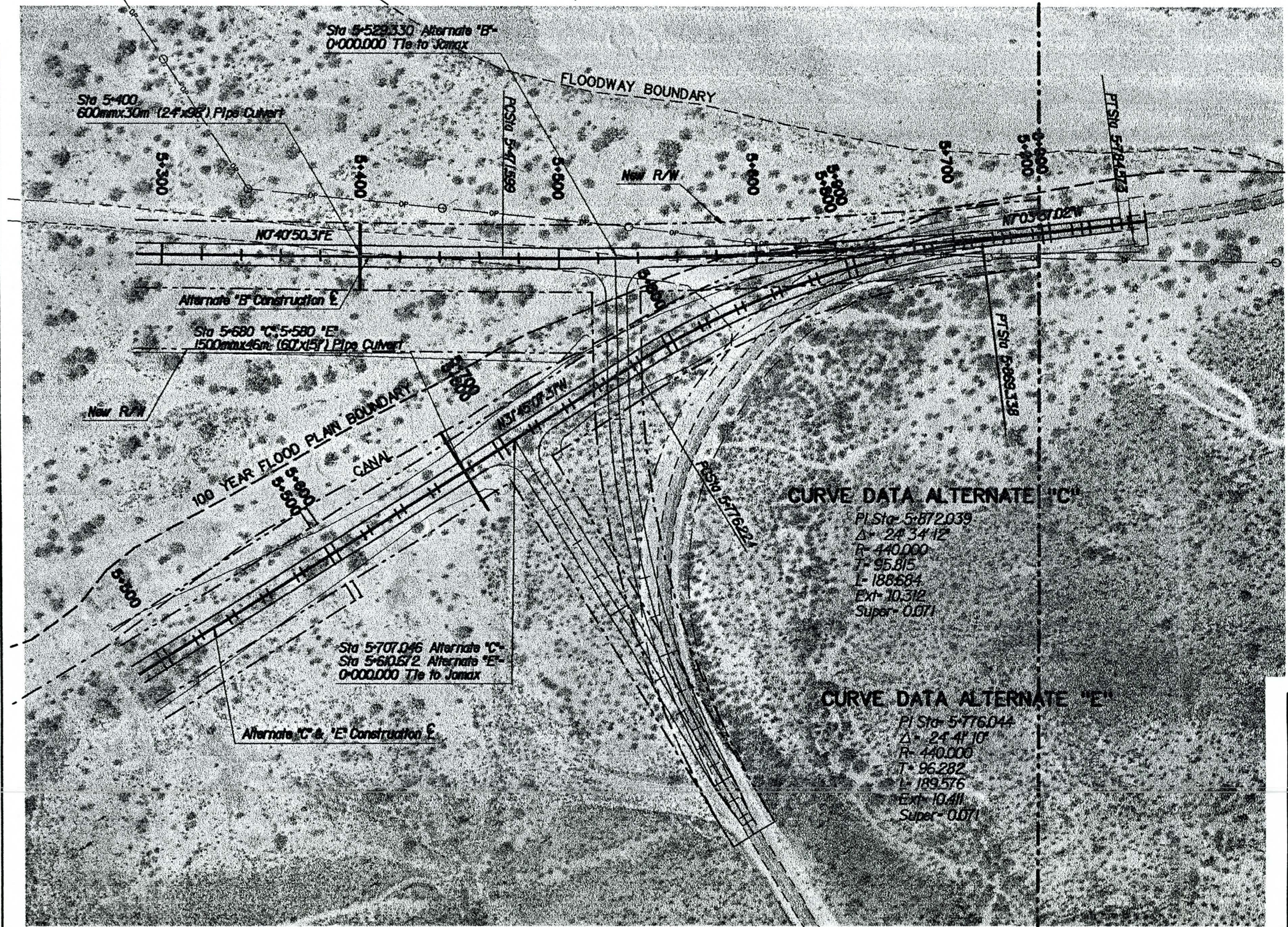
SHEET OF
9 OF 12

TRACS NO.

FILE: d:\31510\31510109.dgn
DATE: 29-Jul-97 16:16

CURVE DATA ALTERNATE "B"

PI Sta= 5+628.324
Δ= 7°43'46"
R= 2320
T= 156.725
L= 312.974
Ext= 5.288
Super= RC



CURVE DATA ALTERNATE "C"

PI Sta= 5+872.039
Δ= 24°34'12"
R= 440.000
T= 95.815
L= 188.684
Ext= 10.312
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 5+776.044
Δ= 24°41'10"
R= 440.000
T= 96.282
L= 189.576
Ext= 10.411
Super= 0.071

NO.	REVISION	BY	DATE
1			
2			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
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CONSTRUCTION

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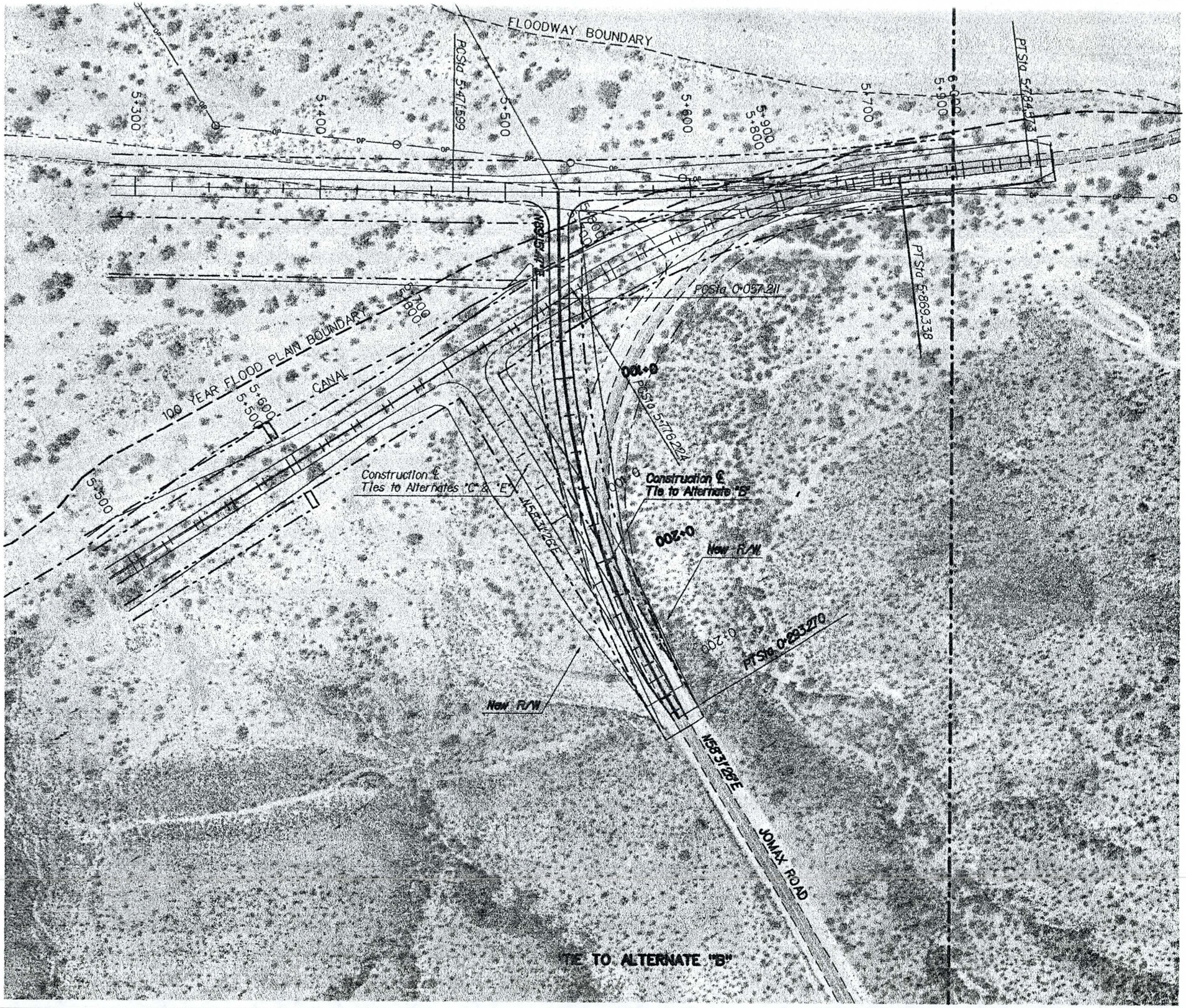
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connell Resing
ENGINEERS AND PLANNERS

PLAN SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF
10 OF 12

FILE: d:\3151O\3151O10.dgn
DATE: 29-Jul-97 16:26



CURVE DATA
TIE TO ALTERNATE "B"

PI Sta= 0+178.156
Δ= 30°44'21"
R= 440.000
T= 120.944
L= 236.059
Ext= 16.320
Super= 0.071

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
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DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

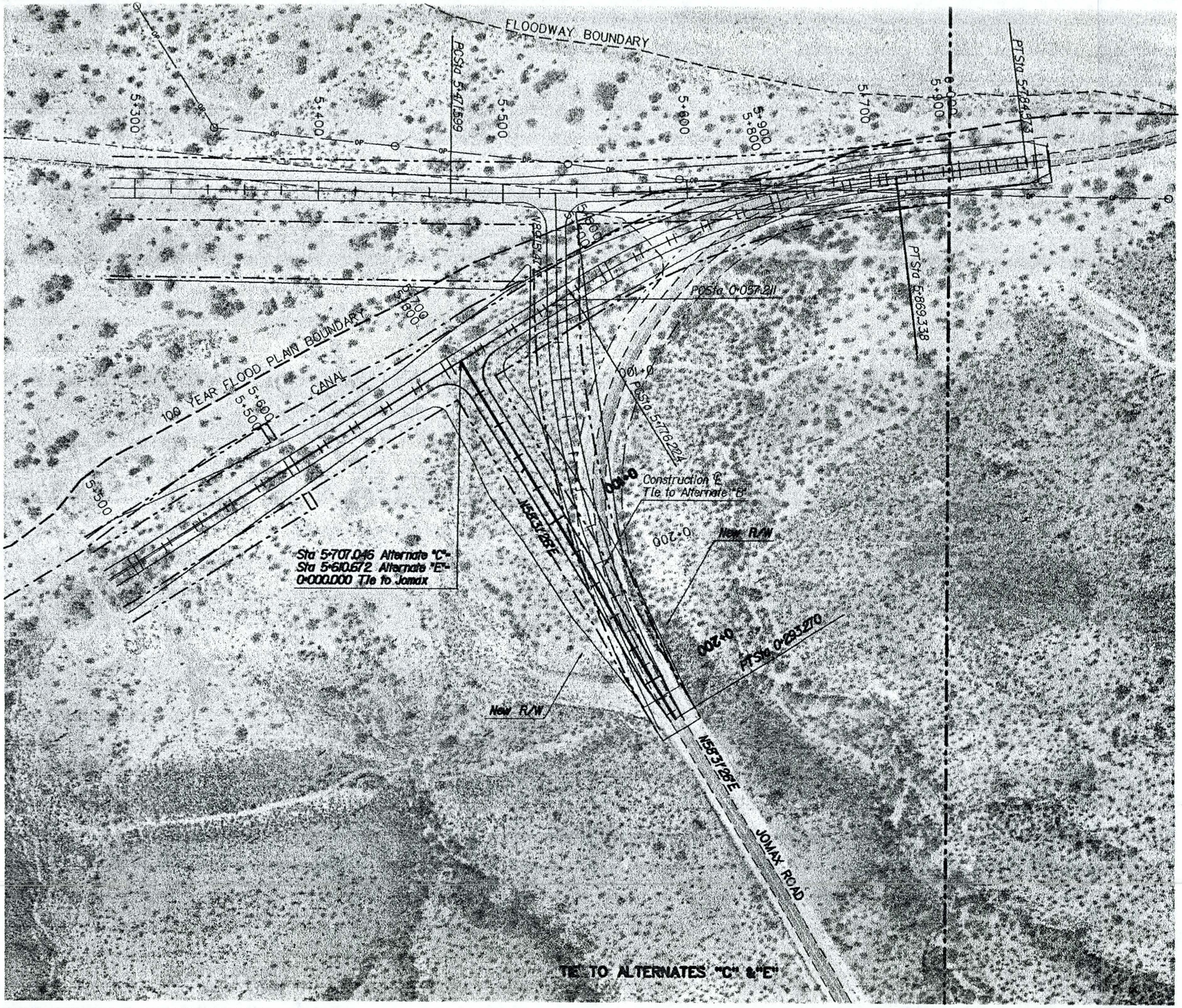
PRELIMINARY
NOT FOR
CONSTRUCTION

Cornett Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
TIE TO ALTERNATE "B"

SHEET OF
11 OF 12

FILE: d:\31510\31510111.dgn
DATE: 29-Jul-97 16:45



CURVE DATA
TIE TO ALTERNATE "B"

PI Sta- 0+178.156
Δ- 30°44'21"
R- 440.000
T- 120.944
L- 236.059
Ext- 16.320
Super- 0.071

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

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Connell Fleming
ENGINEERS AND PLANNERS

PLAN SHEET
TIES TO ALTERNATES "C", "E"

SHEET OF
12 OF 12

TRACS NO

FILE: d:\31510\31510112.dgn
DATE: 29-Jul-97 17:03

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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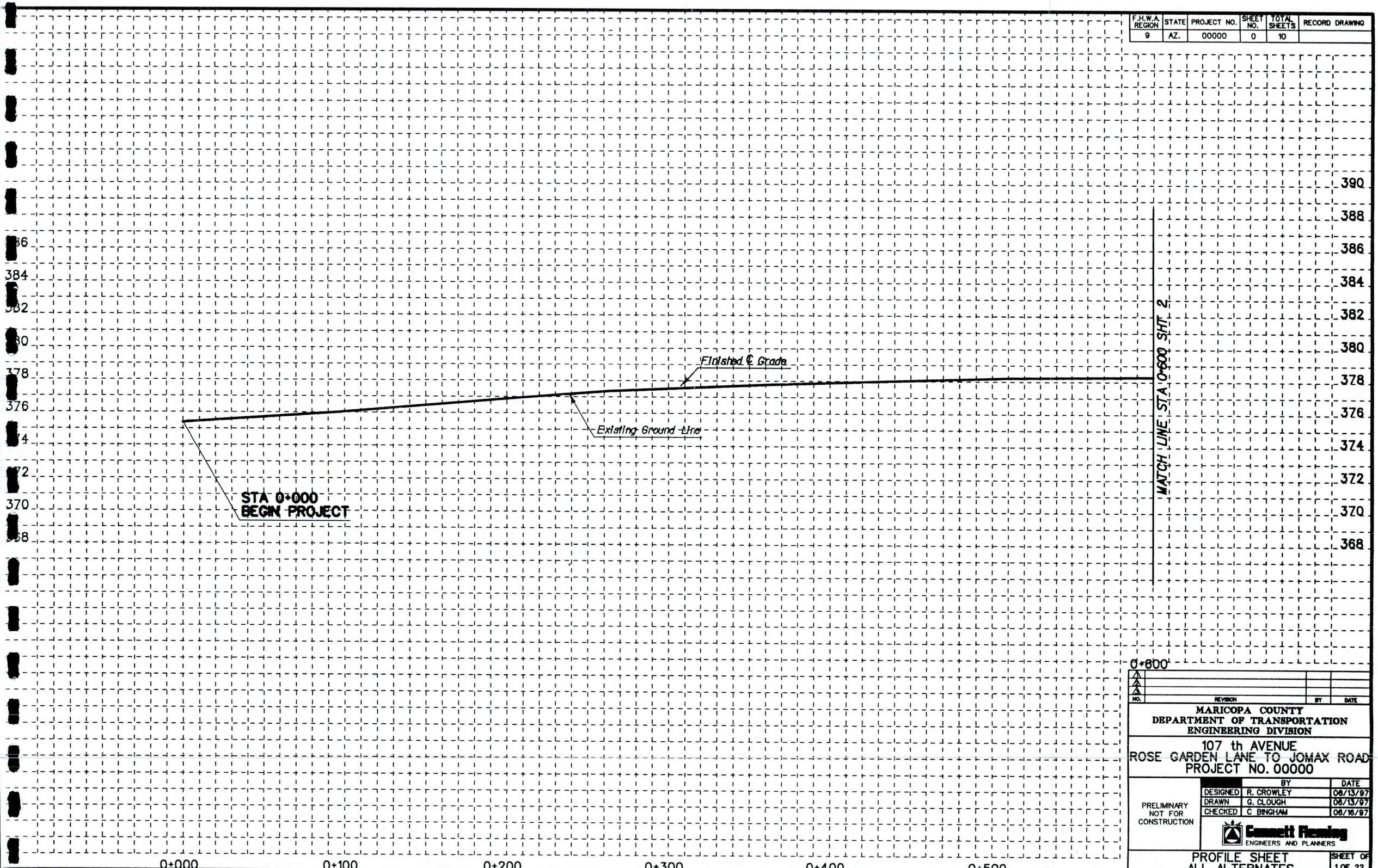

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

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PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	R. CROWLEY	06/13/97
	DRAWN	G. CLOUGH	06/13/97
	CHECKED	C BINGHAM	06/16/97

Gannett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALL ALTERNATES

SHEET OF 1 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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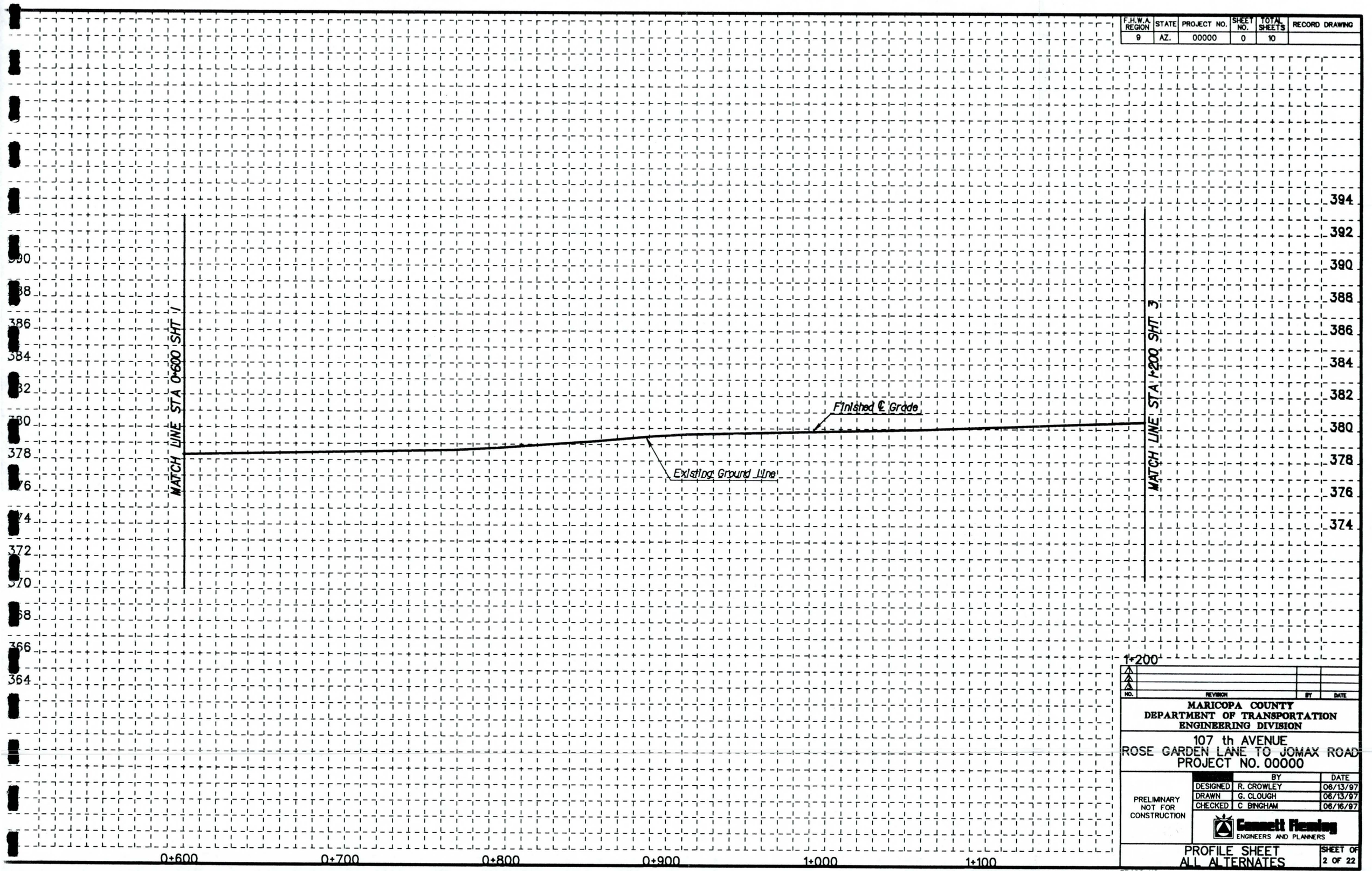

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
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DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
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CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALL ALTERNATES

SHEET OF
2 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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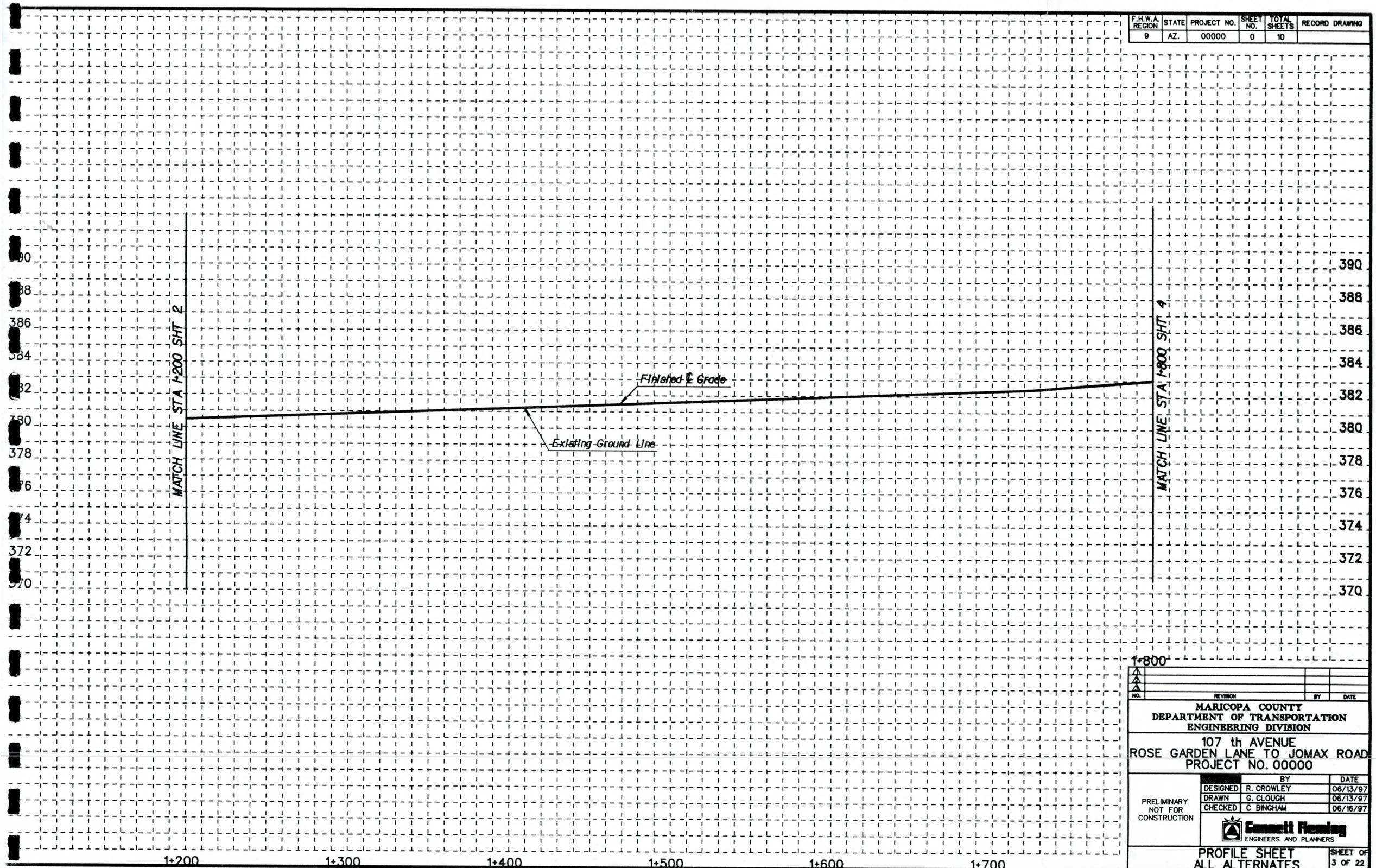

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
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107 th AVENUE
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PRELIMINARY
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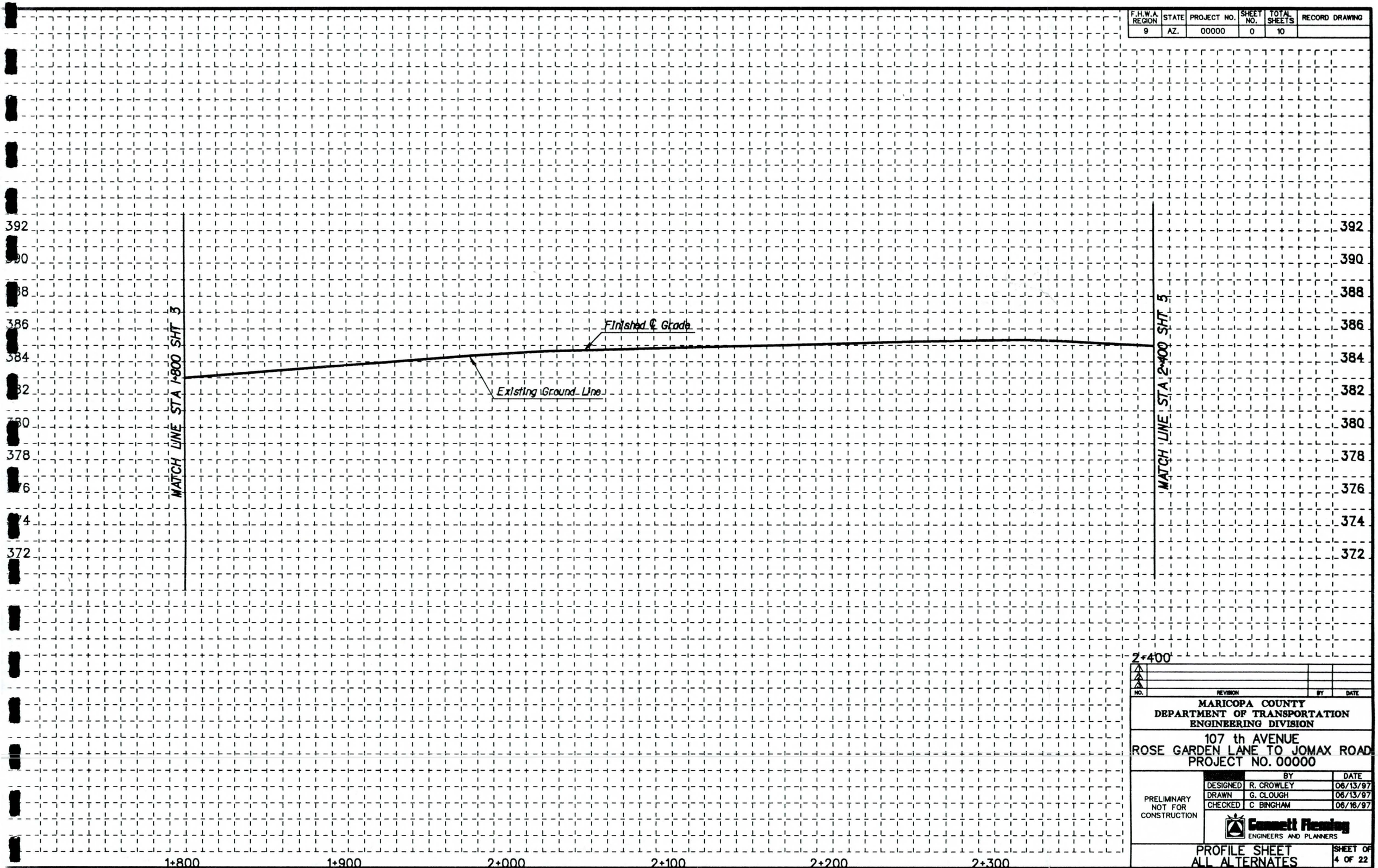
Emmett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALL ALTERNATES

SHEET OF
3 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALL ALTERNATES

SHEET OF
4 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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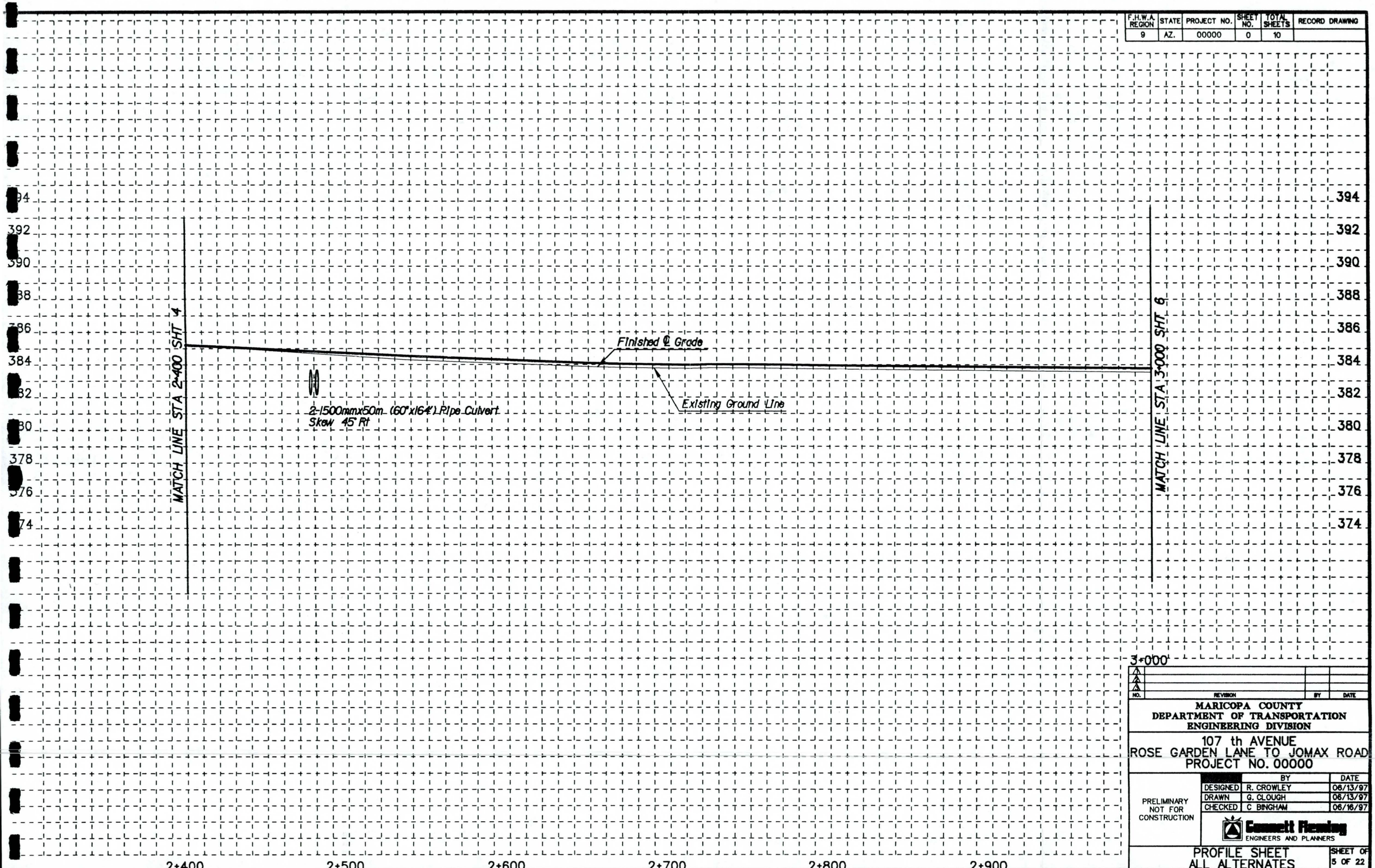

NO.	REVISION	BY	DATE
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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Fennett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALL ALTERNATES

SHEET OF
5 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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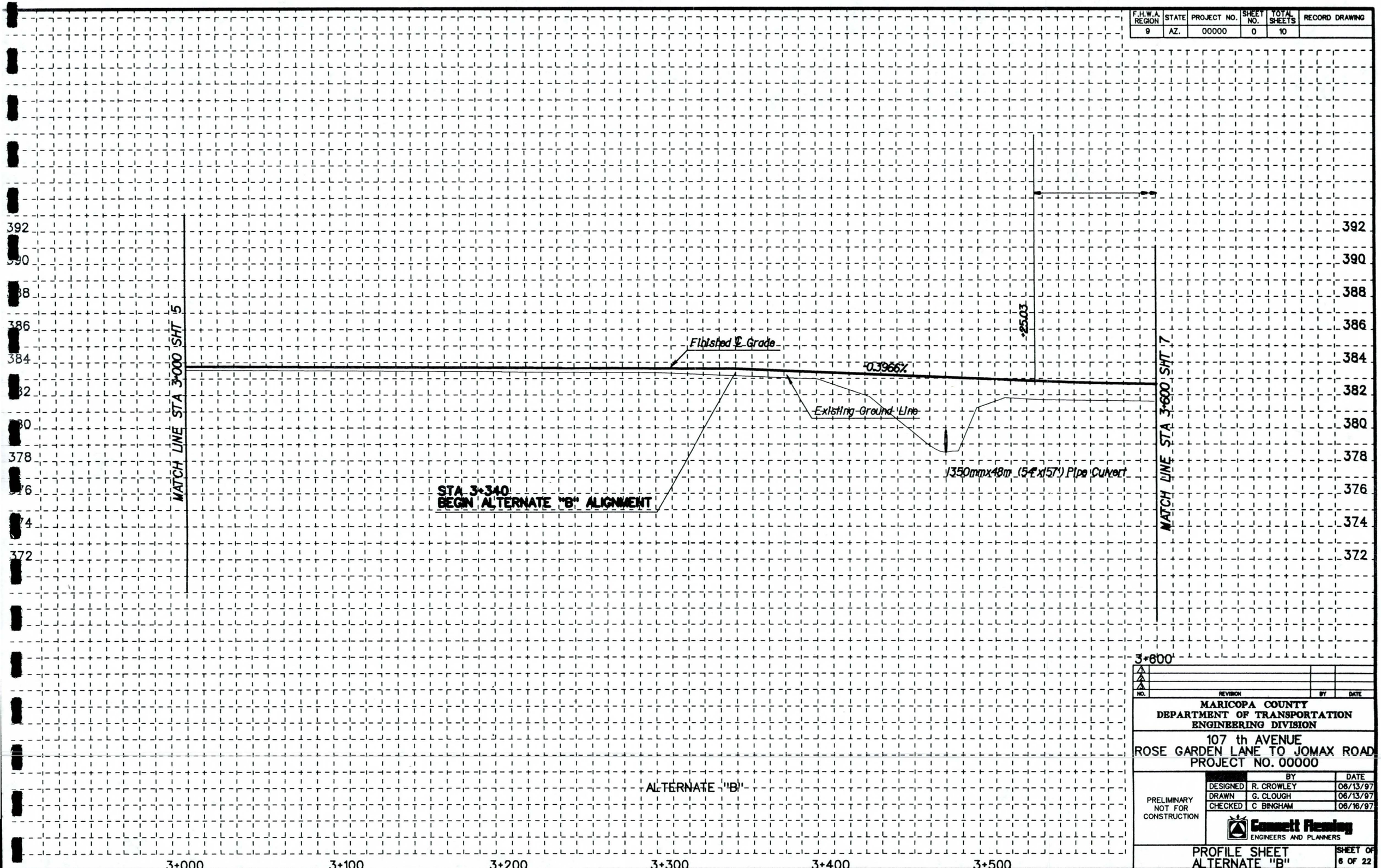

ALTERNATE "B"

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
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Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "B"

SHEET OF
6 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	

250m VC

+775.030

PI 4+040.042
Elev 384.542
Curve +0.300

HATFIELD ROAD

Finished Grade

0.587%

0.0592%

MATCH LINE STA 3+600 SHT 6

1200mmx42m (42"x138") Pipe Culvert

Existing Ground Line

PI 3+650.031
Elev 382.256
Curve +0.310

+915.040

250m VC
SDs-437m

+965.040

MATCH LINE STA 4+200 SHT 8

394
392
390
388
386
384
382
380
378
376
374

3+600 3+700 3+800 3+900 4+000 4+100 4+200

ALTERNATE "B"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
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Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "B"

SHEET OF
7 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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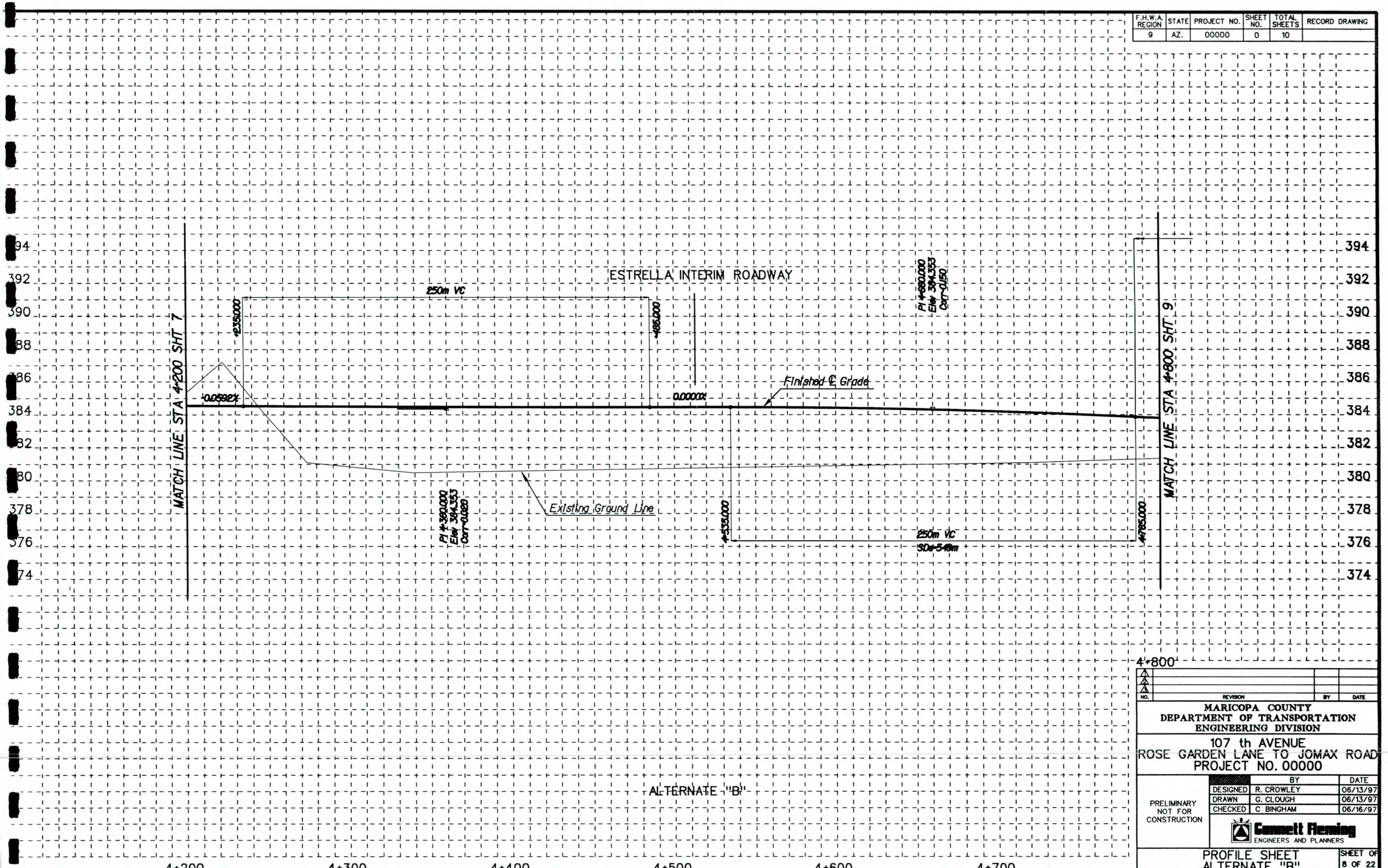

ALTERNATE "B"

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
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ENGINEERING DIVISION

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Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "B"

SHEET OF
8 OF 22

TRACS NO

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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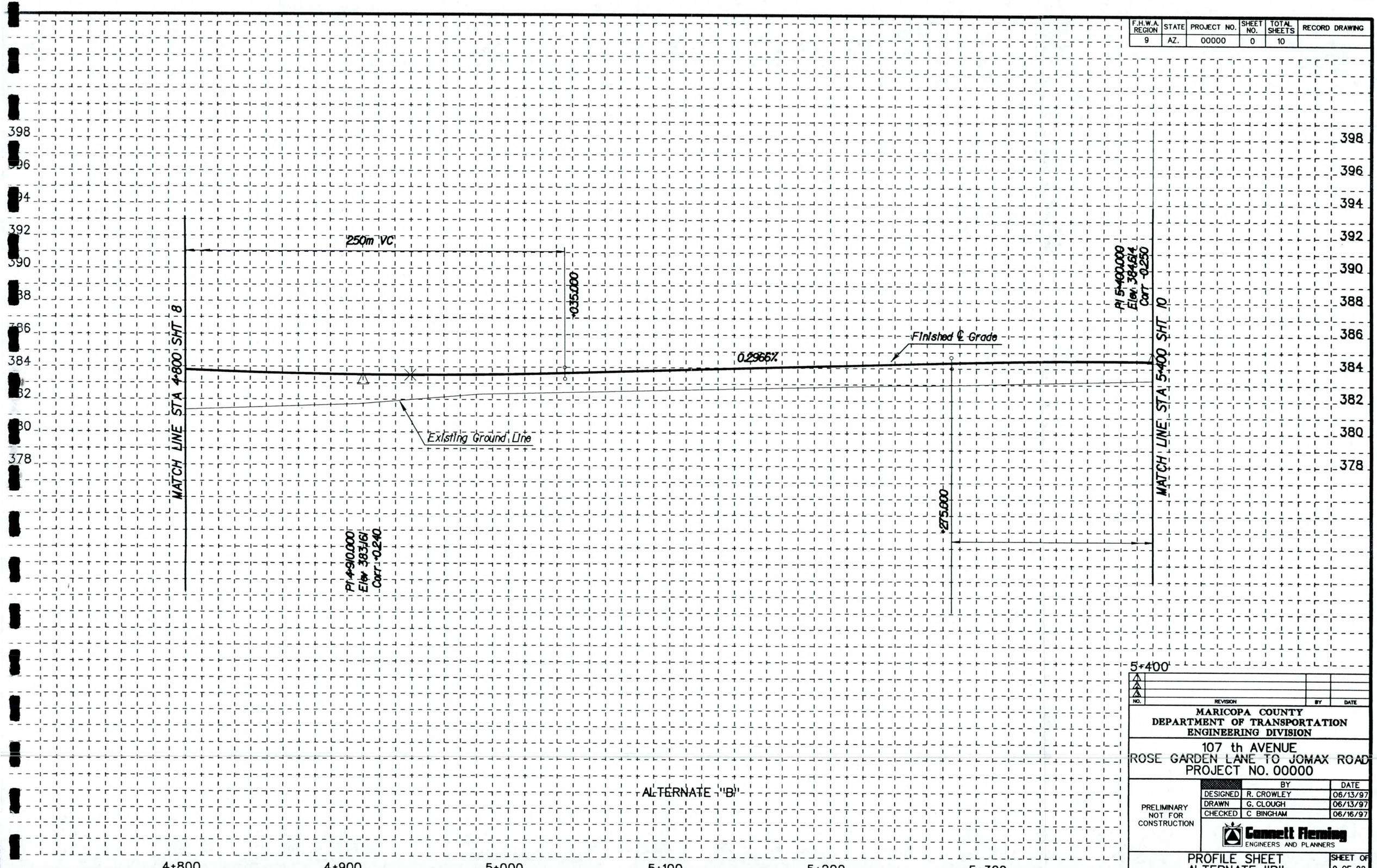

ALTERNATE "B"

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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Cannett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "B"

SHEET OF
9 OF 22

TRACS NO

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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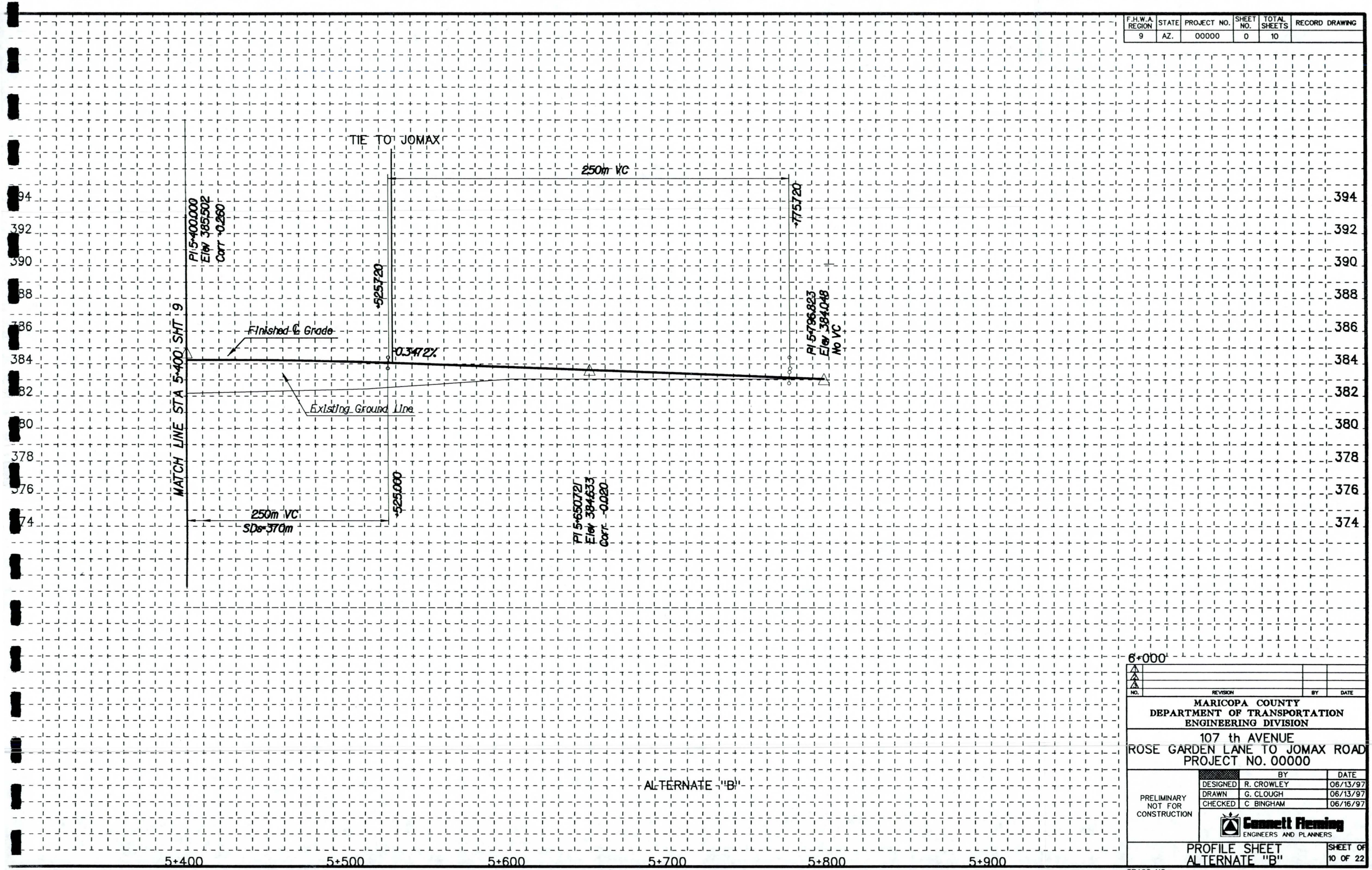

ALTERNATE "B"

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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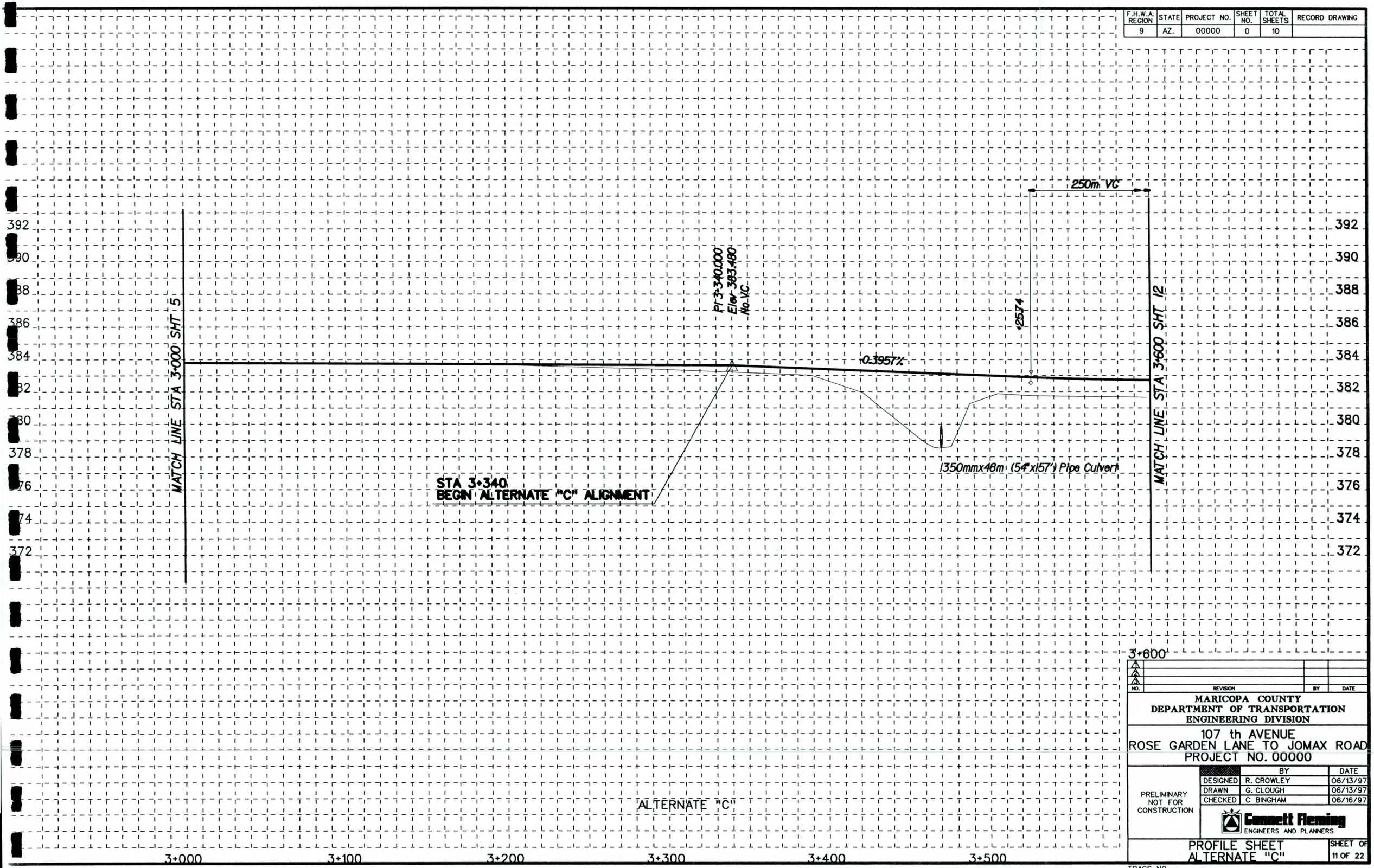
Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "B"

SHEET OF
10 OF 22

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



NO.	REVISION	BY	DATE
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
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DRAWN	G. CLOUGH	06/13/97
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PRELIMINARY
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CONSTRUCTION

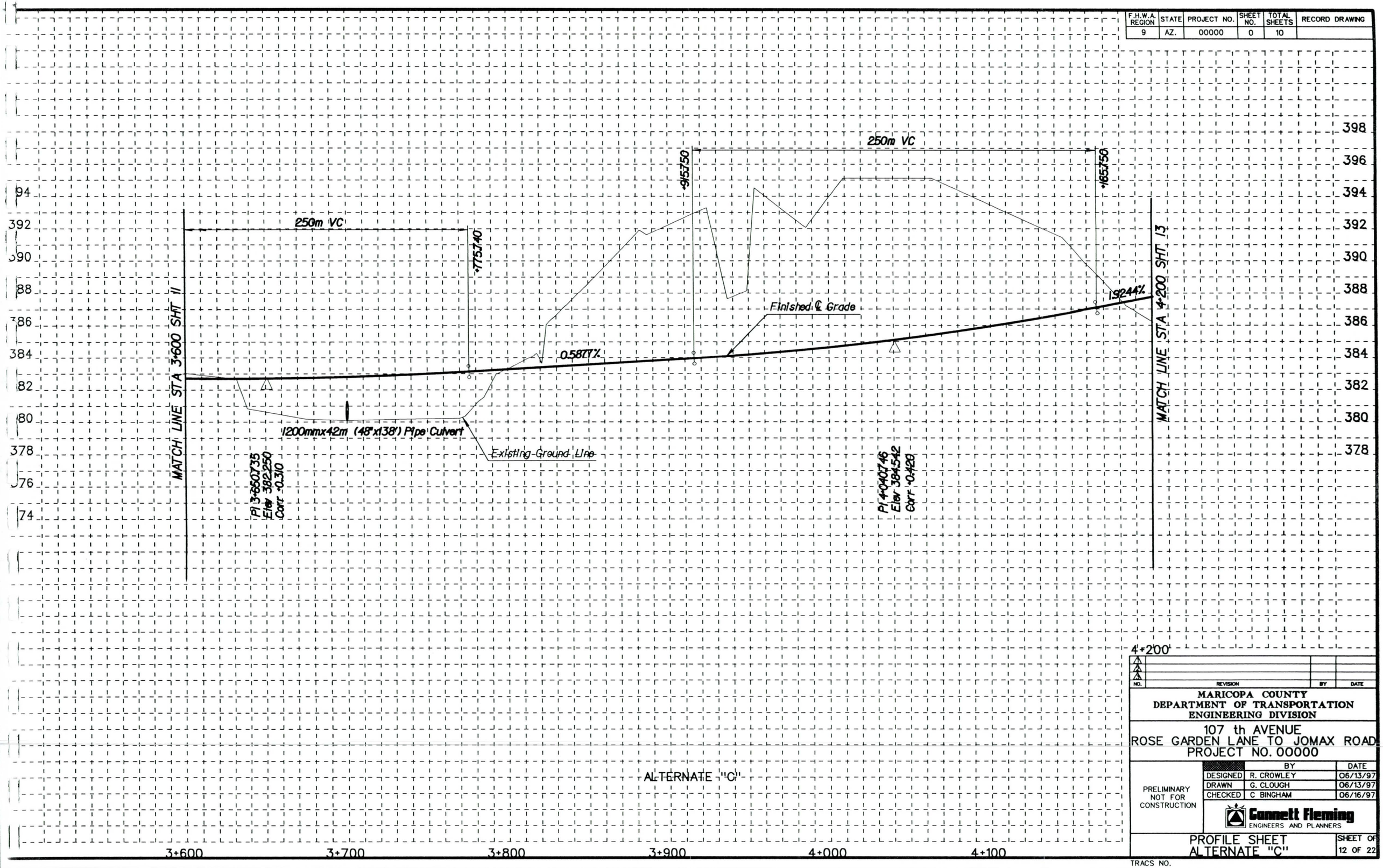
Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "C"

SHEET OF
11 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



3+600 3+700 3+800 3+900 4+000 4+100 4+200

ALTERNATE "C"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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PRELIMINARY
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CONSTRUCTION

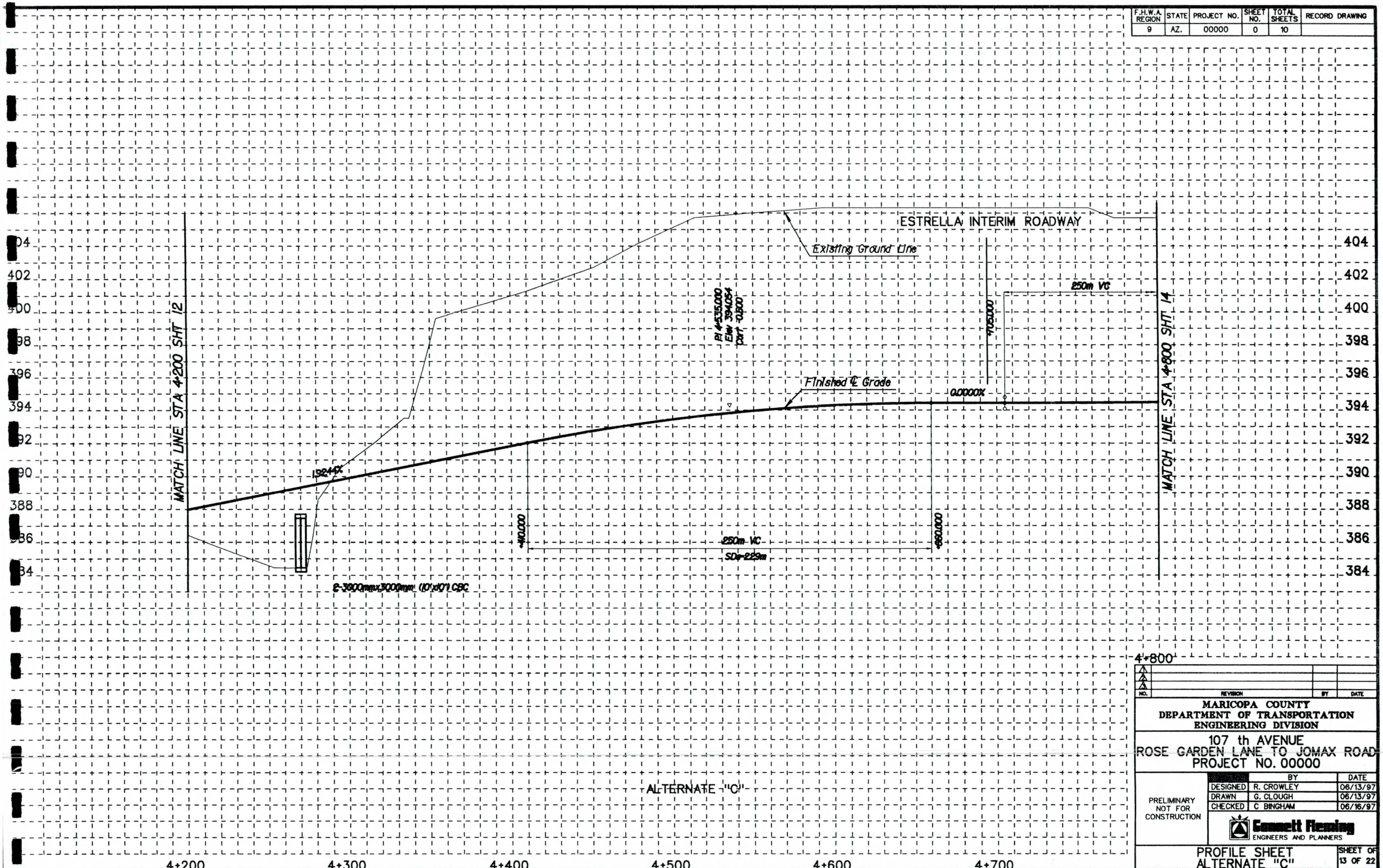
Gannett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "C"

SHEET OF
12 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE "C"

4+800

NO.	REVISION	BY	DATE
1			
2			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
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PRELIMINARY
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CONSTRUCTION

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CHECKED	C BINGHAM	06/16/97

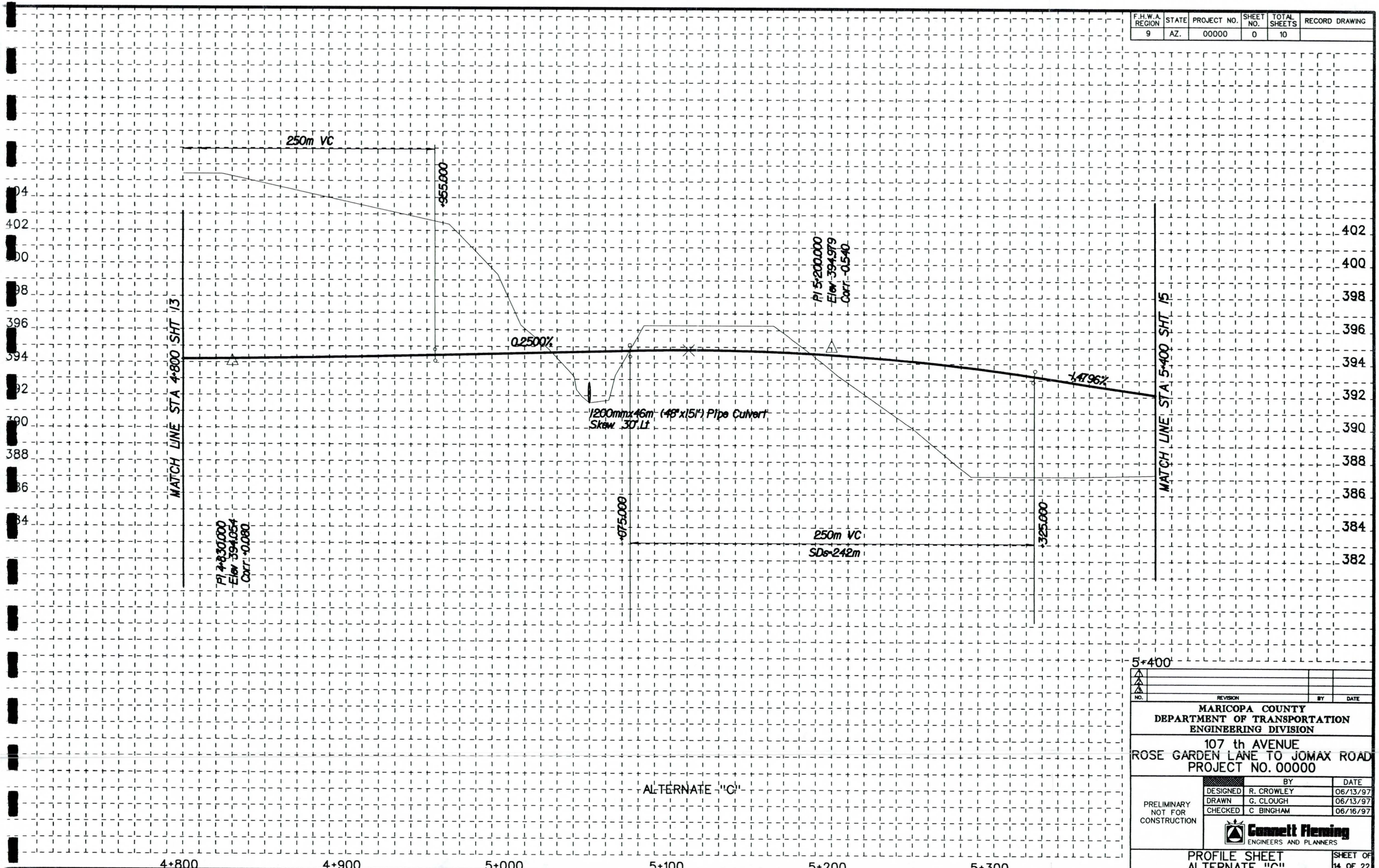
Sunnett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "C"

SHEET OF
13 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



5+400

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
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DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "C"

SHEET OF
14 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
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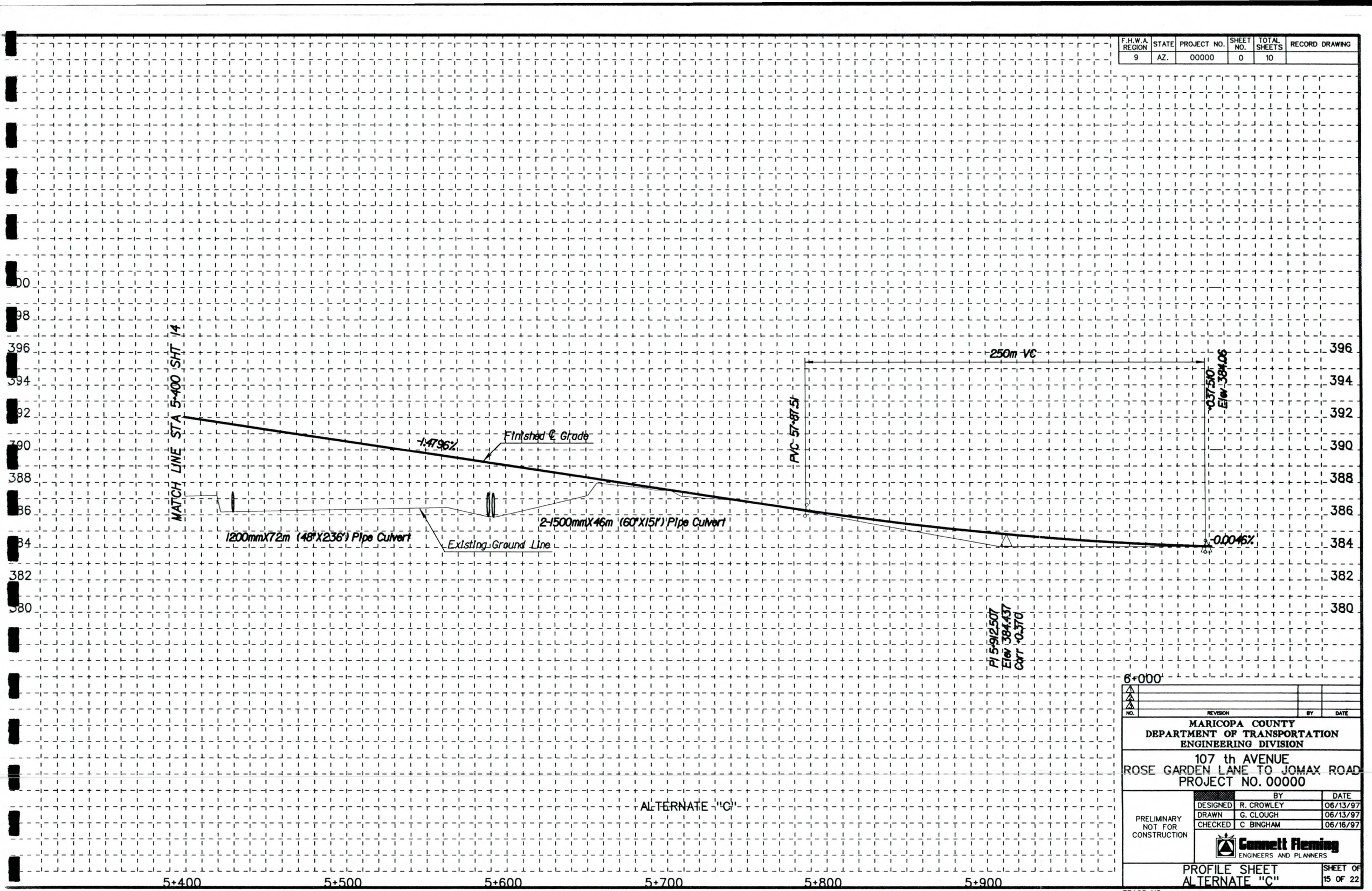

ALTERNATE "C"

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

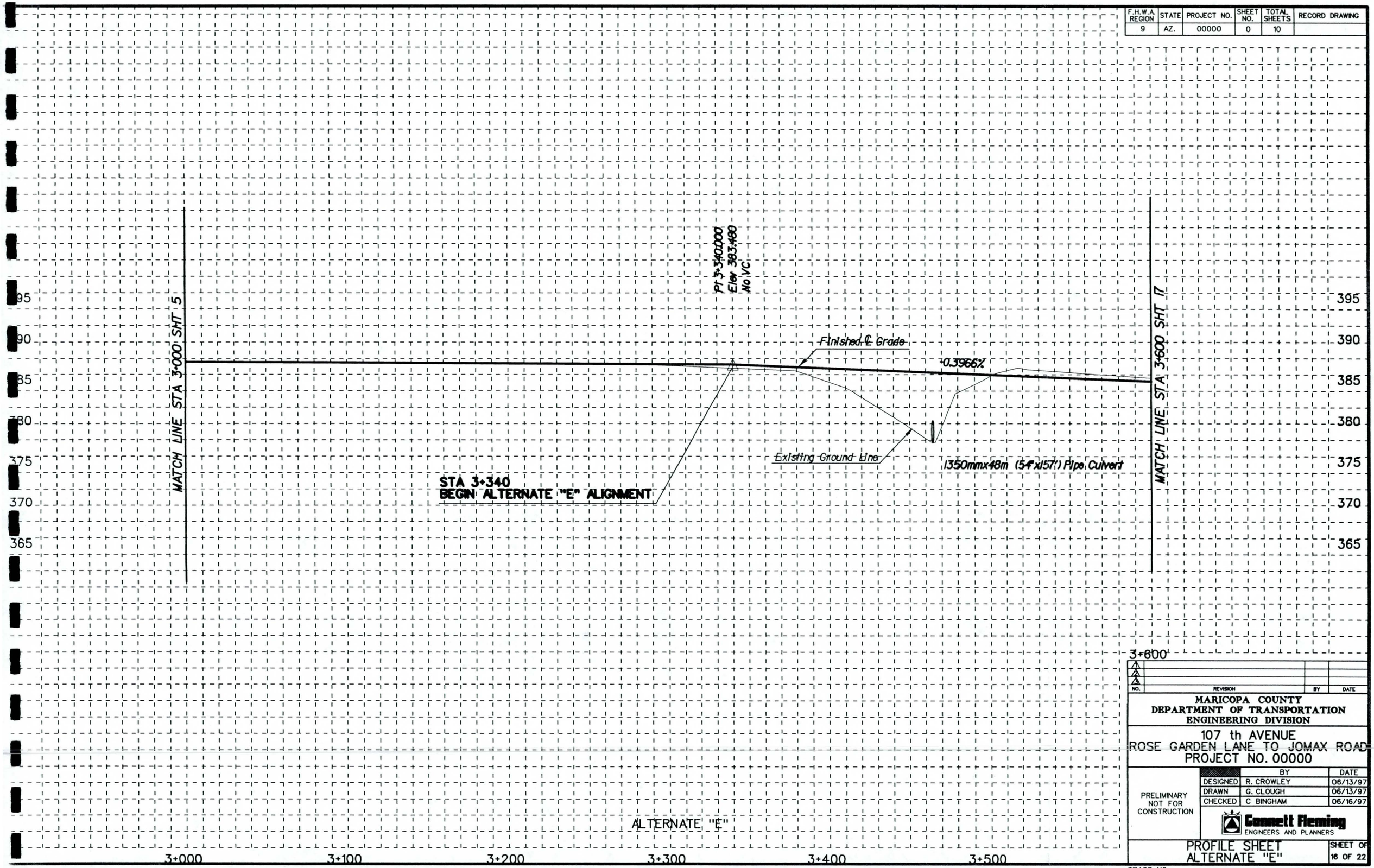
Connell Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "C"

SHEET OF
15 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE "E"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

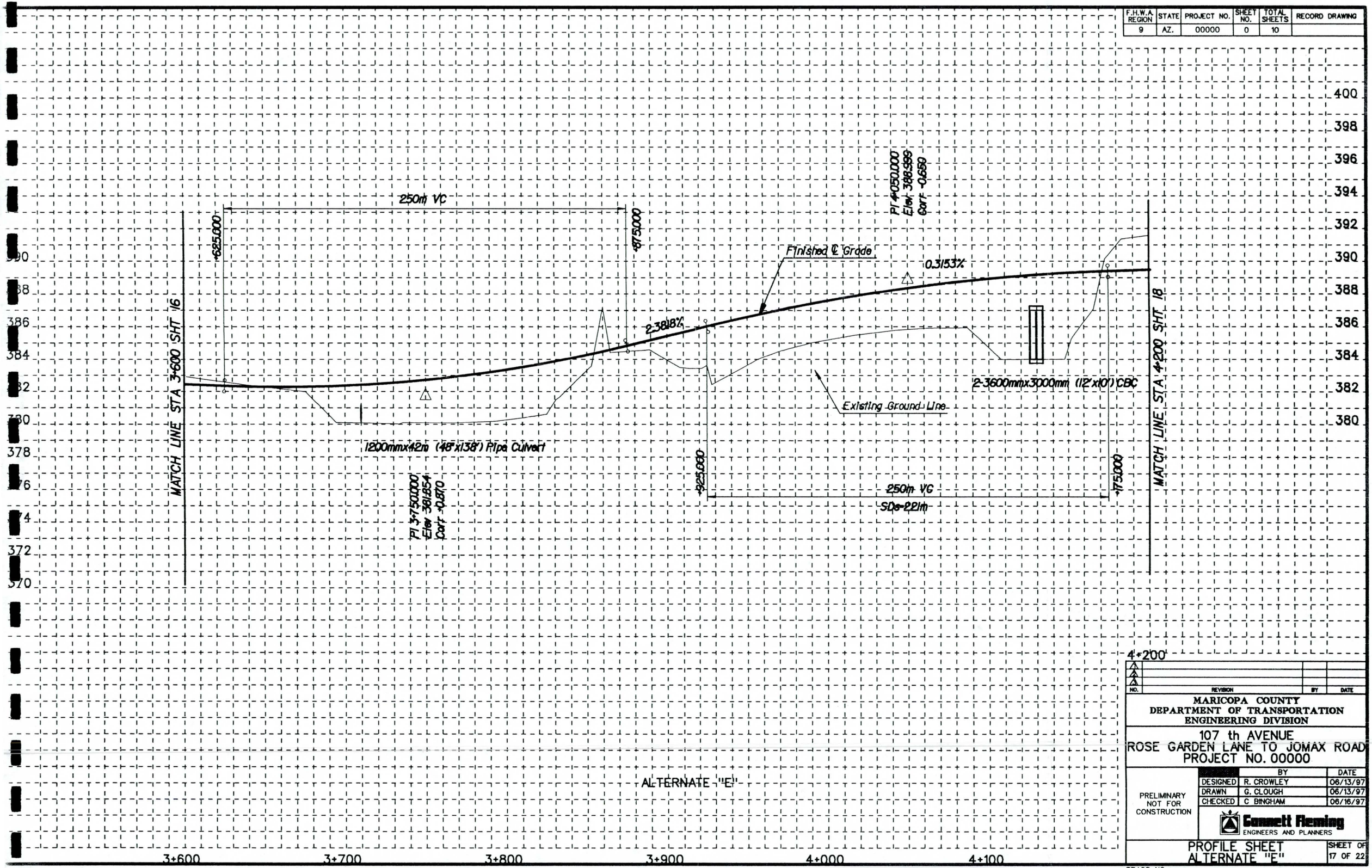
Gannett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "E"

SHEET OF
16 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE "E"

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

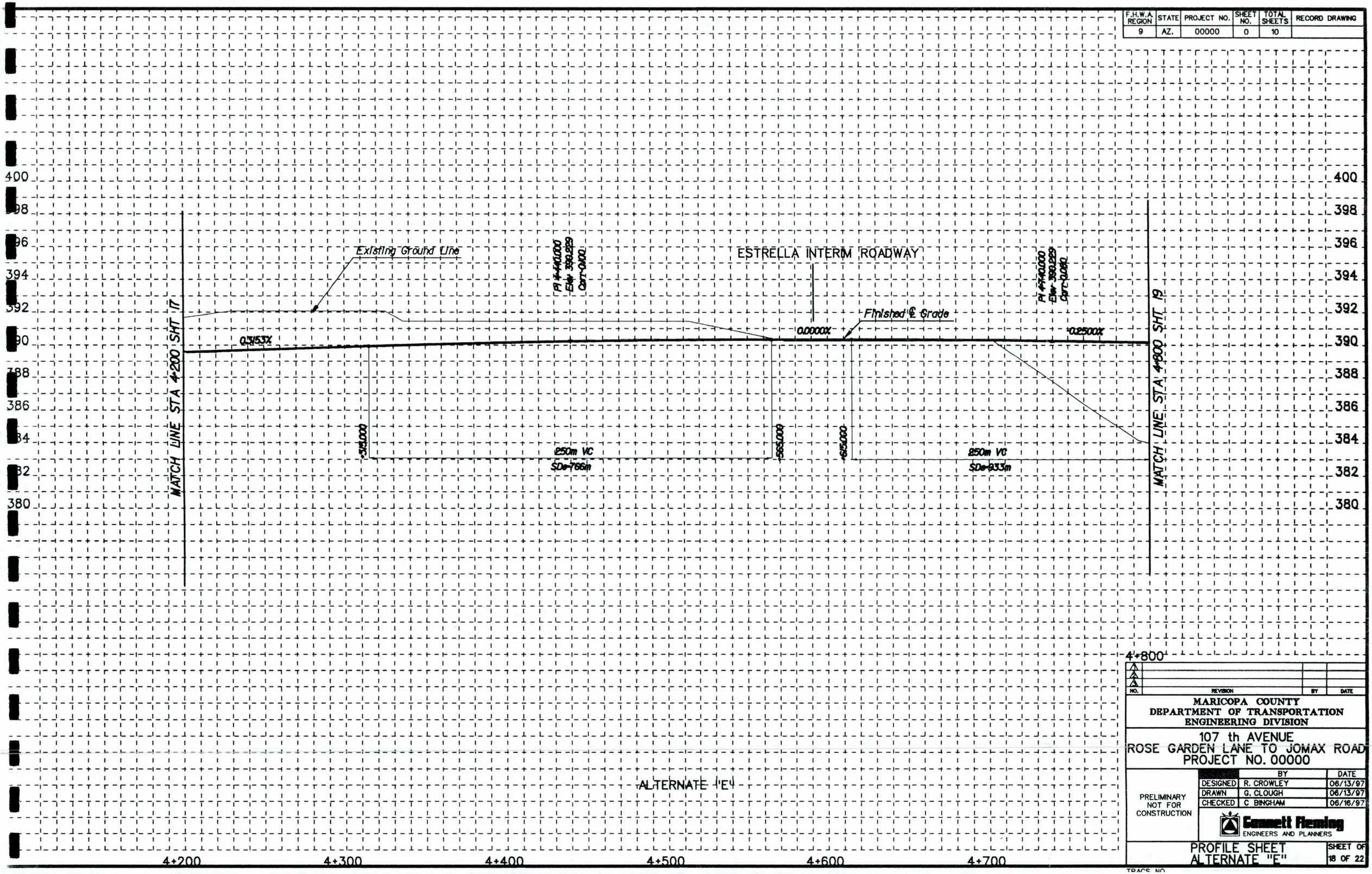
Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "E"

SHEET OF
17 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE 'E'

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

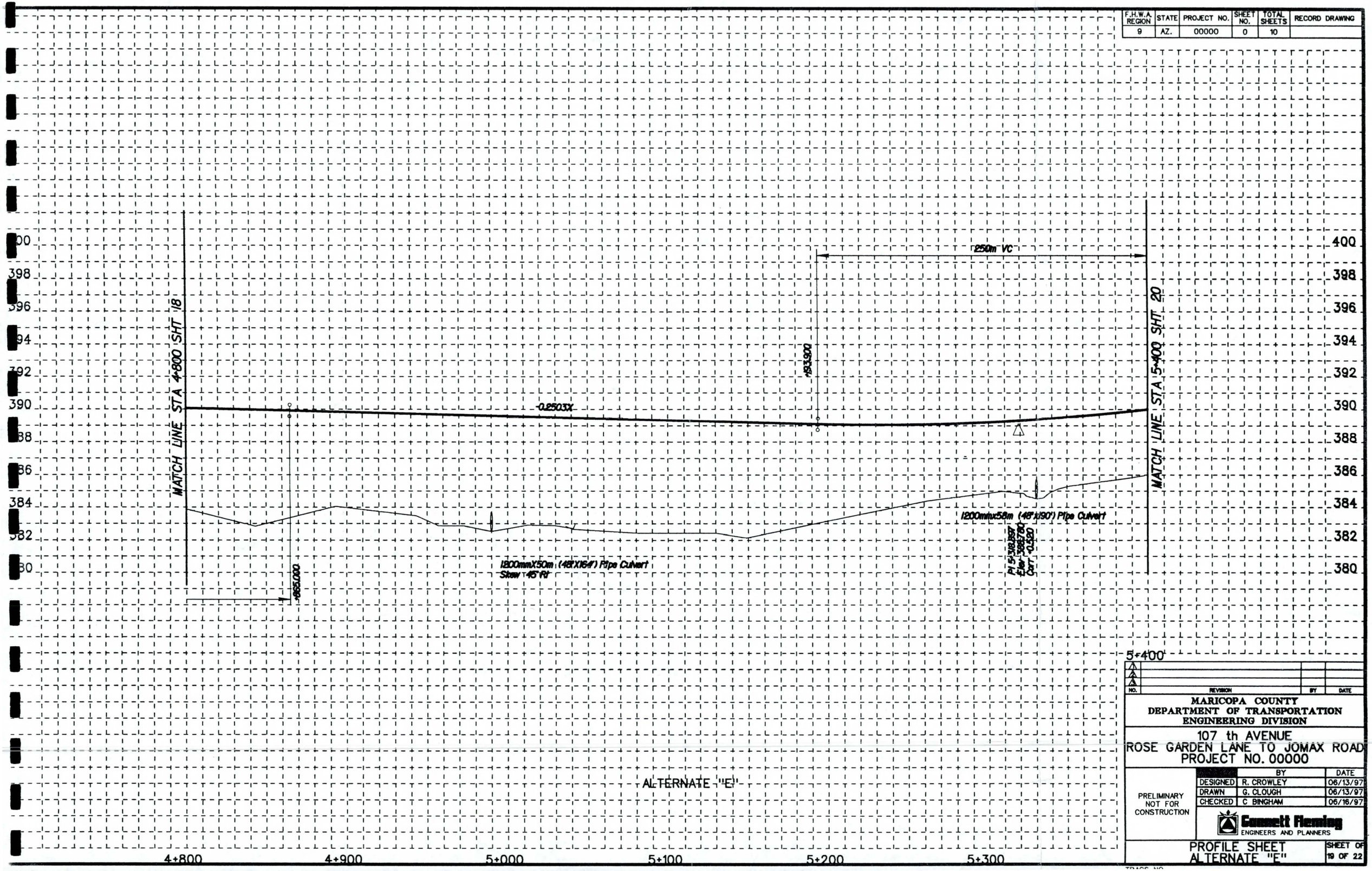
Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "E"

SHEET OF
18 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE "E"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

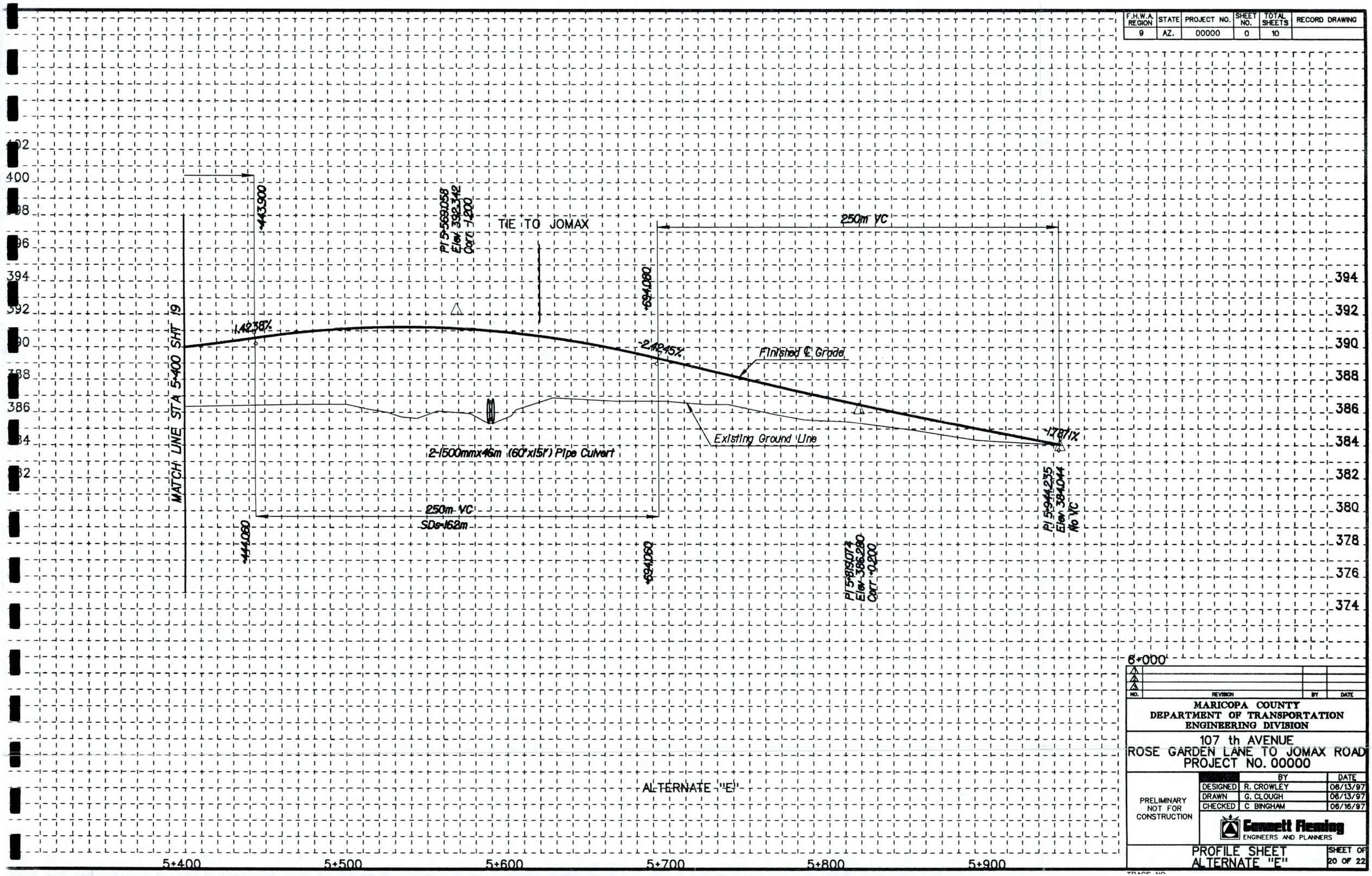
Connell Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "E"

SHEET OF
19 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



ALTERNATE "E"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

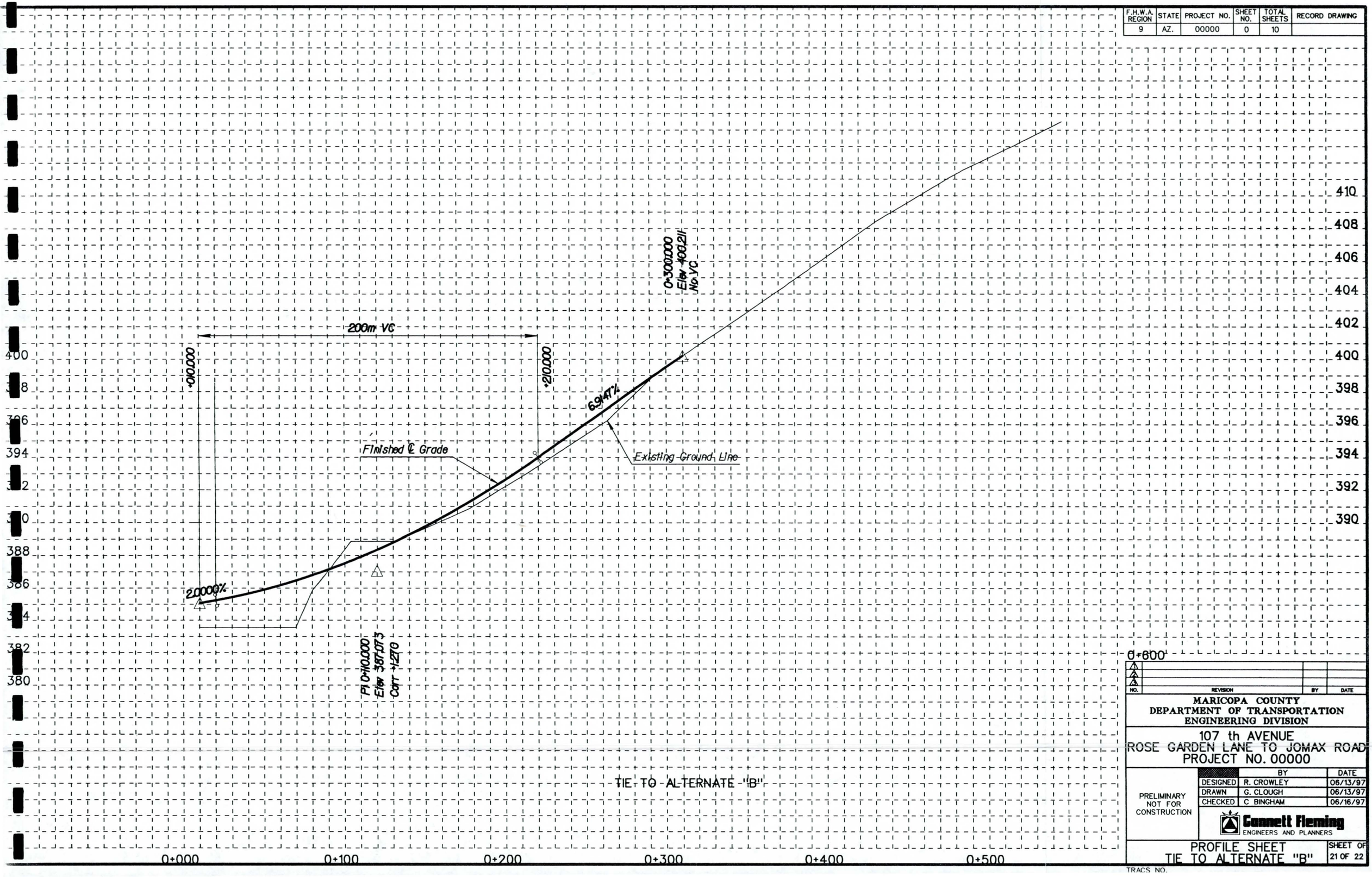
Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
ALTERNATE "E"

SHEET OF
20 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/16/97

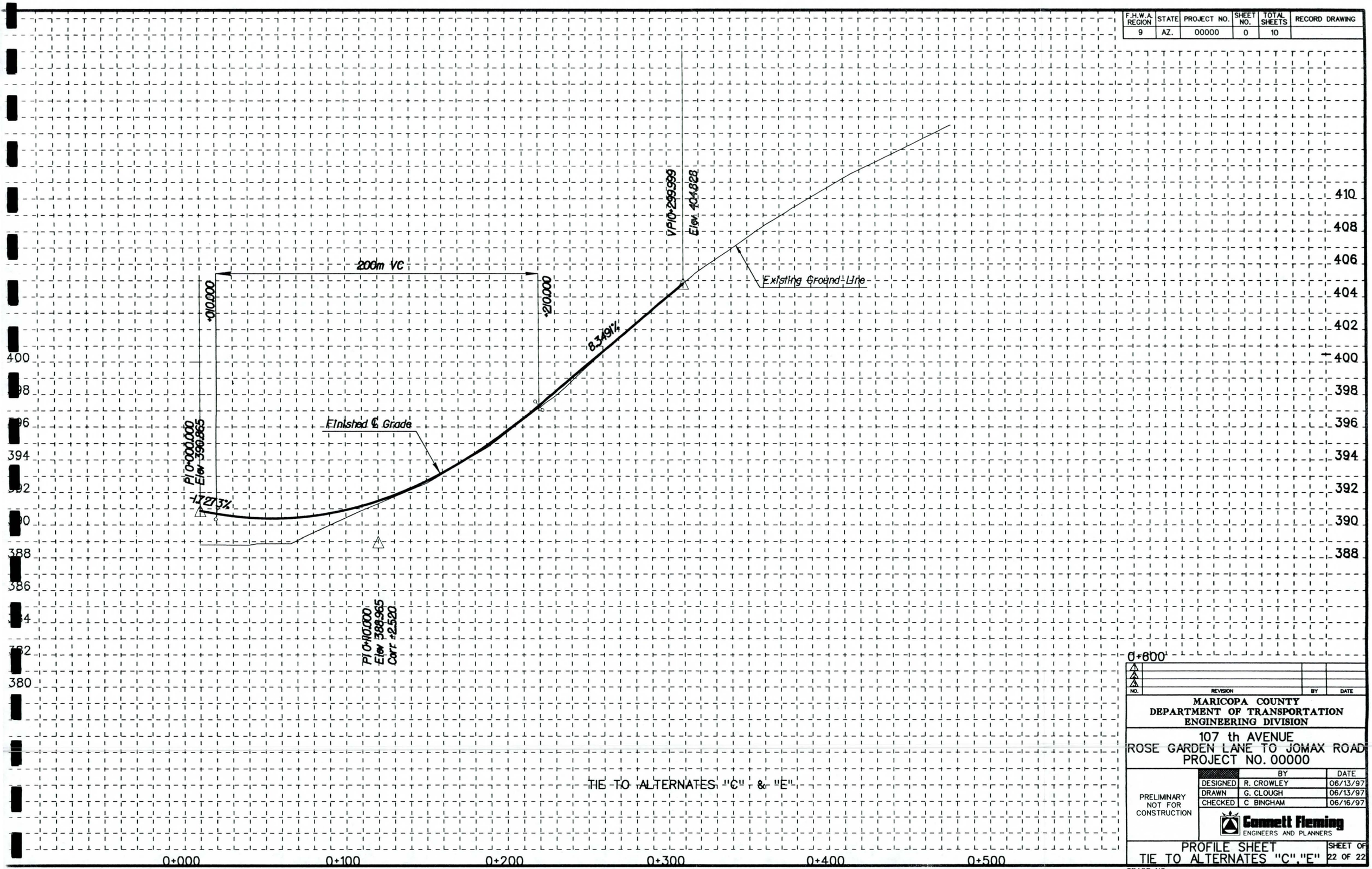
Connell Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
TIE TO ALTERNATE "B"

SHEET OF
21 OF 22

TRACS NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ.	00000	0	10	



TIE TO ALTERNATES "C" & "E"

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C BINGHAM	06/16/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

PROFILE SHEET
TIE TO ALTERNATES "C","E"

SHEET OF
22 OF 22

TRACS NO.

APPENDIX D

Right-of-Way Ownership & Takes

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

RIGHT-OF-WAY SUMMARY								
	A		B		C		E	
	Hectares	Acres	Hectares	Acres	Hectares	Acres	Hectares	Acres
Required Right-of-Way	19.246	47.56	18.586	45.93	19.405	47.95	19.082	47.15
Dedicated Right-of-Way	8.079	19.96	6.917	17.09	6.930	17.13	6.937	17.14
Right-of-Way Take	11.167	27.60	11.669	28.84	12.475	30.83	12.145	30.01
Required Slope Easement	0.000	0.00	1.158	2.86	10.604	26.20	3.206	7.92
Dedicated Slope Easement	0.000	0.00	0.061	0.15	0.017	0.04	0.087	0.21
Slope Easement Take	0.000	0.00	1.097	2.71	10.587	26.16	3.120	7.71
Required Drainage Easement	0.000	0.00	4.015	9.92	0.000	0.00	0.000	0.00
Dedicated Drainage Easement	0.000	0.00	-0.085	-0.21	0.000	0.00	0.000	0.00
Drainage Easement Take	0.000	0.00	4.100	10.13	0.000	0.00	0.000	0.00
TOTAL TAKE	**11.167**	**27.60**	**16.866**	**41.68**	**23.062**	**56.99**	**15.265**	**37.72**
Take @ $61,775/ha ($25,000/ac)	7.009	17.32	12.592	31.11	0.000	0.00	10.708	26.46
Take @ $98,850/ha ($40,000/ac)	4.159	10.28	4.275	10.56	23.062	56.99	4.557	11.26
Cost @ $61,775/ha ($25,000/ac)	$433,000	$433,000	$777,900	$777,900	$0	$0	$661,500	$661,500
Cost @ $98,850/ha ($40,000/ac)	$411,100	$411,000	$422,500	$422,500	$2,279,700	$2,279,400	$450,400	$450,400
TOTAL R/W COST	**$844,100**	**$844,000**	**$1,200,400**	**$1,200,400**	**$2,279,700**	**$2,279,400**	**$1,111,900**	**$1,111,900**

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

PROJECT STATION BY ALTERNATE					
LOCATION	A	B	C	E	
Rose Garden Lane	0 + 103.862	0 + 103.862	0 + 103.862	0 + 103.862	
Deer Valley Road	0 + 913.571	0 + 913.571	0 + 913.571	0 + 913.571	
Williams Road	1 + 731.101	1 + 731.101	1 + 731.101	1 + 731.101	
Pinnacle Peak	2 + 533.529	2 + 533.529	2 + 533.529	2 + 533.529	
Jomax Road	5 + 995.000	5 + 529.330	5 + 707.046	5 + 610.672	
End Project	5 + 995.000	5 + 798.164	6 + 042.527	5 + 946.110	
TOTAL	5891.138	5694.302	5938.665	5842.248	

PROJECT LENGTH (METER)					
FROM	TO	A	B	C	E
Rose Garden Lane	Deer Valley Road	809.709	809.709	809.709	809.709
Deer Valley Road	Williams Road	817.530	817.530	817.530	817.530
Williams Road	Pinnacle Peak	802.428	802.428	802.428	802.428
Pinnacle Peak	Jomax Road	3461.471	2995.801	3173.517	3077.143
Jomax Road	End Project	0.000	268.834	335.481	335.438
	TOTAL	5891.138	5694.302	5938.665	5842.248

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

REQUIRED R/W WIDTH (Meter) - ALTERNATIVE "A"					
FROM	TO	R/W	S.E	D.E.	TOTAL
0 + 103.862	0 + 913.571	26.822	0.000	0.000	26.822
0 + 913.571	1 + 731.101	33.528	0.000	0.000	33.528
1 + 731.101	2 + 330.999	33.528	0.000	0.000	33.528
2 + 330.999	2 + 372.595	33.528	0.000	0.000	33.528
2 + 372.595	2 + 533.529	33.528	0.000	0.000	33.528
2 + 533.529	2 + 550.029	33.528	0.000	0.000	33.528
2 + 550.029	2 + 680.000	33.528	0.000	0.000	33.528
2 + 680.000	2 + 735.570	40.234	0.000	0.000	40.234
2 + 735.570	3 + 550.000	33.528	0.000	0.000	33.528
3 + 550.000	5 + 995.000	33.528	0.000	0.000	33.528
5 + 995.000	5 + 995.000	33.528	0.000	0.000	33.528

REQUIRED R/W AREA (Ha=10 000 m^2) - ALTERNATIVE "A"					
FROM	TO	Length	R/W	S.E.	D.E
0 + 103.862	0 + 913.571	809.709	2.172	0.000	0.000
0 + 913.571	1 + 731.101	817.530	2.741	0.000	0.000
1 + 731.101	2 + 330.999	599.898	2.011	0.000	0.000
2 + 330.999	2 + 372.595	41.596	0.139	0.000	0.000
2 + 372.595	2 + 533.529	160.934	0.540	0.000	0.000
2 + 533.529	2 + 550.029	16.500	0.055	0.000	0.000
2 + 550.029	2 + 680.000	129.971	0.436	0.000	0.000
2 + 680.000	2 + 735.570	55.570	0.224	0.000	0.000
2 + 735.570	3 + 550.000	814.430	2.731	0.000	0.000
3 + 550.000	5 + 995.000	2445.000	8.198	0.000	0.000
5 + 995.000	5 + 995.000	0.000	0.000	0.000	0.000
	TOTAL	5891.138	19.246	0.000	0.000

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

REQUIRED R/W WIDTH (Meter) - ALTERNATIVE "B"					
FROM	TO	R/W	S.E	D.E.	TOTAL
0 + 103.862	0 + 913.571	26.822	0.000	0.000	26.822
0 + 913.571	1 + 731.101	33.528	0.000	0.000	33.528
1 + 731.101	2 + 330.999	33.528	0.000	0.000	33.528
2 + 330.999	2 + 372.595	33.528	0.000	0.000	33.528
2 + 372.595	2 + 533.529	33.528	0.000	0.000	33.528
2 + 533.529	2 + 550.029	33.528	0.000	0.000	33.528
2 + 550.029	2 + 680.000	33.528	0.000	0.000	33.528
2 + 680.000	2 + 735.570	40.234	0.000	0.000	40.234
2 + 735.570	3 + 550.000	33.528	0.000	0.000	33.528
3 + 550.000	3 + 740.000	33.528	12.192	0.000	45.720
3 + 740.000	4 + 200.000	33.528	12.192	0.000	45.720
4 + 200.000	4 + 800.000	33.528	6.096	30.480	70.104
4 + 800.000	5 + 517.138	33.528	0.000	30.480	64.008
5 + 517.138	5 + 798.164	33.528	0.000	0.000	33.528

REQUIRED R/W AREA (Ha=10 000 m^2) - ALTERNATIVE "B"					
FROM	TO	Length	R/W	S.E.	D.E
0 + 103.862	0 + 913.571	809.709	2.172	0.000	0.000
0 + 913.571	1 + 731.101	817.530	2.741	0.000	0.000
1 + 731.101	2 + 330.999	599.898	2.011	0.000	0.000
2 + 330.999	2 + 372.595	41.596	0.139	0.000	0.000
2 + 372.595	2 + 533.529	160.934	0.540	0.000	0.000
2 + 533.529	2 + 550.029	16.500	0.055	0.000	0.000
2 + 550.029	2 + 680.000	129.971	0.436	0.000	0.000
2 + 680.000	2 + 735.570	55.570	0.224	0.000	0.000
2 + 735.570	3 + 550.000	814.430	2.731	0.000	0.000
3 + 550.000	3 + 740.000	190.000	0.637	0.232	0.000
3 + 740.000	4 + 200.000	460.000	1.542	0.561	0.000
4 + 200.000	4 + 800.000	600.000	2.012	0.366	1.829
4 + 800.000	5 + 517.138	717.138	2.404	0.000	2.186
5 + 517.138	5 + 798.164	281.026	0.942	0.000	0.000
	TOTAL	5694.302	18.586	1.158	4.015

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

REQUIRED R/W WIDTH (Meter) - ALTERNATIVE "C"					
FROM	TO	R/W	S.E	D.E.	TOTAL
0 + 103.862	0 + 913.571	26.822	0.000	0.000	26.822
0 + 913.571	1 + 731.101	33.528	0.000	0.000	33.528
1 + 731.101	2 + 330.999	33.528	0.000	0.000	33.528
2 + 330.999	2 + 372.595	33.528	0.000	0.000	33.528
2 + 372.595	2 + 533.529	33.528	0.000	0.000	33.528
2 + 533.529	2 + 550.029	33.528	0.000	0.000	33.528
2 + 550.029	2 + 680.000	33.528	0.000	0.000	33.528
2 + 680.000	2 + 735.570	40.234	0.000	0.000	40.234
2 + 735.570	3 + 550.000	33.528	0.000	0.000	33.528
3 + 550.000	3 + 650.000	33.528	12.192	0.000	45.720
3 + 650.000	3 + 760.000	33.528	12.192	0.000	45.720
3 + 760.000	4 + 180.000	33.528	57.912	0.000	91.440
4 + 180.000	4 + 300.000	33.528	18.288	0.000	51.816
4 + 300.000	5 + 020.000	33.528	79.248	0.000	112.776
5 + 020.000	5 + 160.000	33.528	53.340	0.000	86.868
5 + 160.000	5 + 400.000	33.528	36.576	0.000	70.104
5 + 400.000	5 + 600.000	33.528	18.288	0.000	51.816
5 + 600.000	5 + 707.046	33.528	0.000	0.000	33.528
5 + 707.046	6 + 042.527	33.528	0.000	0.000	33.528

REQUIRED R/W AREA (Ha=10 000 m^2) - ALTERNATIVE "C"					
FROM	TO	Length	R/W	S.E.	D.E
0 + 103.862	0 + 913.571	809.709	2.172	0.000	0.000
0 + 913.571	1 + 731.101	817.530	2.741	0.000	0.000
1 + 731.101	2 + 330.999	599.898	2.011	0.000	0.000
2 + 330.999	2 + 372.595	41.596	0.139	0.000	0.000
2 + 372.595	2 + 533.529	160.934	0.540	0.000	0.000
2 + 533.529	2 + 550.029	16.500	0.055	0.000	0.000
2 + 550.029	2 + 680.000	129.971	0.436	0.000	0.000
2 + 680.000	2 + 735.570	55.570	0.224	0.000	0.000
2 + 735.570	3 + 550.000	814.430	2.731	0.000	0.000
3 + 550.000	3 + 650.000	100.000	0.335	0.122	0.000
3 + 650.000	3 + 760.000	110.000	0.369	0.134	0.000
3 + 760.000	4 + 180.000	420.000	1.408	2.432	0.000
4 + 180.000	4 + 300.000	120.000	0.402	0.219	0.000
4 + 300.000	5 + 020.000	720.000	2.414	5.706	0.000
5 + 020.000	5 + 160.000	140.000	0.469	0.747	0.000
5 + 160.000	5 + 400.000	240.000	0.805	0.878	0.000
5 + 400.000	5 + 600.000	200.000	0.671	0.366	0.000
5 + 600.000	5 + 707.046	107.046	0.359	0.000	0.000
5 + 707.046	6 + 042.527	335.481	1.125	0.000	0.000
	TOTAL	5938.665	19.405	10.604	0.000

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

REQUIRED R/W WIDTH (Meter) - ALTERNATIVE "E"					
FROM	TO	R/W	S.E	D.E.	TOTAL
0 + 103.862	0 + 913.571	26.822	0.000	0.000	26.822
0 + 913.571	1 + 731.101	33.528	0.000	0.000	33.528
1 + 731.101	2 + 330.999	33.528	0.000	0.000	33.528
2 + 330.999	2 + 372.595	33.528	0.000	0.000	33.528
2 + 372.595	2 + 533.529	33.528	0.000	0.000	33.528
2 + 533.529	2 + 550.029	33.528	0.000	0.000	33.528
2 + 550.029	2 + 680.000	33.528	0.000	0.000	33.528
2 + 680.000	2 + 735.570	40.234	0.000	0.000	40.234
2 + 735.570	3 + 550.000	33.528	0.000	0.000	33.528
3 + 550.000	3 + 660.000	33.528	12.192	0.000	45.720
3 + 660.000	4 + 380.000	33.528	12.192	0.000	45.720
4 + 380.000	4 + 730.000	33.528	0.000	0.000	33.528
4 + 730.000	5 + 160.000	33.528	36.576	0.000	70.104
5 + 160.000	5 + 500.000	33.528	18.288	0.000	51.816
5 + 500.000	5 + 610.672	33.528	0.000	0.000	33.528
5 + 610.672	5 + 946.110	33.528	0.000	0.000	33.528
REQUIRED R/W AREA (Ha=10 000 m^2) - ALTERNATIVE "E"					
FROM	TO	Length	R/W	S.E.	D.E
0 + 103.862	0 + 913.571	809.709	2.172	0.000	0.000
0 + 913.571	1 + 731.101	817.530	2.741	0.000	0.000
1 + 731.101	2 + 330.999	599.898	2.011	0.000	0.000
2 + 330.999	2 + 372.595	41.596	0.139	0.000	0.000
2 + 372.595	2 + 533.529	160.934	0.540	0.000	0.000
2 + 533.529	2 + 550.029	16.500	0.055	0.000	0.000
2 + 550.029	2 + 680.000	129.971	0.436	0.000	0.000
2 + 680.000	2 + 735.570	55.570	0.224	0.000	0.000
2 + 735.570	3 + 550.000	814.430	2.731	0.000	0.000
3 + 550.000	3 + 660.000	110.000	0.369	0.134	0.000
3 + 660.000	4 + 380.000	720.000	2.414	0.878	0.000
4 + 380.000	4 + 730.000	350.000	1.173	0.000	0.000
4 + 730.000	5 + 160.000	430.000	1.442	1.573	0.000
5 + 160.000	5 + 500.000	340.000	1.140	0.622	0.000
5 + 500.000	5 + 610.672	110.672	0.371	0.000	0.000
5 + 610.672	5 + 946.110	335.438	1.125	0.000	0.000
	TOTAL	5842.248	19.082	3.206	0.000

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "A" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0001	3C	200-12-3C	RISING STAR VI LLC	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0002	10	200-12-10	WILDFLOWER POINT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0003	2F	200-11-2F	OAK BAY INVESTMENTS L.T.D. PARTNERSHIP	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0004	2C	200-11-2C	CITY OF PEORIA	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0005			ARIZONA STATE LAND DEPARTMENT	6 704.352	72,165.04	0.000	0.00	0.000	0.00	0.000	0.00	No
0006	5L	200-11-5L	GOLDSMITH, KATHLEEN A.	3 377.382	36,353.84	0.000	0.00	0.000	0.00	0.000	0.00	No
0007	5P	200-11-5P	FIELDS JAMES L. & EDITH J. ETAL	2 152.601	23,170.40	0.000	0.00	0.000	0.00	0.000	0.00	No
0008	5Q	200-11-5Q	BCW INC.	1 055.006	11,355.99	0.000	0.00	0.000	0.00	0.000	0.00	No
0009	5G	200-11-5G	SRPAI & PD	162.854	1,752.95	0.000	0.00	0.000	0.00	0.000	0.00	No
0010	18B	201-22-18B	SRPAI & PD	2 448.859	26,359.30	0.000	0.00	0.000	0.00	0.000	0.00	No
0011	18C	201-22-18C	HARDY GORDON L & DONNA CO. & TR	5 913.708	63,654.62	0.000	0.00	0.000	0.00	0.000	0.00	No
0012	16B	201-22-16B	BCW INC.	4 767.985	51,322.16	0.000	0.00	0.000	0.00	0.000	0.00	No
0013	15B	201-22-15B	BCW INC.	4 521.193	48,665.72	0.000	0.00	0.000	0.00	0.000	0.00	No
0014	9	201-22-9	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	4 599.252	49,505.94	0.000	0.00	0.000	0.00	0.000	0.00	No
0015	8A	201-22-8A	BCW INC.	7 307.323	78,655.37	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0016	5A	201-22-5A	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0017	1P	201-22-1P	MILLER EDMUND / MARY A TR	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0018	1N	201-22-1N	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0019	1M	201-22-1M	MANCILLAS MARY E / RHONDA / CHARLES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0020	3	201-17-3	ARIZONA TITLE GUAR & TR CO TR	48 380.904	520,767.72	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0021	1	201-08-1	FIRST AMERICAN TITLE TR	14 398.463	154,983.77	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0022	70	201-08-70	SRPAI & PD	1 155.949	12,442.53	0.000	0.00	0.000	0.00	0.000	0.00	No

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "A" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0023	11	201-08-11	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0024	15	201-08-15	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0025	19C	201-08-19C	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0026	19B	201-08-19B	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0027	20B	201-08-20B	SRPAI & PD	1 119.997	12,055.55	0.000	0.00	0.000	0.00	0.000	0.00	No
0028	20A	201-08-20A	BODNER EIZABETH W & BRUCE A & DONALD R	406.168	4,371.96	0.000	0.00	0.000	0.00	0.000	0.00	No
0029	1M	200-10-1M	KAPRINYAK JULIUS / SZERENA K TR	82.126	884.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0030	1K	200-10-1K	KAPRINYAK JULIUS / SZERENA K TR	3 119.662	33,579.76	0.000	0.00	0.000	0.00	0.000	0.00	No
0031	6 & 7	200-10-6 & 7	ALTA VISTA ESTATES UNIT 4	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0032	5	200-10-5	ALTA VISTA ESTATES UNIT 3	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0033	3 & 4	200-10-3 & 4	ALTA VISTA ESTATES UNIT 2	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0034	2	200-10-2	ALTA VISTA ESTATES UNIT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0035	2D	200-14-2D	ARIZONA STATE LAND DEPARTMENT	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0036	930	200-14-930	EL PASO NATURAL GAS CO.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
			TOTAL TAKE m^2 (sq.ft.)	111 673.784	1,202,046.61	0.000	0.00	0.000	0.00	0.000	0.00	
			TOTAL TAKE Hectares (acres)	11.167	27.60	0.000	0.00	0.000	0.00	0.000	0.00	
			Flood Plain Take ($25,000/ac)	7.009	17.32	0.000	0.00	0.000	0.00	0.000	0.00	
			Net R/W Take ($40,000/ac)	4.159	10.28	0.000	0.00	0.000	0.00	0.000	0.00	

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "B" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0001	3C	200-12-3C	RISING STAR VI LLC	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0002	10	200-12-10	WILDFLOWER POINT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0003	2F	200-11-2F	OAK BAY INVESTMENTS L.T.D. PARTNERSHIP	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0004	2C	200-11-2C	CITY OF PEORIA	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0005			ARIZONA STATE LAND DEPARTMENT	6 704.352	72,165.04	0.000	0.00	0.000	0.00	0.000	0.00	No
0006	5L	200-11-5L	GOLDSMITH, KATHLEEN A.	3 377.382	36,353.84	0.000	0.00	0.000	0.00	0.000	0.00	No
0007	5P	200-11-5P	FIELDS JAMES L. & EDITH J. ETAL	2 152.601	23,170.40	0.000	0.00	0.000	0.00	0.000	0.00	No
0008	5Q	200-11-5Q	BCW INC.	1 055.006	11,355.99	0.000	0.00	0.000	0.00	0.000	0.00	No
0009	5G	200-11-5G	SRPAI & PD	162.854	1,752.95	0.000	0.00	0.000	0.00	0.000	0.00	No
0010	18B	201-22-18B	SRPAI & PD	2 448.859	26,359.30	0.000	0.00	0.000	0.00	0.000	0.00	No
0011	18C	201-22-18C	HARDY GORDON L & DONNA CO. & TR	5 913.708	63,654.62	0.000	0.00	0.000	0.00	0.000	0.00	No
0012	16B	201-22-16B	BCW INC.	4 767.985	51,322.16	0.000	0.00	0.000	0.00	0.000	0.00	No
0013	15B	201-22-15B	BCW INC.	4 521.193	48,665.72	0.000	0.00	0.000	0.00	0.000	0.00	No
0014	9	201-22-9	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	4 599.252	49,505.94	0.000	0.00	0.000	0.00	0.000	0.00	No
0015	8A	201-22-8A	BCW INC.	7 307.323	78,655.37	0.000	0.00	0.000	0.00	1 000.812	10,772.65	Yes
0016	5A	201-22-5A	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0017	1P	201-22-1P	MILLER EDMUND / MARY A TR	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0018	1N	201-22-1N	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0019	1M	201-22-1M	MANCILLAS MARY E / RHONDA / CHARLES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0020	3	201-17-3	ARIZONA TITLE GUAR & TR CO TR	53 399.537	574,787.83	0.000	0.00	40 999.592	441,315.94	3 962.906	42,656.37	Yes
0021	1	201-08-1	FIRST AMERICAN TITLE TR	14 398.463	154,983.77	0.000	0.00	0.000	0.00	4 848.232	52,185.93	Yes
0022	70	201-08-70	SRPAI & PD	1 155.949	12,442.53	0.000	0.00	0.000	0.00	1 159.300	12,478.60	No

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "B" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0023	11	201-08-11	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0024	15	201-08-15	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0025	19C	201-08-19C	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0026	19B	201-08-19B	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0027	20B	201-08-20B	SRPAI & PD	1 119.997	12,055.55	0.000	0.00	0.000	0.00	0.000	0.00	No
0028	20A	201-08-20A	BODNER EIZABETH W & BRUCE A & DONALD R	406.168	4,371.96	0.000	0.00	0.000	0.00	0.000	0.00	No
0029	1M	200-10-1M	KAPRINYAK JULIUS / SZERENA K TR	82.126	884.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0030	1K	200-10-1K	KAPRINYAK JULIUS / SZERENA K TR	3 119.662	33,579.76	0.000	0.00	0.000	0.00	0.000	0.00	No
0031	6 & 7	200-10-6 & 7	ALTA VISTA ESTATES UNIT 4	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0032	5	200-10-5	ALTA VISTA ESTATES UNIT 3	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0033	3 & 4	200-10-3 & 4	ALTA VISTA ESTATES UNIT 2	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0034	2	200-10-2	ALTA VISTA ESTATES UNIT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0035	2D	200-14-2D	ARIZONA STATE LAND DEPARTMENT	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0036	930	200-14-930	EL PASO NATURAL GAS CO.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
			TOTAL TAKE m^2 (sq.ft.)	116 692.417	1,256,066.72	0.000	0.00	40 999.592	441,315.94	10 971.250	118,093.55	
			TOTAL TAKE Hectares (acres)	11.669	28.84	0.000	0.00	4.100	10.13	1.097	2.71	
			Flood Plain Take ($25,000/ac)	7.511	18.56	0.000	0.00	4.100	10.13	0.981	2.42	
			Net R/W Take ($40,000/ac)	4.159	10.28	0.000	0.00	0.000	0.00	0.116	0.29	

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "C" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0001	3C	200-12-3C	RISING STAR VI LLC	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0002	10	200-12-10	WILDFLOWER POINT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0003	2F	200-11-2F	OAK BAY INVESTMENTS L.T.D. PARTNERSHIP	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0004	2C	200-11-2C	CITY OF PEORIA	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0005			ARIZONA STATE LAND DEPARTMENT	6 704.352	72,165.04	0.000	0.00	0.000	0.00	0.000	0.00	No
0006	5L	200-11-5L	GOLDSMITH, KATHLEEN A.	3 377.382	36,353.84	0.000	0.00	0.000	0.00	0.000	0.00	No
0007	5P	200-11-5P	FIELDS JAMES L. & EDITH J. ETAL	2 152.601	23,170.40	0.000	0.00	0.000	0.00	0.000	0.00	No
0008	5Q	200-11-5Q	BCW INC.	1 055.006	11,355.99	0.000	0.00	0.000	0.00	0.000	0.00	No
0009	5G	200-11-5G	SRPAI & PD	162.854	1,752.95	0.000	0.00	0.000	0.00	0.000	0.00	No
0010	18B	201-22-18B	SRPAI & PD	2 448.859	26,359.30	0.000	0.00	0.000	0.00	0.000	0.00	No
0011	18C	201-22-18C	HARDY GORDON L & DONNA CO. & TR	5 913.708	63,654.62	0.000	0.00	0.000	0.00	0.000	0.00	No
0012	16B	201-22-16B	BCW INC.	4 767.985	51,322.16	0.000	0.00	0.000	0.00	0.000	0.00	No
0013	15B	201-22-15B	BCW INC.	4 521.193	48,665.72	0.000	0.00	0.000	0.00	0.000	0.00	No
0014	9	201-22-9	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	4 599.252	49,505.94	0.000	0.00	0.000	0.00	0.000	0.00	No
0015	8A	201-22-8A	BCW INC.	5 535.281	59,581.27	0.000	0.00	0.000	0.00	731.184	7,870.40	No
0016	5A	201-22-5A	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0017	1P	201-22-1P	MILLER EDMUND / MARY A TR	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0018	1N	201-22-1N	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0019	1M	201-22-1M	MANCILLAS MARY E / RHONDA / CHARLES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0020	3	201-17-3	ARIZONA TITLE GUAR & TR CO TR	55 451.306	596,872.89	0.000	0.00	0.000	0.00	75 256.532	810,054.57	No
0021	1	201-08-1	FIRST AMERICAN TITLE TR	16 462.783	177,203.92	0.000	0.00	0.000	0.00	25 028.484	269,404.36	No
0022	70	201-08-70	SRPAI & PD	4 188.364	45,083.17	0.000	0.00	0.000	0.00	1 643.696	17,692.60	No

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "C" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0023	11	201-08-11	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0024	15	201-08-15	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0025	19C	201-08-19C	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0026	19B	201-08-19B	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0027	20B	201-08-20B	SRPAI & PD	1 119.997	12,055.55	0.000	0.00	0.000	0.00	0.000	0.00	No
0028	20A	201-08-20A	BODNER EIZABETH W & BRUCE A & DONALD R	406.168	4,371.96	0.000	0.00	0.000	0.00	0.000	0.00	No
0029	1M	200-10-1M	KAPRINYAK JULIUS / SZERENA K TR	82.126	884.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0030	1K	200-10-1K	KAPRINYAK JULIUS / SZERENA K TR	3 119.662	33,579.76	0.000	0.00	0.000	0.00	0.000	0.00	No
0031	6 & 7	200-10-6 & 7	ALTA VISTA ESTATES UNIT 4	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0032	5	200-10-5	ALTA VISTA ESTATES UNIT 3	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0033	3 & 4	200-10-3 & 4	ALTA VISTA ESTATES UNIT 2	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0034	2	200-10-2	ALTA VISTA ESTATES UNIT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0035	2D	200-14-2D	ARIZONA STATE LAND DEPARTMENT	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0036	930	200-14-930	EL PASO NATURAL GAS CO.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0037	2L	201-08-2L	SILCOK ARVIL L & BETTY JEAN	2 612.456	28,120.24	0.000	0.00	0.000	0.00	1 301.001	14,003.86	No
0038	2K	201-08-2K	YEATES CHERI J	69.811	751.44	0.000	0.00	0.000	0.00	1 906.176	20,517.91	No
			TOTAL TAKE m^2 (sq.ft.)	124 751.146	1,342,810.16	0.000	0.00	0.000	0.00	105 867.073	1,139,543.69	
			TOTAL TAKE Hectares (acres)	12.475	30.83	0.000	0.00	0.000	0.00	10.587	26.16	
			Flood Plain Take ($25,000/ac)	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	
			Net R/W Take ($40,000/ac)	12.475	30.83	0.000	0.00	0.000	0.00	10.587	26.16	

107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "E" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0001	3C	200-12-3C	RISING STAR VI LLC	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0002	10	200-12-10	WILDFLOWER POINT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0003	2F	200-11-2F	OAK BAY INVESTMENTS L.T.D. PARTNERSHIP	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0004	2C	200-11-2C	CITY OF PEORIA	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0005			ARIZONA STATE LAND DEPARTMENT	6 704.352	72,165.04	0.000	0.00	0.000	0.00	0.000	0.00	No
0006	5L	200-11-5L	GOLDSMITH, KATHLEEN A.	3 377.382	36,353.84	0.000	0.00	0.000	0.00	0.000	0.00	No
0007	5P	200-11-5P	FIELDS JAMES L. & EDITH J. ETAL	2 152.601	23,170.40	0.000	0.00	0.000	0.00	0.000	0.00	No
0008	5Q	200-11-5Q	BCW INC.	1 055.006	11,355.99	0.000	0.00	0.000	0.00	0.000	0.00	No
0009	5G	200-11-5G	SRPAI & PD	162.854	1,752.95	0.000	0.00	0.000	0.00	0.000	0.00	No
0010	18B	201-22-18B	SRPAI & PD	2 448.859	26,359.30	0.000	0.00	0.000	0.00	0.000	0.00	No
0011	18C	201-22-18C	HARDY GORDON L & DONNA CO. & TR	5 913.708	63,654.62	0.000	0.00	0.000	0.00	0.000	0.00	No
0012	16B	201-22-16B	BCW INC.	4 767.985	51,322.16	0.000	0.00	0.000	0.00	0.000	0.00	No
0013	15B	201-22-15B	BCW INC.	4 521.193	48,665.72	0.000	0.00	0.000	0.00	0.000	0.00	No
0014	9	201-22-9	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	4 599.252	49,505.94	0.000	0.00	0.000	0.00	0.000	0.00	No
0015	8A	201-22-8A	BCW INC.	5 429.754	58,445.39	0.000	0.00	0.000	0.00	842.323	9,066.69	Yes
0016	5A	201-22-5A	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0017	1P	201-22-1P	MILLER EDMUND / MARY A TR	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0018	1N	201-22-1N	ARIZONA STATE DIVISION OF EMERGENCY SERVICES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0019	1M	201-22-1M	MANCILLAS MARY E / RHONDA / CHARLES	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	Yes
0020	3	201-17-3	ARIZONA TITLE GUAR & TR CO TR	56 046.902	603,283.83	0.000	0.00	0.000	0.00	23 238.294	250,134.91	Yes
0021	1	201-08-1	FIRST AMERICAN TITLE TR	15 758.575	169,623.89	0.000	0.00	0.000	0.00	5 765.250	62,056.63	Yes
0022	70	201-08-70	SRPAI & PD	3 782.803	40,717.75	0.000	0.00	0.000	0.00	1 352.618	14,559.46	No

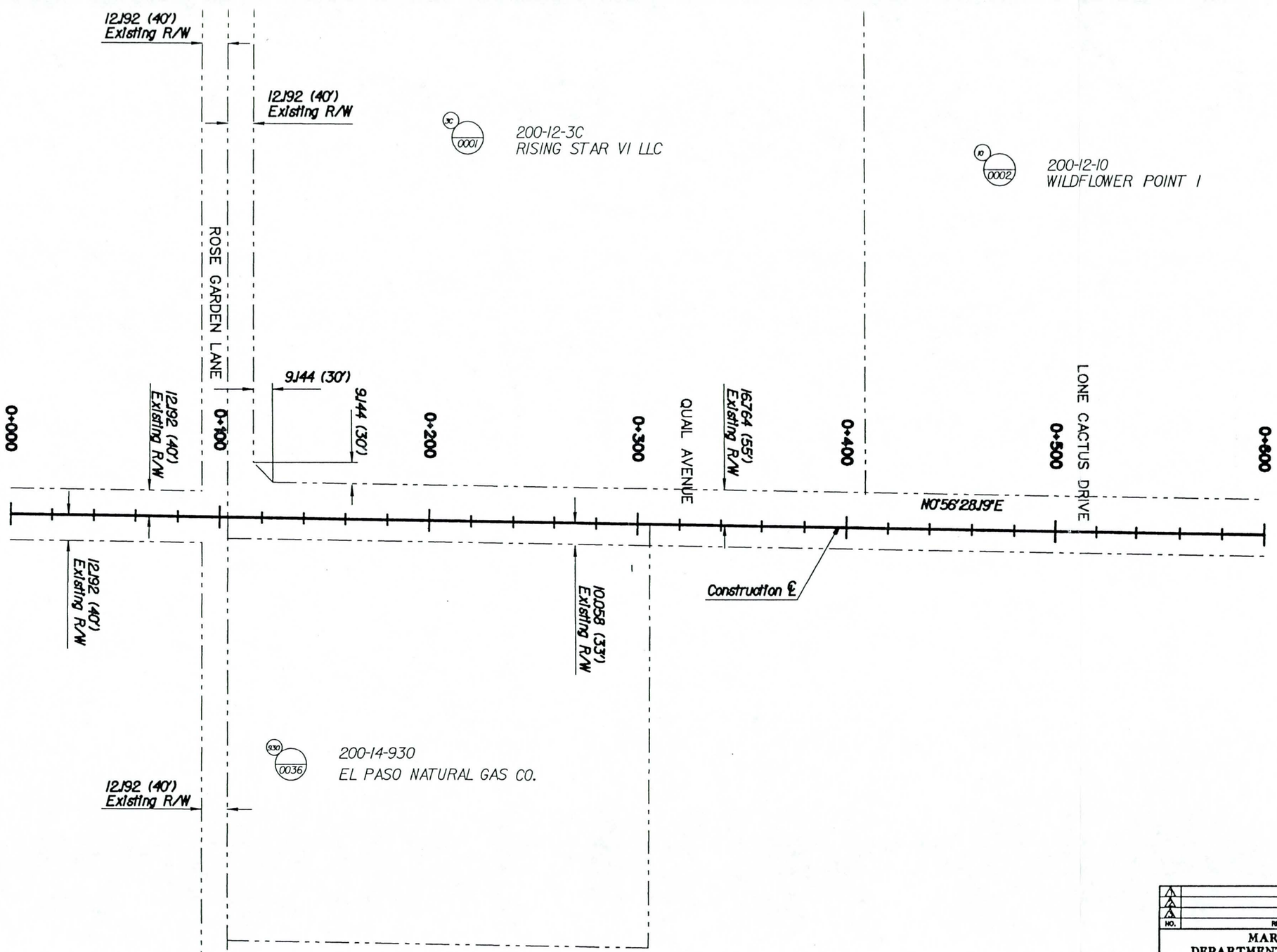
107th AVENUE
Rose Garden Lane to Jomax Road
Work Order 68932

ALTERNATIVE "E" RIGHT-OF-WAY TAKES

				Right-of-Way		T.C.E.		Drainage Easement		Slope Easement		Flood
Reference#		Parcel No.	Ownership	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	M^2	Ft^2	Plain
0023	11	201-08-11	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0024	15	201-08-15	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0025	19C	201-08-19C	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0026	19B	201-08-19B	SRPAI & PD	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0027	20B	201-08-20B	SRPAI & PD	1 119.997	12,055.55	0.000	0.00	0.000	0.00	0.000	0.00	No
0028	20A	201-08-20A	BODNER EIZABETH W & BRUCE A & DONALD R	406.168	4,371.96	0.000	0.00	0.000	0.00	0.000	0.00	No
0029	1M	200-10-1M	KAPRINYAK JULIUS / SZERENA K TR	82.126	884.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0030	1K	200-10-1K	KAPRINYAK JULIUS / SZERENA K TR	3 119.662	33,579.76	0.000	0.00	0.000	0.00	0.000	0.00	No
0031	6 & 7	200-10-6 & 7	ALTA VISTA ESTATES UNIT 4	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0032	5	200-10-5	ALTA VISTA ESTATES UNIT 3	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0033	3 & 4	200-10-3 & 4	ALTA VISTA ESTATES UNIT 2	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0034	2	200-10-2	ALTA VISTA ESTATES UNIT 1	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0035	2D	200-14-2D	ARIZONA STATE LAND DEPARTMENT	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
0036	930	200-14-930	EL PASO NATURAL GAS CO.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	No
			TOTAL TAKE m^2 (sq.ft.)	121 449.179	1,307,268.08	0.000	0.00	0.000	0.00	31 198.485	335,817.70	
			TOTAL TAKE Hectares (acres)	12.145	30.01	0.000	0.00	0.000	0.00	3.120	7.71	
			Flood Plain Take ($25,000/ac)	7.724	19.08	0.000	0.00	0.000	0.00	2.985	7.37	
			Net R/W Take ($40,000/ac)	4.421	10.93	0.000	0.00	0.000	0.00	0.135	0.33	

APPENDIX E

Right-of-Way Strip Map



NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALL ALTERNATES

SHEET OF
1 OF 10

TRACS NO.

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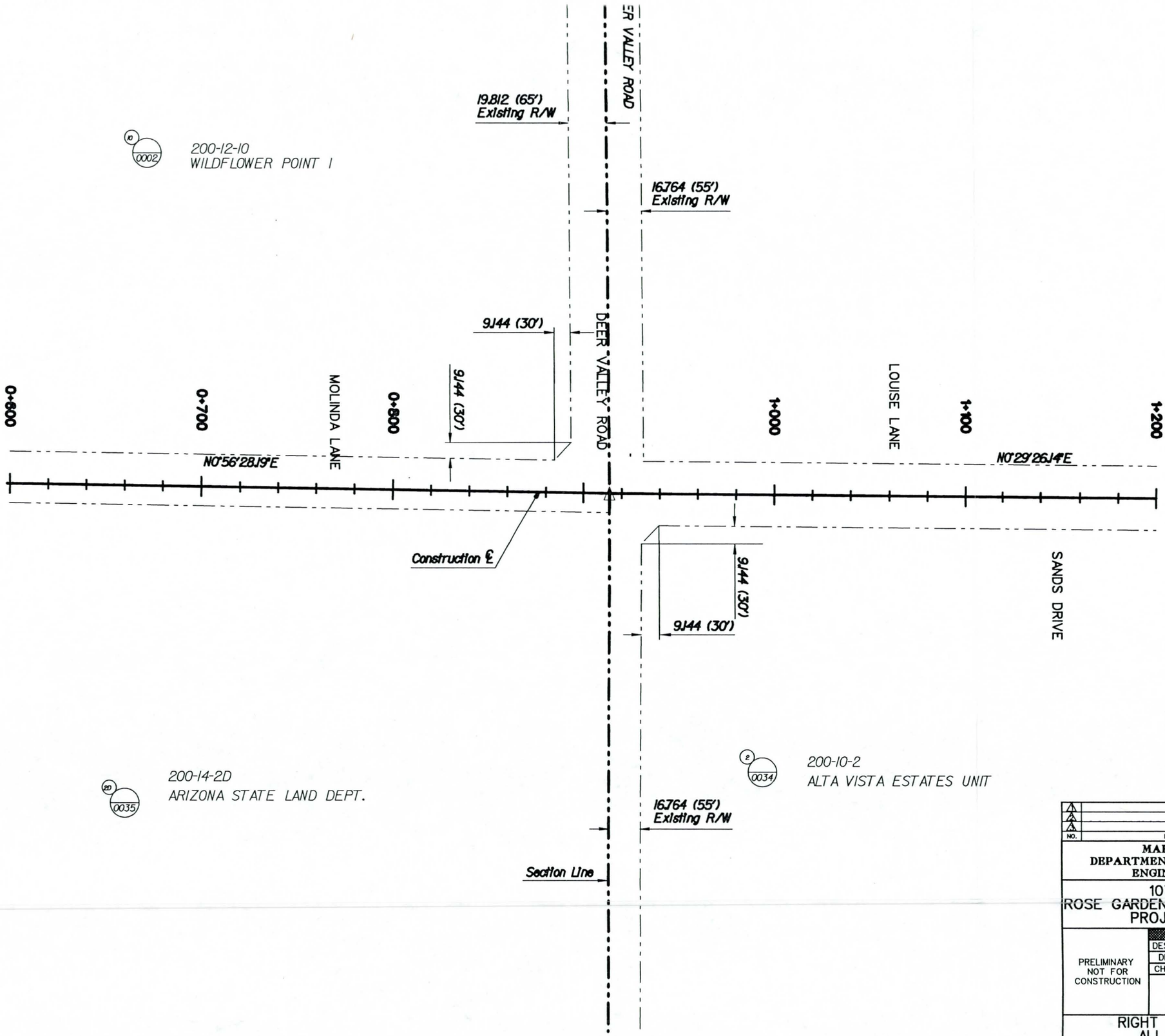
DATE: 27-Aug-97 14:13



NO.	REVISION	BY	DATE
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3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
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PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALL ALTERNATES

SHEET OF
2 OF 10

TRACS NO

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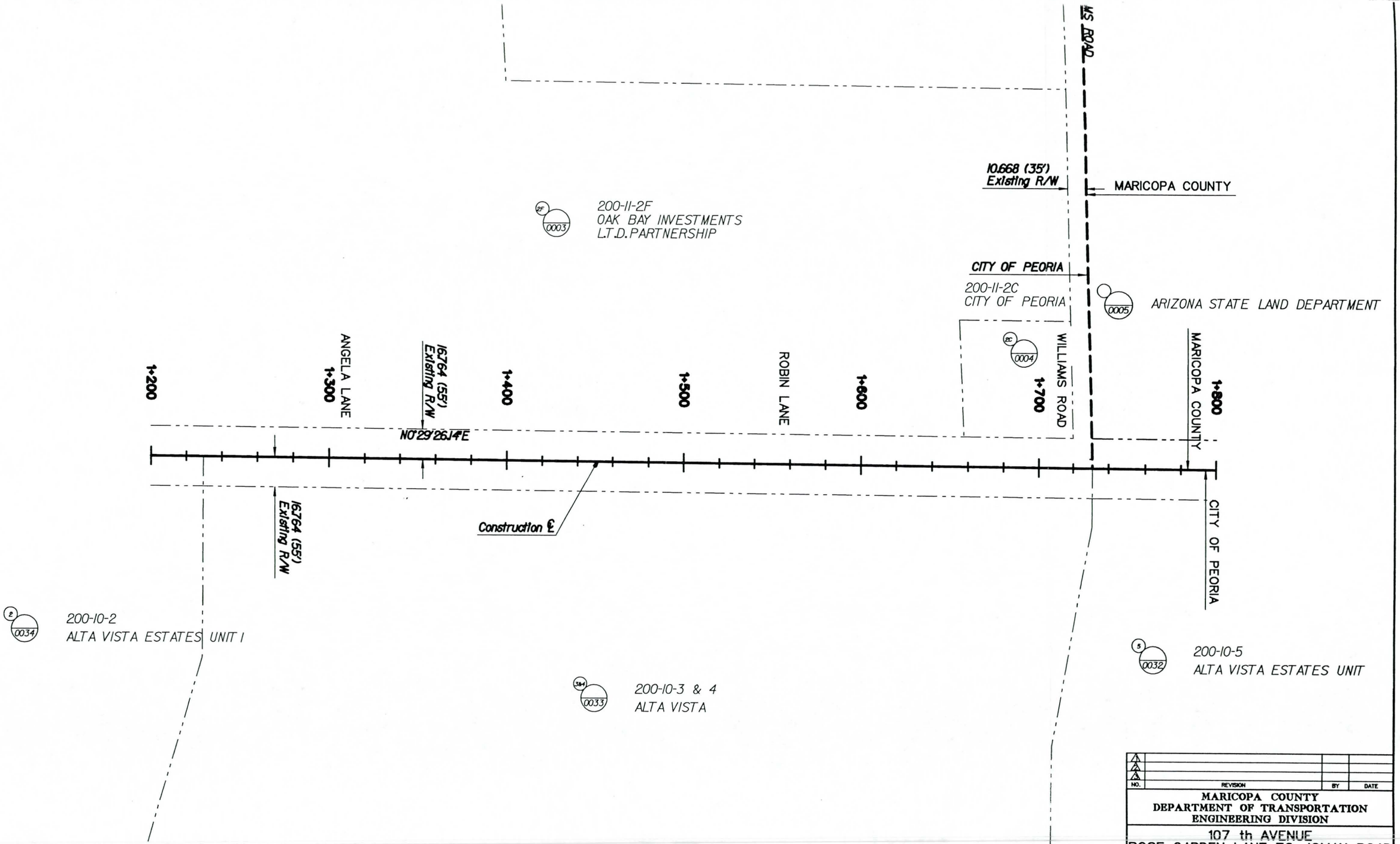

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
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PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALL ALTERNATES

SHEET OF
3 OF 10

FILE: d:\31510\31510r03.dgn
DATE: 27-Aug-97 14:14

0005 ARIZONA STATE LAND DEPARTMENT

200-11-5P
FIELDS JAMES L.&

5L 0006 200-11-5L
GOLDSMITH, KATHLEEN A.

1+800 | 1+900 | 16764 (55') New R/W | 2+000 | 2+100 | 2+200 | MARICOPA COUNTY | 2+300 | 16764 (55') New R/W | 5P 0007 | 2+400

N0°28'42.26"E

16764 (55') Existing R/W

DALEY LANE

Construction ℄

CITY OF PEORIA

VILLA CHULA

2+330.999

2+372.595

IK 0030 200-10-IK
KAPRINYAK JULIUS / SZERENA K TR

5 0032 200-10-5
ALTA VISTA ESTATES UNIT

6&7 0031 200-10-6 & 7
ALTA VISTA
ESTATES UNIT 4

NO.	REVISION	BY	DATE
1			
2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Connett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALL ALTERNATES

SHEET OF
4 OF 10

TRACS NO.

FILE: d:\31510\31510r04.dgn
DATE: 27-Aug-97 14:14

PINNACLE PEAK ROAD

200-11-5P
FIELDS JAMES L.& EDITH J.ETAL

200-11-5G
SRPAI & PD

200-11-5Q
BCW INC.

201-22-18B
SRPAI & PD

201-22-18C
HARDY GORDON L &

201-22-16B
BCW INC.

CURVE DATA

PI Sta= 2+756.541
Δ= 8° 38' 01"
R= 440.000
T= 33.213
L= 66.301
Ext= 1.252
Super= 0.071

2+400 | 2+500 | 2+600 | 2+680.000 | 2+700 | 2+800 | 2+900 | 3+000

23.470 (77') New R/W

N0°14'05.20"W

N5°11'15.66"W

N0°17'18.24"E

MARICOPA COUNTY

16.764 (55') New R/W

CITY OF PEORIA

Construction ℄

6.706 (22') New R/W

2+735.570

10.058 (33') Existing R/W

201-08-20B
SRPAI & PD

201-08-15
SRPAI & PD

201-08-19C
SRPAI & PD

201-08-20A
BODNER EIZABETH W &

201-08-19B
SRPAI & PD

12.192 (40') Existing R/W

MARICOPA COUNTY

200-10-1K
KAPRINYAK JULIUS /
SZERENA K TR

CITY OF PEORIA

16.764 (55')

200-10-1M
KAPRINYAK JULIUS /
SZERENA K TR

CURVE DATA

PI Sta= 2+278.543
Δ= 8° 23' 53"
R= 440.000
T= 32.304
L= 64.493
Ext= 1.184
Super= 0.071

NO.	REVISION	BY	DATE

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Gannett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALL ALTERNATES

SHEET OF
5 OF 10

FILE: d:\31510\31510r05.dgn
DATE: 27-Aug-97 14:15

SUNWARD MATERIALS

158 0012 201-22-16B BCW INC.

158 0013 201-22-15B BCW INC.

9 0014 201-22-9 ARIZONA STATE DIVISION OF EMERGENCY SERVICES

8A 0015 201-22-8A BCW INC.

3+000 3+100 23,470 (77') New R/W 3+200 3+300 3+400 3+500 3+600

N0°14'05.7"W

Construction ℄

B-550.000

15 0024 201-08-15 SRPAI & PD

11 0023 201-08-11 SRPAI & PD

STA 3+340
BEGIN ALTERNATIVE ALIGNMENTS

70 0022 201-08-70 SRPAI & PD

PCSta 3+558.016

NO.	REVISION	BY	DATE
1			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

	BY	DATE
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DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

PRELIMINARY
NOT FOR
CONSTRUCTION

Gannett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF 6 OF 10

TRACS NO.

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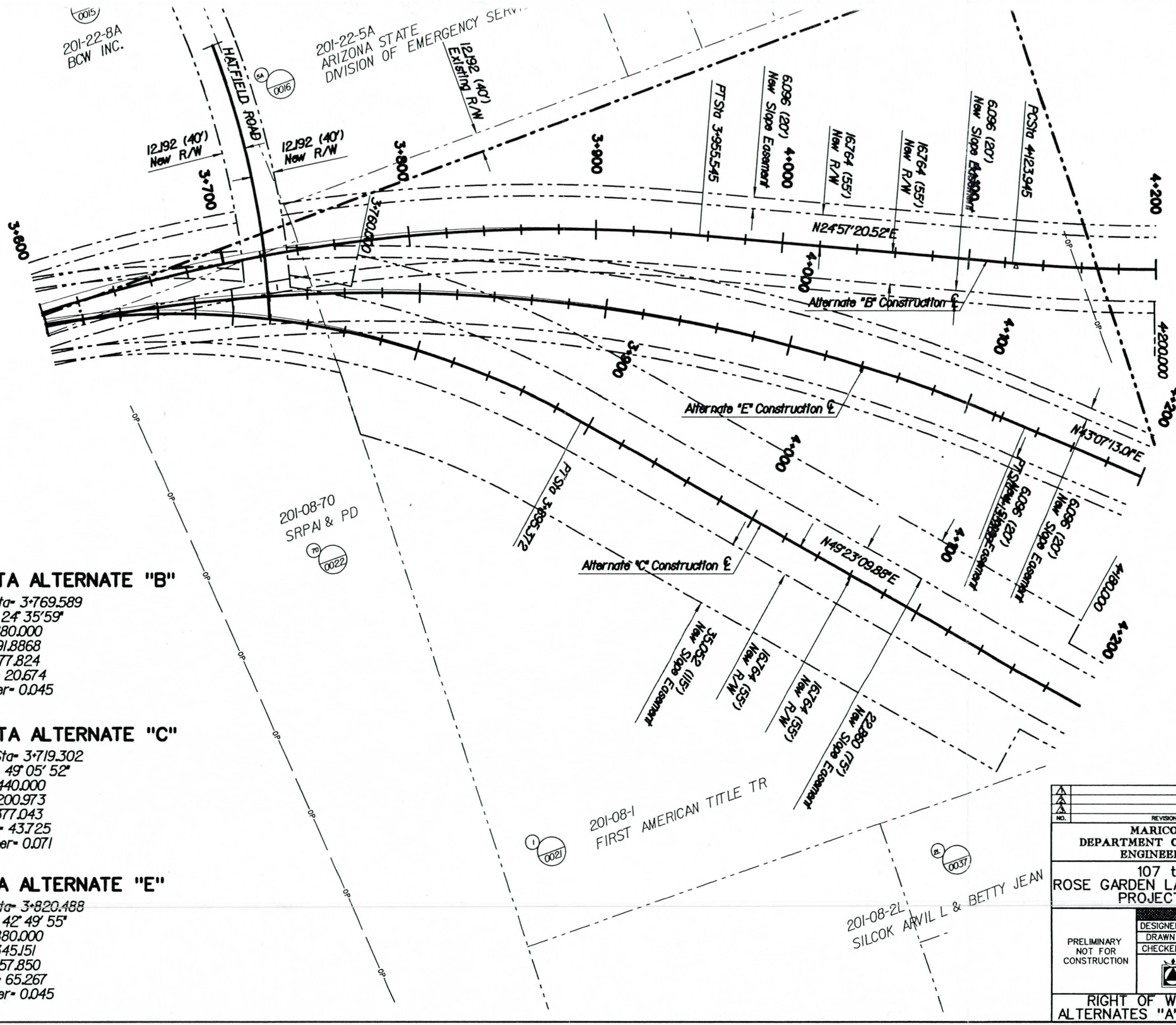

CURVE DATA ALTERNATE "B"

PI Sta= 3+769.589
Δ= 24° 35' 59"
R= 880.000
T= 191.8868
L= 377.824
Ext= 20.674
Super= 0.045

CURVE DATA ALTERNATE "C"

PI Sta= 3+719.302
Δ= 49° 05' 52"
R= 440.000
T= 200.973
L= 377.043
Ext= 43.725
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 3+820.488
Δ= 42° 49' 55"
R= 880.000
T= 345.151
L= 657.850
Ext= 65.267
Super= 0.045

NO.	REVISION	BY	DATE
1			
2			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Connett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALTERNATES "A", "B", "C", "E"

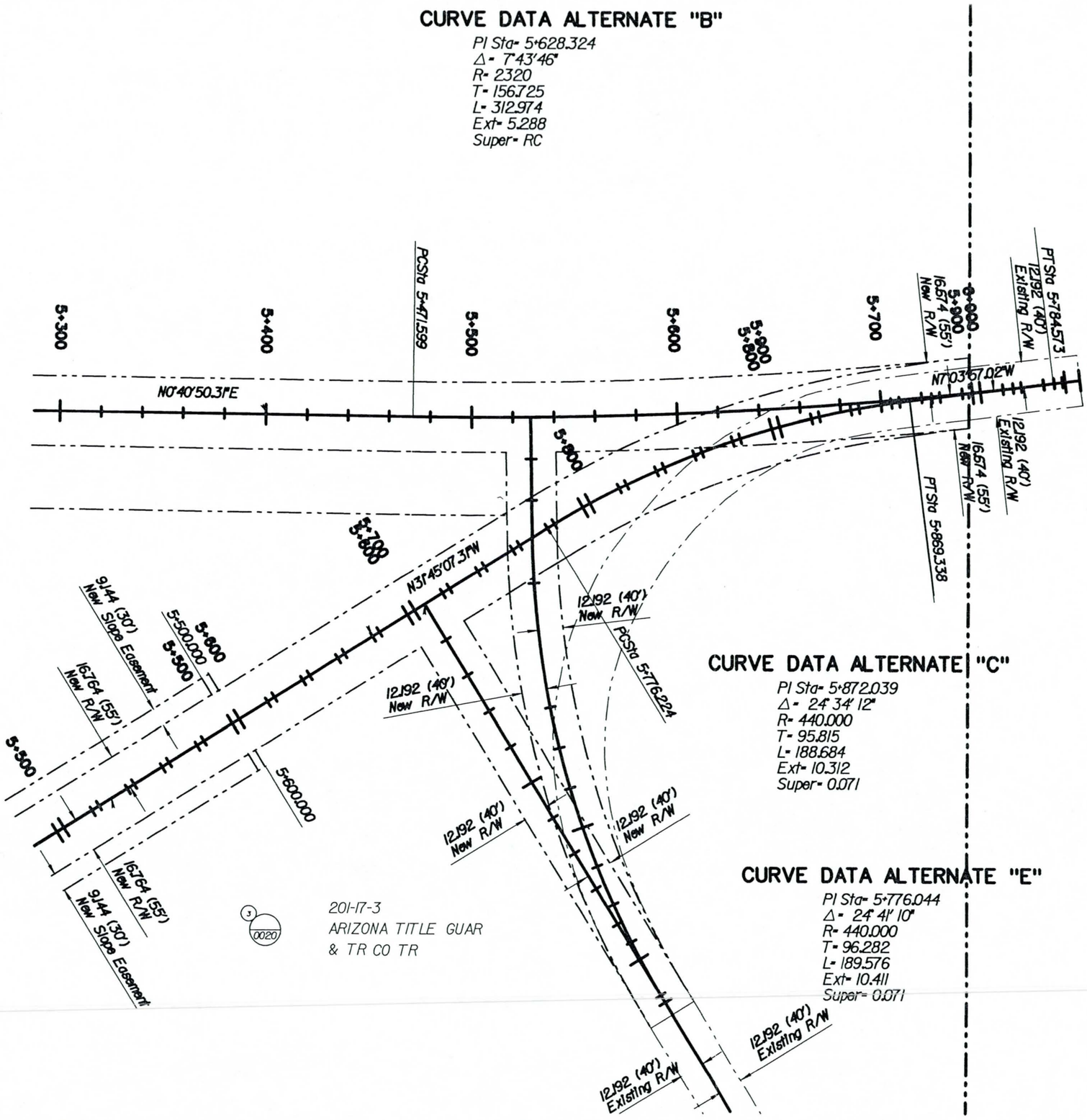
SHEET OF
7 OF 10

TRACS NO.

FILE: d:\31510\31510r07.dgn
DATE: 27-Aug-97 14:16

CURVE DATA ALTERNATE "B"

PI Sta= 5+628.324
Δ= 7°43'46"
R= 2320
T= 156.725
L= 312.974
Ext= 5.288
Super= RC



CURVE DATA ALTERNATE "C"

PI Sta= 5+872.039
Δ= 24° 34' 12"
R= 440.000
T= 95.815
L= 188.684
Ext= 10.312
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 5+776.044
Δ= 24° 41' 10"
R= 440.000
T= 96.282
L= 189.576
Ext= 10.411
Super= 0.071

NO.	REVISION	BY	DATE
1			
2			
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Gannett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF 10 OF 10

TRACS NO.

FILE: d:\31510\31510r10.dgn
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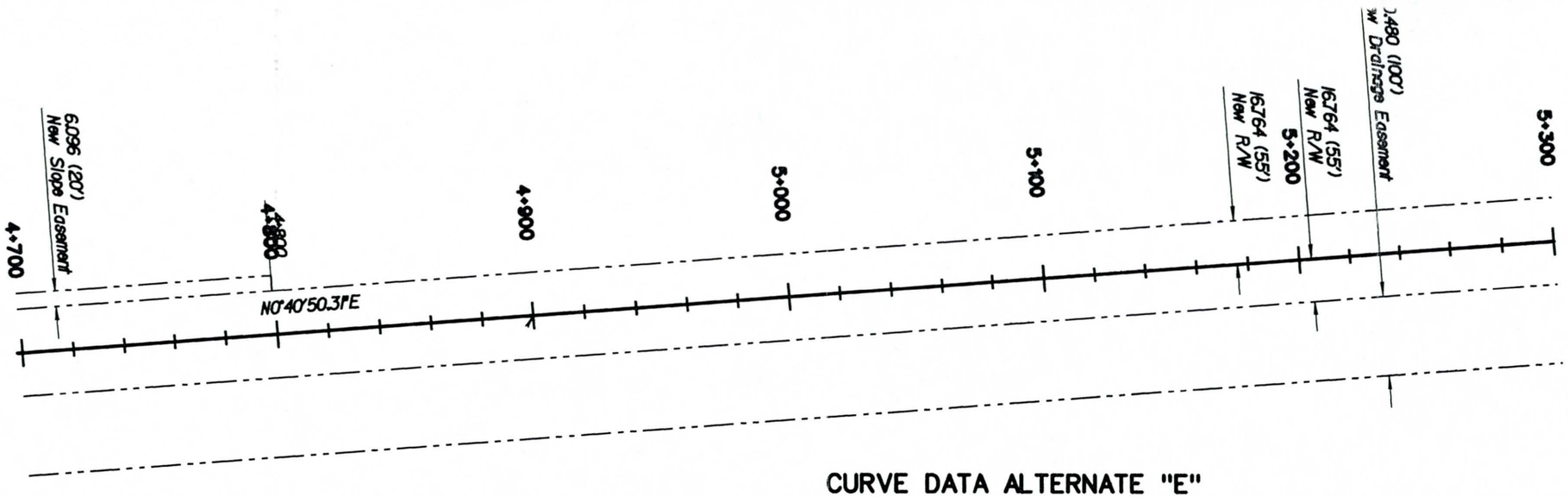


CURVE DATA ALTERNATE "C"

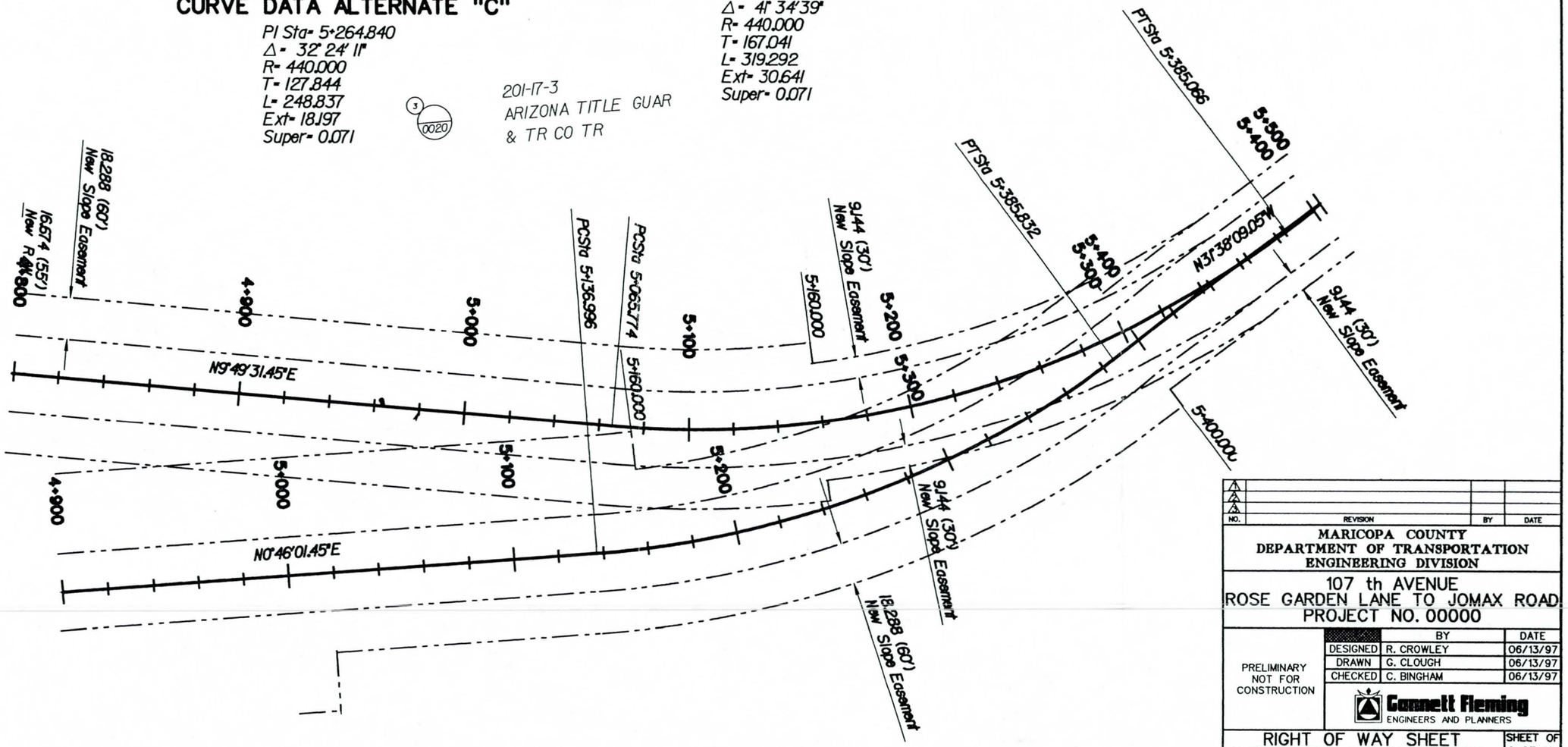
PI Sta= 5+264.840
Δ= 32° 24' 11"
R= 440.000
T= 127.844
L= 248.837
Ext= 18.197
Super= 0.071

CURVE DATA ALTERNATE "E"

PI Sta= 5+232.816
Δ= 41° 34'39"
R= 440.000
T= 167.041
L= 319.292
Ext= 30.641
Super= 0.071

3
0020

201-17-3
ARIZONA TITLE GUAR
& TR CO TR



NO.	REVISION	BY	DATE
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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	R. CROWLEY	06/13/97
DRAWN	G. CLOUGH	06/13/97
CHECKED	C. BINGHAM	06/13/97

Gannett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALTERNATES "A", "B", "C", "E"

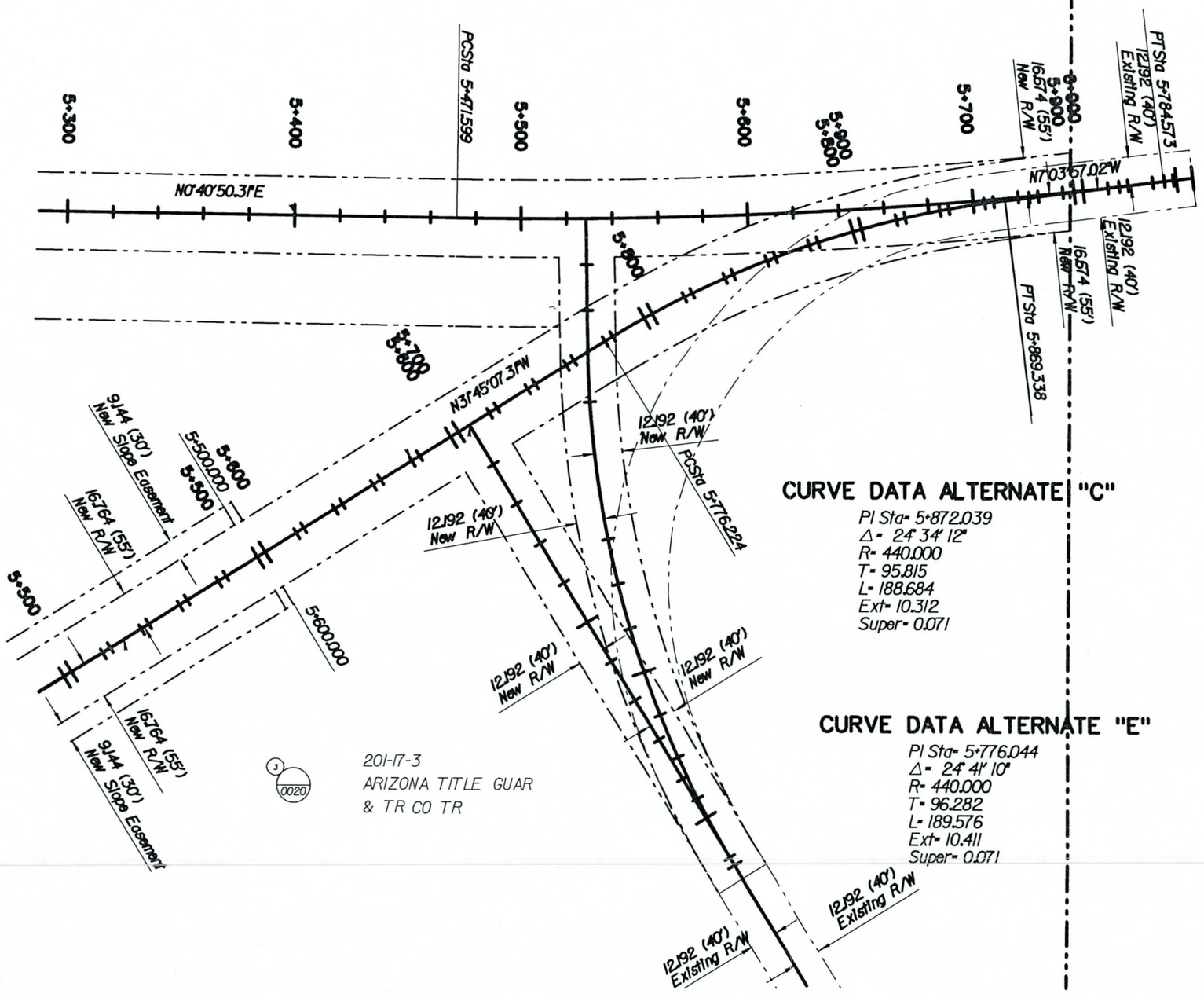
SHEET OF
9 OF 10

TRACS NO.

FILE: d:\31510\31510r09.dgn
DATE: 27-Aug-97 14:10

CURVE DATA ALTERNATE "B"

PI Sta- 5+628.324
Δ- 7°43'46"
R- 2320
T- 156.725
L- 312.974
Ext- 5.288
Super- RC



CURVE DATA ALTERNATE "C"

PI Sta- 5+872.039
Δ- 24°34'12"
R- 440.000
T- 95.815
L- 188.684
Ext- 10.312
Super- 0.071

CURVE DATA ALTERNATE "E"

PI Sta- 5+776.044
Δ- 24°41'10"
R- 440.000
T- 96.282
L- 189.576
Ext- 10.411
Super- 0.071

NO.	REVISION	BY	DATE
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2			
3			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

107 th AVENUE
ROSE GARDEN LANE TO JOMAX ROAD
PROJECT NO. 00000

PRELIMINARY
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Gannett Fleming
ENGINEERS AND PLANNERS

RIGHT OF WAY SHEET
ALTERNATES "A", "B", "C", "E"

SHEET OF
10 OF 10

TRACS NO.

FILE: d:\31510\31510r10.dgn
DATE: 27-Aug-97 14:09

APPENDIX F

Traffic Report

107th AVENUE
Rose Garden Lane to Jomax Road

TRAFFIC ANALYSIS TECHNICAL MEMORANDUM

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION
Work Order No. 68932

June 30, 1997

Gannett Fleming
ENGINEERS AND PLANNERS

TABLE OF CONTENTS

1. INTRODUCTION

MCDOT Work Order Number 68932 for 107th Avenue encompasses the design of improvements to upgrade the existing roadway to a Rural Minor Collector from Rose Garden Lane to Jomax Road. The project is located within the jurisdiction of Maricopa County and Peoria.

The objects of this Traffic Memorandum are:

1. To establish valid traffic projections and design data for the Design Year 2021.
2. To evaluate the various roadway alternative alignments with respect to traffic operations.
3. To identify recommended intersection configurations and typical traffic engineering details.

2. EXISTING CONDITIONS

Existing 107th Avenue is a paved half-street, 9.75m (32 feet) west to face of curb, for one mile from Rose Garden Lane to Williams Road, within the jurisdiction of Peoria. The horizontal alignment is on a tangent (north-south) and the vertical alignment is relatively flat, from Williams Road to Jomax Road (4.02km, 2.5 miles), 107th Avenue is a curve linear gravel two-lane county roadway located mainly within the Agua Fria Floodplain.

Figure 2. illustrates the existing roadway, together with important adjacent land uses and features. Noteworthy are the following issues:

- Significant residential development is planned between Rose Garden Lane and Pinnacle Peak Road.
- Proposed SRP substation site south of Hatfield Road.
- Heavy truck volumes associated with Sunward Materials.
- Planned interim at-grade intersections with the Estrella Roadway.
- Proposed reduction in floodplain width (due to the upstream dam) and the potential for increased development intensity.

Several sources of data have been reviewed to estimate the existing average daily traffic (ADT) volume. According to information presented in MCDOT's Candidate Assessment Report (CAR), the City of Peoria took traffic counts on 107th Avenue between Union Hills Drive and Beardsley Road (south of this project area) resulting in an ADT of 941. Also in the CAR, Sunward Materials is cited as generating about 500 total trips per day (two-way estimate).

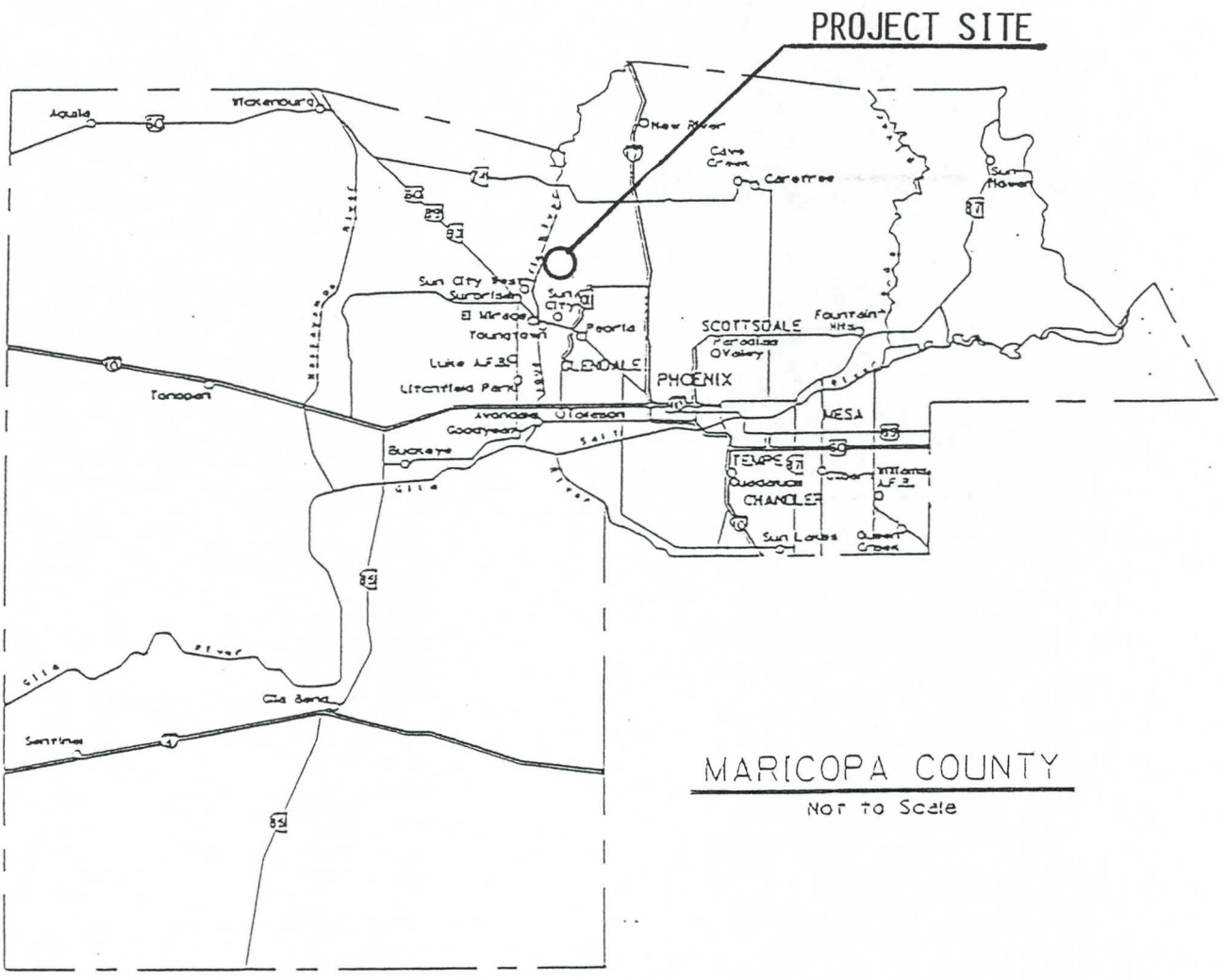


FIGURE 1
LOCATION MAP

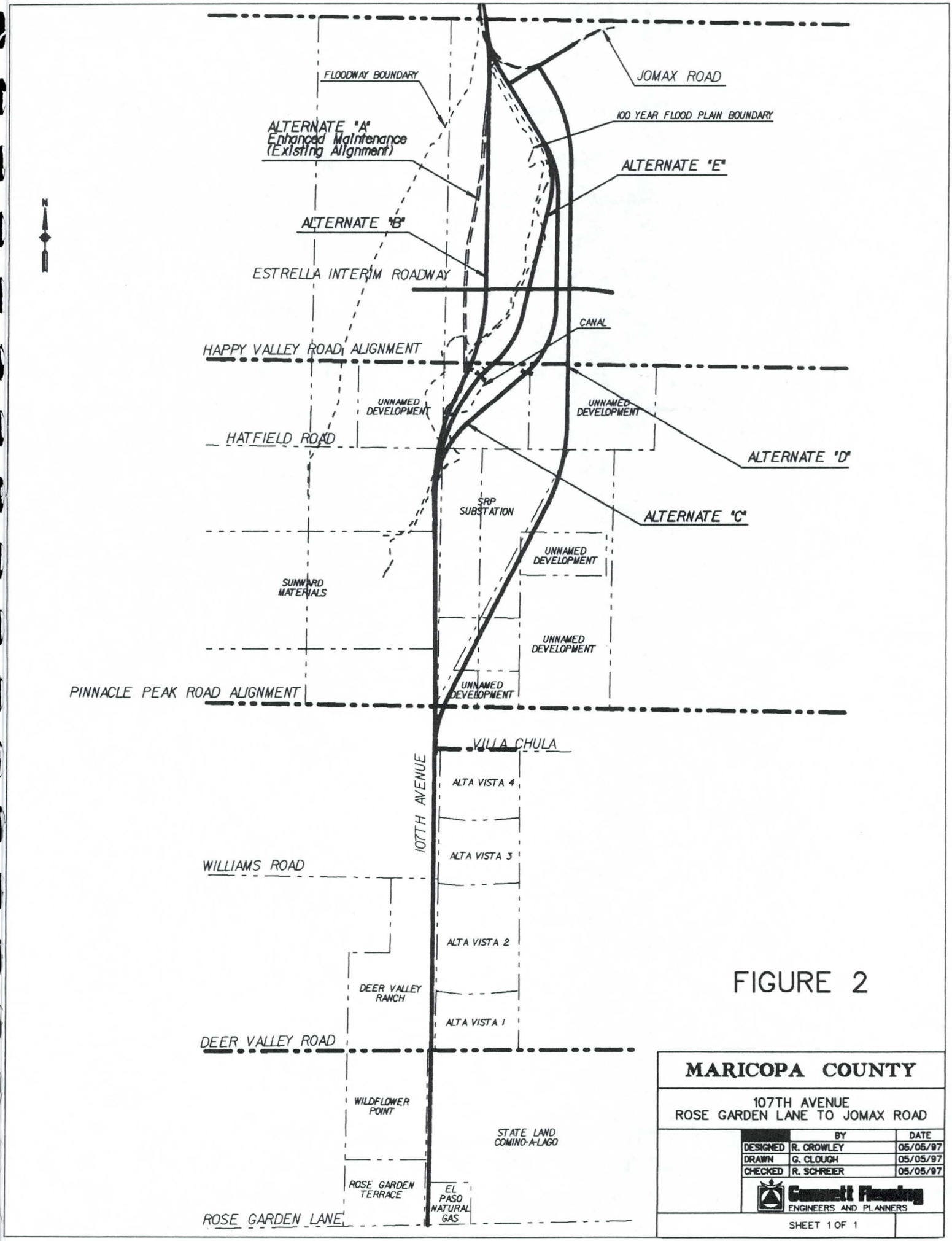


FIGURE 2

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	05/05/97
DRAWN	G. CLOUGH	05/05/97
CHECKED	R. SCHREIER	05/05/97

Cannett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 1

In August of 1996, MCDOT undertook vehicle classification counts on 107th Avenue north and south of Sunward Materials and also on Jomax Road east of 107th Avenue. The results are presented in Appendix A and summarized below:

- Total Trips counted at Sunward Materials (24 hours)
  - to/from the north (106)
  - to/from the south (293)
  - total volume 399

- Total Trips counted on Jomax Road
  - 202

In May of 1997 Gannett Fleming, Inc. conducted a driveway count of trucks entering/exiting Sunward Materials; and also interviewed staff of Sunward Materials. These results are presented in Appendix B and summarized below:

- Trips counted at Sunward Materials
  - Single Unit Vehicles - 37 outbound in 4 hours
  - WB Vehicles (3 or more axles) - 40 outbound in 4 hours
  - Estimated 24 hour Total Vehicles - 360

- Trips generated by Sunward Materials
  - 24 hour total based on staff interview (420)

Examination of the various estimates for existing volumes shows a range of between 360 and 500 vehicles on 107th Avenue between Rose Garden Lane and Jomax Road. Between Union Hills Drive and Beardsley Road (to the south), the volume was counted at 941. For purposes of this Traffic Memorandum, the existing 1997 ADT on 107th Avenue between Rose Garden Lane and Jomax Road is assumed to be 500 vehicles consisting of 100% commercial/truck classification.

3. PROJECTED CONDITIONS

A. Planned Land Use Trip Generation

Figure 2. has illustrated the numerous planned residential developments. Table 1 summarizes the estimated number of dwelling units in each development.

TABLE 1 Estimated Dwelling Units	
Development	No. of Units
Rose Garden Acres	99
Wildflower Point	189
Deer Valley Ranch	232
Alta Vista 1, 2,3,4	570
Lakeland Village *(northwest of the study corridor*	1500
TOTALS	**2590**

To estimate the number of trips generated by these developments, two assumptions are needed. First, the Institute of Transportation Engineers Trip Generation Manual identifies an average trip rate per dwelling unit of 9 vehicles daily. Second, all of the developments except Lakeland Village front on 107th Avenue. Lakeland Village provides access in all four cardinal directions. 115th Avenue and 123rd Avenue will provide a direct southbound link between Lakeland Village and the Interim Estrella. A small portion of the Lakeland southbound trips will utilize the Interim Estrella/107th Avenue and a portion of the eastbound trips will use Dixileta/107th Avenue. Assuming only 20% of the Lakeland trips will be distributed to 107th Avenue lowers the total dwelling unit count from 2590 to 1390. Utilizing the ITE trip rate of 9 per dwelling unit per day results in an estimated 12,510 vehicles daily to/from the planned development.

B. MAG Forecasts

In the current MAG model, the intersection of 107th Avenue/Jomax Road is shown in the network. However, it is not connected by a centroid, so the activity is not connected to the rest of the network. The Year 2020 model shows less than 500 vehicles per day on 107th Avenue/Jomax Road.

In the MAG Long Range Transportation Plan, the 107th Avenue/Jomax Road connection is shown as a planned road built to 4 lanes. There is no indication of the projected traffic volumes.

In MAG's recent Northwest Area Study, a new model was utilized with a build out scenario based on a projected study area population of 1.4 million persons. This build out scenario included those developments listed in Table 1 as well as many others based on zoning patterns. For the build out scenario, 107th Avenue south of Jomax Road is projected to carry 50,000 vehicles daily. Jomax Road east of 107th Avenue is projected to carry 20,000 vehicles daily. 107th Avenue extended northwest from Jomax Road (labeled Dixiletta Drive in the model) is projected to carry 54,000 vehicles daily.

C. Adopted Forecasts

Review of the various forecasts in the two sections above reveals a range of projected ADT from 500 to 50,000 vehicles. Following is the basis for estimation of the Design Year and Build out ADT proposed for use in the Design Concept Report for 107th Avenue (Rose Garden Lane to Jomax Road).

- Existing ADT = 500 trucks per day
- Planned Additional ADT to the Design Year 2021
  - 3% growth in trucks/year = 1,047
  - Planned Development on Figure 1 = 12,510
  - Unnamed Developments north of Pinnacle Peak Road = 6,943
- Total Estimated Year 2021 ADT = 21,000 vehicles
- Total Estimated Build out ADT (from MAG) = 50,000 vehicles

D. Design Year Traffic Data

For the Design Year 2021, the estimated ADT of 21,000 corresponds to a Road Classification of Urban Minor Arterial (Table 2.1, MCDOT Roadway Design Manual). Associated design data includes:

K (Peak Hour Factor) = 8%
D (Directional split) = 60%/40%
Desired Level of Service = C
Number of Through Lanes = 4

In addition, the estimated percentage of trucks (T) is based on the existing plus projected data as follows:

- Existing Sunward Materials = 500
- Projected Sunward Materials = 1,047
- Projected Other Trucks = 389
  (21000-1547)x(0.02)
- Total Projected Trucks = 1,936
- T (% Trucks) = 9%

E. Roadway Typical Sections

Figure 3. illustrates the recommended Interim intersections and lane configuration. Figures 4. through 9. illustrate the proposed typical sections for 107th Avenue from Rose Garden Lane to Jomax Road. The sections have been developed with the following two assumptions:

- An interim facility will be designed and constructed to provide an immediate improvement to traffic operations and safety (minimum 2 paved lanes).

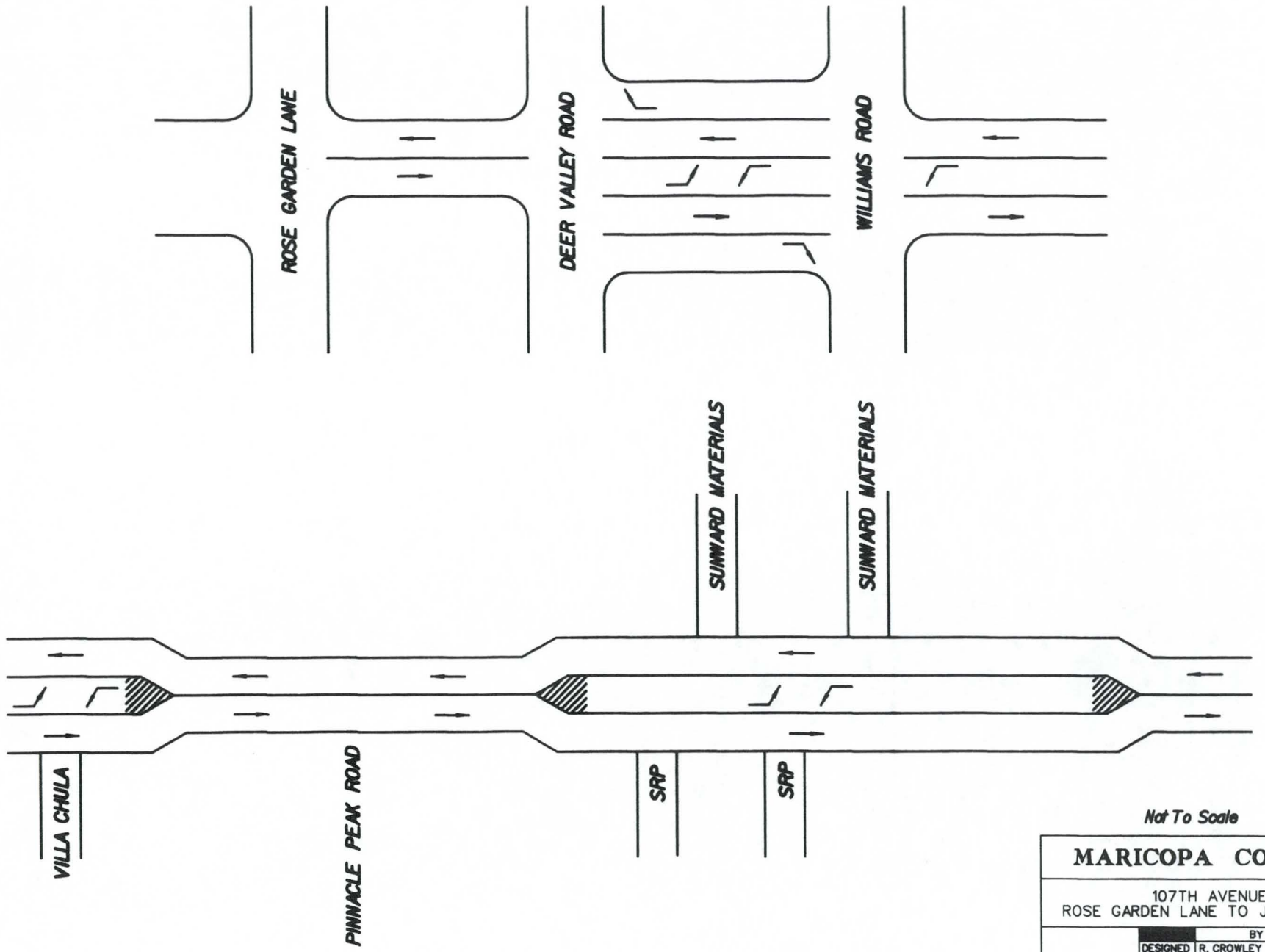


FIGURE 3
INTERIM INTERSECTION AND LANE CONFIGURATIONS
(1 OF 2)

Not To Scale

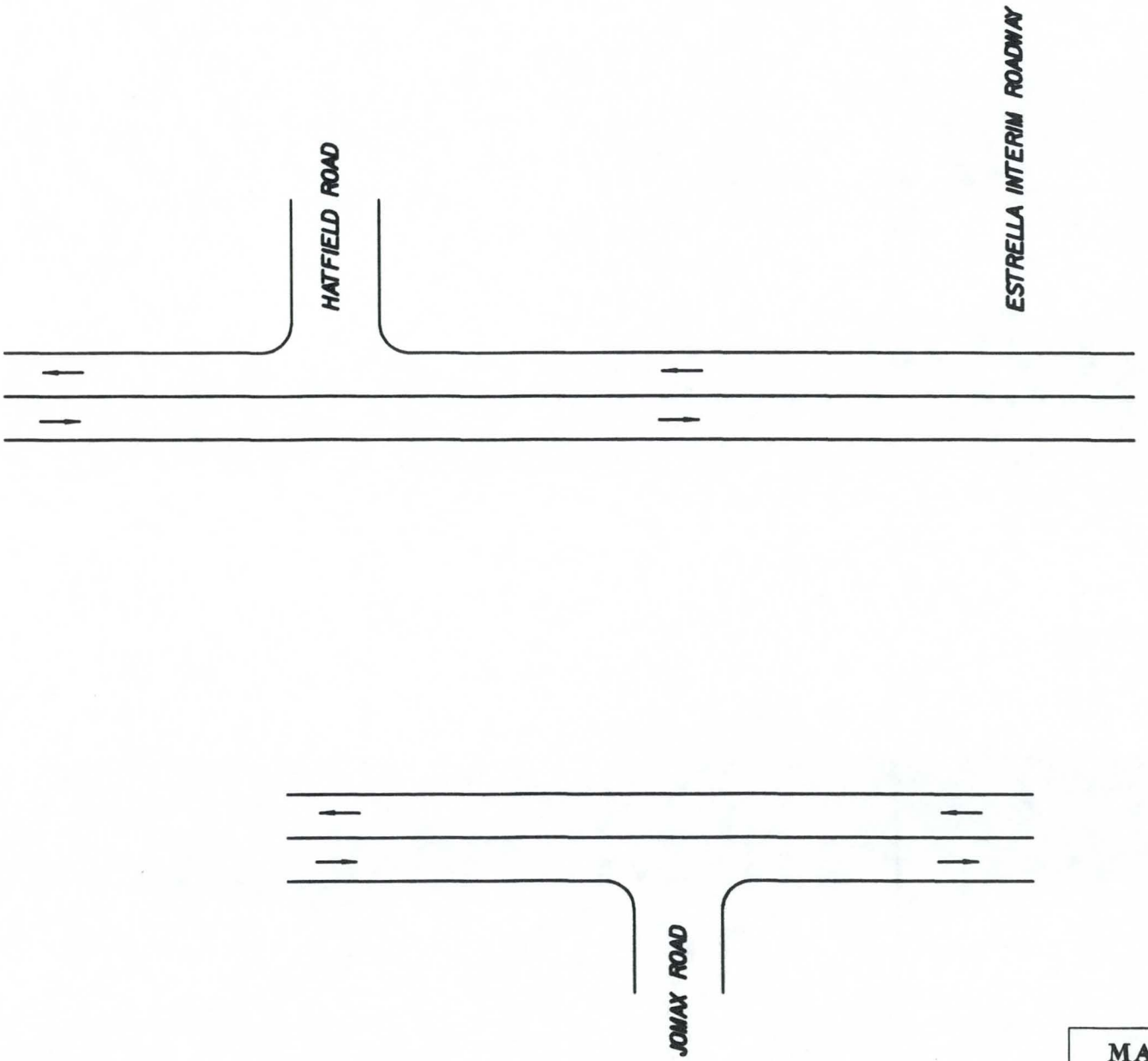
MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Connett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 2



Not To Scale

MARICOPA COUNTY

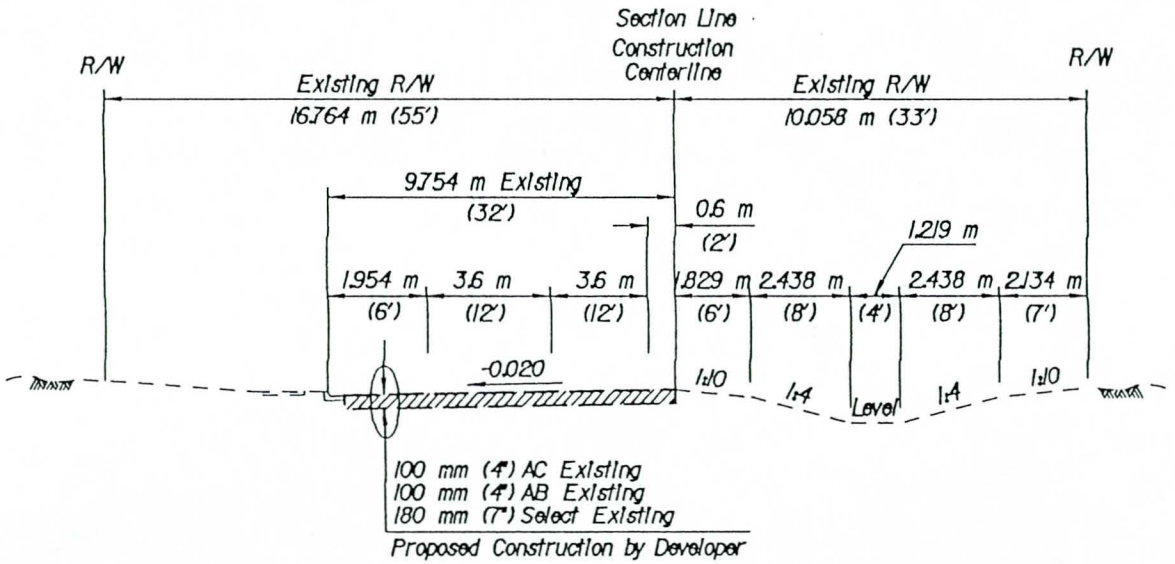
107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Connett Fleming
ENGINEERS AND PLANNERS

SHEET 2 OF 2

FIGURE 3
INTERIM INTERSECTION AND LANE CONFIGURATIONS
(2 OF 2)



TYPICAL SECTION
107TH AVENUE

Rose Garden Lane to Deer Valley Road
Sta 0+097.000 to 0+913.000

FIGURE 4
TYPICAL SECTION

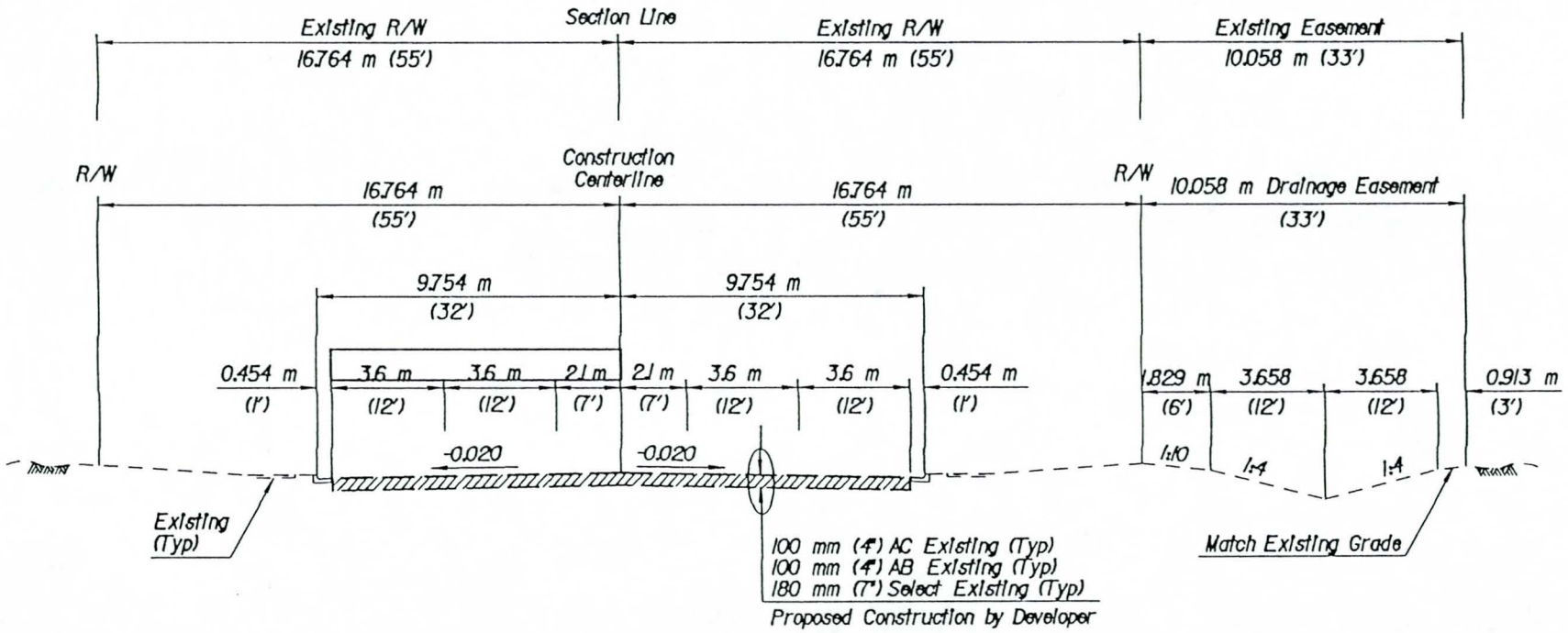
MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS

SHEET 1 OF 6



TYPICAL SECTION
107TH AVENUE

Deer Valley Road to Williams Road
Sta 0+913.000 to 1+724.000

FIGURE 5
TYPICAL SECTION

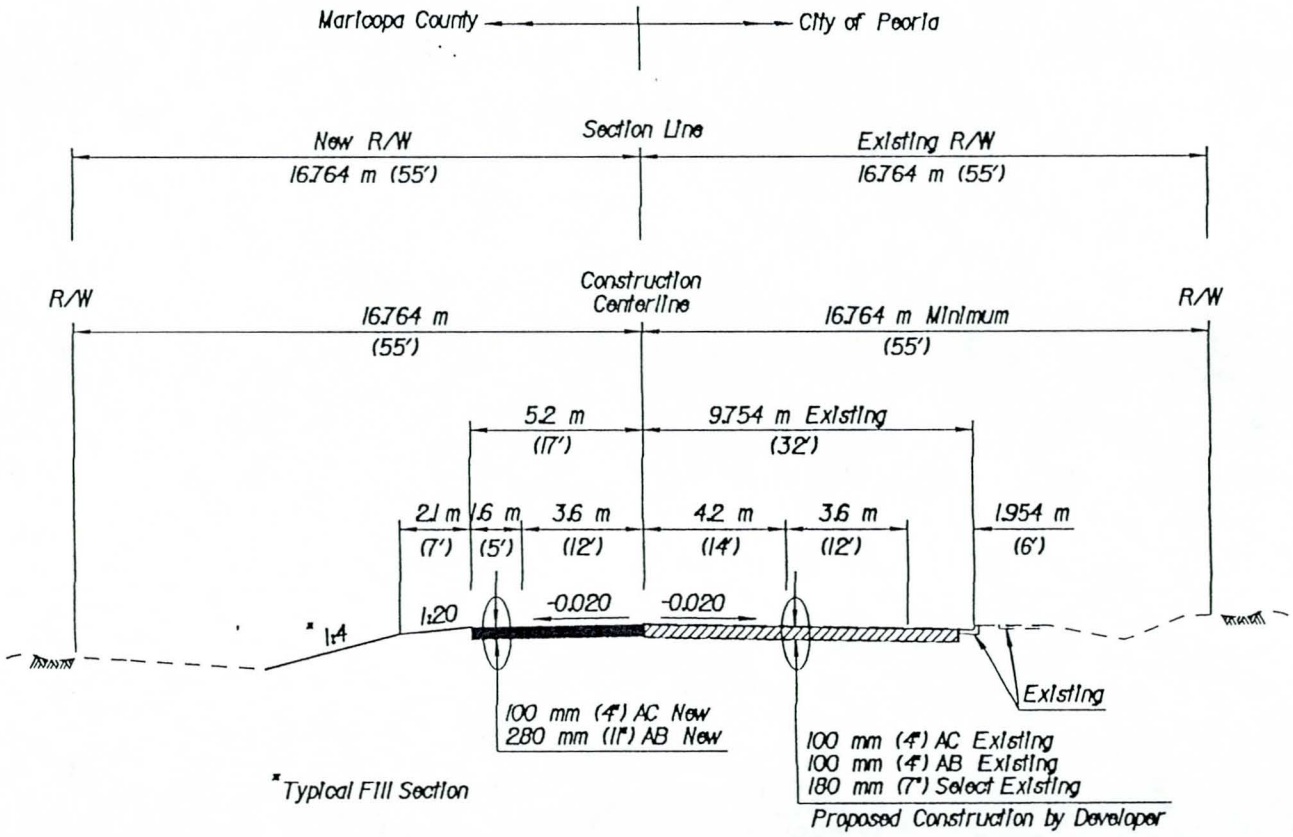
MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS

SHEET 2 OF 6



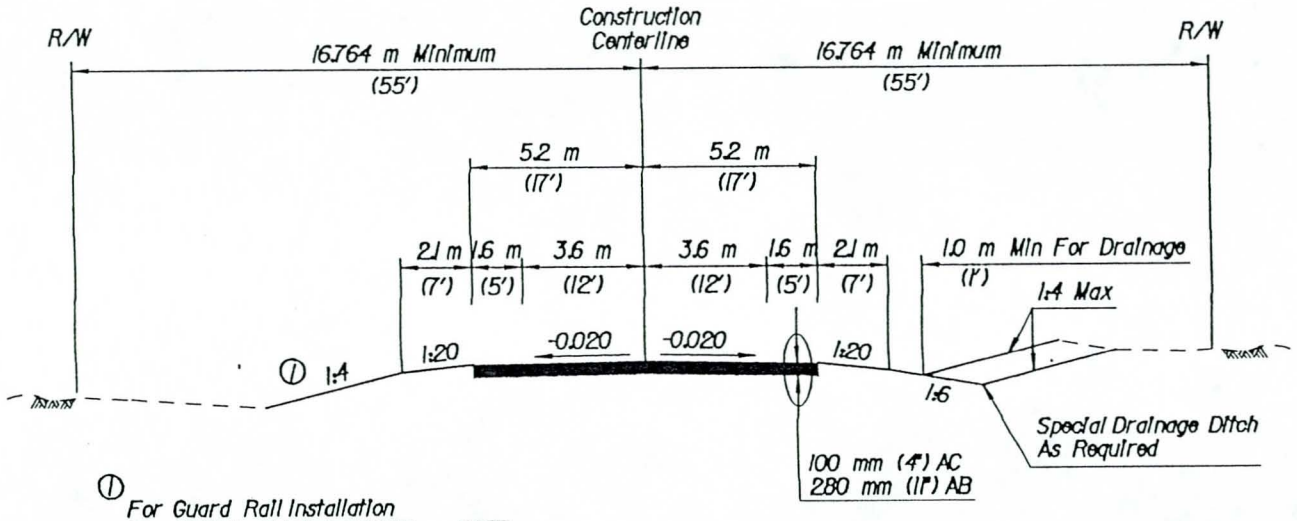
TYPICAL SECTION
107TH AVENUE

Williams Road to Pinnacle Peak Road
*Sta 1+724.000 to 2+347.267***

** 185.733 m (609.36') South of Pinnacle Peak Road Alignment

MARICOPA COUNTY		
107TH AVENUE ROSE GARDEN LANE TO JOMAX ROAD		
	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97
Gannett Fleming ENGINEERS AND PLANNERS		
SHEET 3 OF 6		

FIGURE 6
TYPICAL SECTION



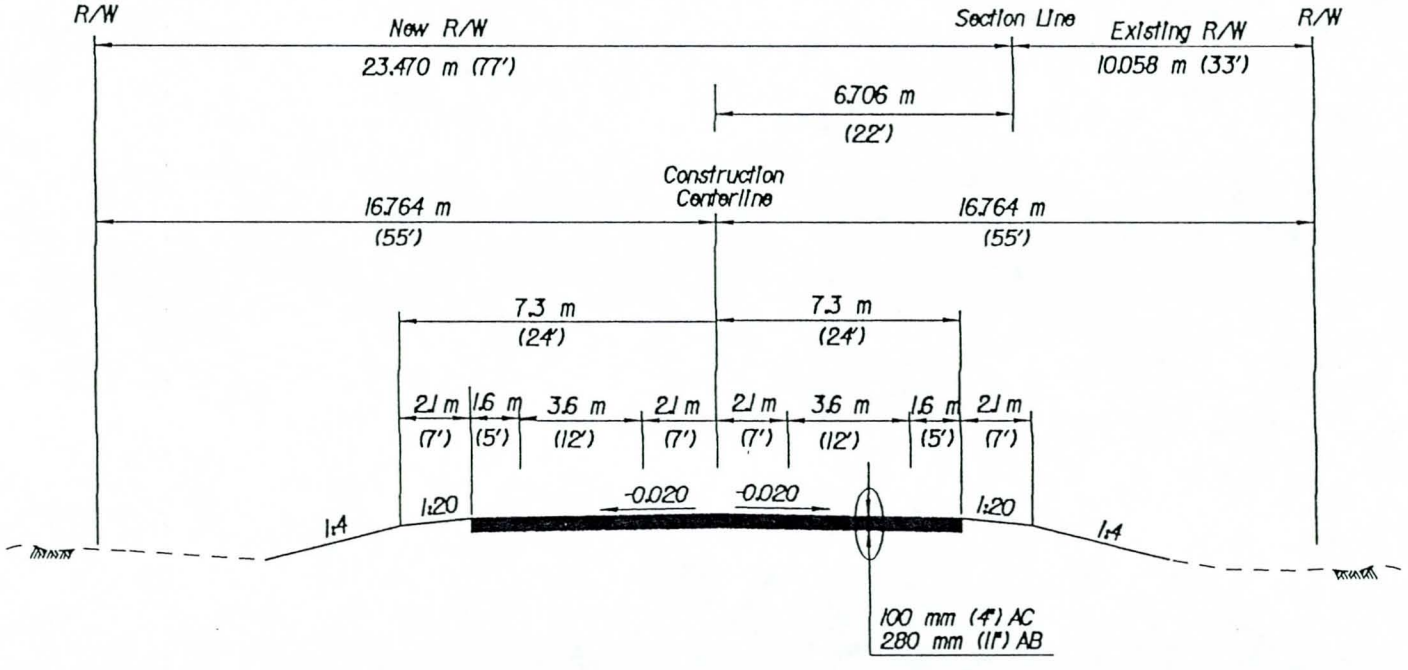
TYPICAL SECTION
107TH AVENUE

Pinnacle Peak Road to Jomax Road
Alternate "B" Sta 2+347.267* to 5+796.823
Alternate "C" Sta 2+347.267* to 6+037.510
Alternate "E" Sta 2+347.267* to 5+944.230

* 185.733 m (609.36') South of Pinnacle Peak Road Alignment

MARICOPA COUNTY		
107TH AVENUE ROSE GARDEN LANE TO JOMAX ROAD		
	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97
Gannett Fleming ENGINEERS AND PLANNERS		
SHEET 4 OF 6		

FIGURE 7
TYPICAL SECTION



WIDENED SECTION FOR LEFT TURN LANES

107 th Avenue @ Sunward Materials
Sta 2+781.000 to 3+339.000

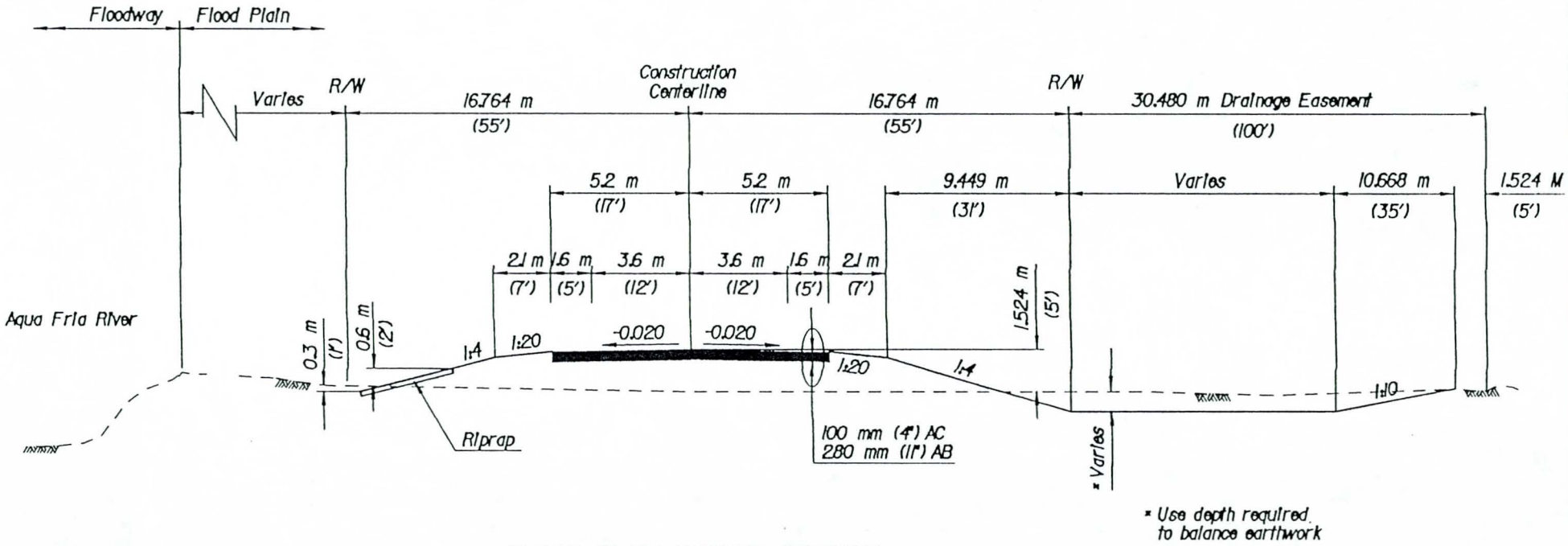
FIGURE 8
TYPICAL SECTION

MARICOPA COUNTY

107TH AVENUE
ROSE GARDEN LANE TO JOMAX ROAD

	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97

Gannett Fleming
ENGINEERS AND PLANNERS



* Use depth required to balance earthwork

FLOOD PLAIN TYPICAL SECTION

Alternate "B" From Happy Valley Road to Jomax Road
Sta 4+169.000 to 5+796.823

FIGURE 9
TYPICAL SECTION

MARICOPA COUNTY		
107TH AVENUE ROSE GARDEN LANE TO JOMAX ROAD		
	BY	DATE
DESIGNED	R. CROWLEY	07/25/97
DRAWN	G. CLOUGH	07/25/97
CHECKED	C. BINGHAM	07/28/97
Gannett Fleming ENGINEERS AND PLANNERS		
SHEET 6 OF 6		

4. ALTERNATIVES ANALYSIS

A. Alignment Alternatives

Figure 2. has illustrated the alternative alignments for 107th Avenue. From Rose Garden Lane to Pinnacle Peak Road, all alternatives follow the existing alignment. North of Pinnacle Peak Road, five alternatives are shown with varying impacts on cost, existing land uses and national resources. All of the alternatives meet the established design criteria and provide similar for the operations and safety characteristics.

The key issue with respect to traffic is the need to provide additional roadway capacity as development intensity increases. Figure 3. presents the recommended lane configuration for the proposed MCDOT Interim improvements to 107th Avenue. From Rose Garden Lane to Villa Chula Drive (South of Pinnacle Peak Road) the existing and short range plans and development warrants provision of a three lane cross section including a center two-way left turn lane. Within this 1.5 miles the segment from Deer Valley Road to Williams Road currently provides a five-lane cross section. North of Villa Chula Drive, a typical two-lane country road cross section is recommended with left turn lane at Sunward Materials.

Traffic projections for the Design Year 2021 will require an urban minor arterial cross section with two lanes in each direction, plus provisions for left turns (5 lanes total). As development occurs, widening of 107th Avenue from the recommended lane configuration in Figure 3. to the 5 lane cross section must be implemented as part of the development approval process.

MAG Traffic projection beyond the Design Year indicate the potential build-out to an urban major arterial with the need for additional roadway capacity. Consideration should be given by MCDOT and the City of Peoria to preserving sufficient right-of-way to accommodate this ultimate (build-out) scenario.

B. Intersection Configurations

Figure 3. illustrates the recommended lane configurations at the principal cross streets. South of Villa Chula Drive, the two-way center left turn lane will provide the required left turn capacity. Although no right turn lanes are required, they can be provided between Deer Valley Road and Williams Road due to the existing five lane cross section already in place.

At Pinnacle Peak Road, no turn lanes are provided since the cross street has not yet been constructed. West of Pinnacle Peak Road, a widened cross section is recommended due to the heavy truck traffic turning to/from the Sunward Materials Plant. These slow-moving trucks require a left turn lane in order to maintain through traffic safety and operations.

At Jomax Road, long range traffic projections indicate that the primary movement is for north-south traffic. Thus, the intersection is configured as a "T" with Jomax Road to the east.

With the exception of Estrella Roadway, all cross streets along 107th Avenue will be stop controlled as part of the MCDOT improvement plans. At the Estrella intersection, 107th Avenue will be stop controlled. Conduit and pull boxes are recommended for potential future signalization at the following intersection:

- Rose Garden Lane
- Deer Valley Road
- Williams Road
- Pinnacle Peak Road
- Estrella Roadway
- Jomax Road

At Williams Road, provision needs to be made for bicycle lane and cross-walks. A proposed elementary school is planned west at 107th Avenue and a park is planned in the southeast quadrant at the 107th/Williams intersection.

C. Typical Details

Following is a summary of typical details recommended as part of the Design Concept Report:

- Left turn storage length - 60m (200')
- Lane and pavement transition tapers - 55:1
- Conduit and Pull Boxes - ADOT Standards

Lane transitions from the existing five lane section (Deer Valley Road to Williams Drive) to the proposed three lane sections will need to be addressed as part of the final design process. Specific details concerning the physical location of the three lane sections (i.e., not symmetrical about the construction center-line) have not yet been finalized.

5. SUMMARY AND CONCLUSIONS

Following is a summary of the major technical issues and conclusions of this Traffic Memorandum:

1. Existing 107th Avenue carries very low traffic volumes, but a significant number of heavy trucks. ADT is estimated at 500 with a 100% truck factor.

2. Development intensity is projected to be very high with the resulting design year ADT equal to 21,000 vehicles. Ultimate build out ADT is estimated to be as high as 50,000 vehicles.

3. MCDOT, in coordination with the City of Peoria proposes to construct a new interim paved roadway with lanes as shown on Figure 3. This upgrade in combination with developer-funded future widening will not meet the projected traffic demands in the Design Year 2021. Future projects will be required to meet projected traffic demands in the Design Year 2021.

APPENDIX A

MCDOT Vehicle Classification Counts

Study Orders

Customer Type:	MCDOT	Study Order ID:	966
Customer Name:	Kent McLain	Request Taken By:	Mike Brannan
Company:	Engineering Division	Order Date:	8/1/96
Address:		Main Street Name:	JOMAX ROAD
City, State:	Phoenix, Arizona 85009	Cross Street Reference 1:	e/o 107th AVENUE
Home Phone: (602)		Cross Street Reference 2:	
Work Phone:	506-8623		
Response Requested:	Yes		

BOS Involved: No ACE Involved: No MCDOT Involved: No Traf Eng Involved: No

Order Description:
Request for **CLASSIFICATION COUNT** on this section of road.

Assignment ID:	Assigned to:	Study Type:	Date Assigned:	Date Due
934	Mike Brannan	Other Study Requests-Classification Count	8/2/96	8/16/96

Recommendation

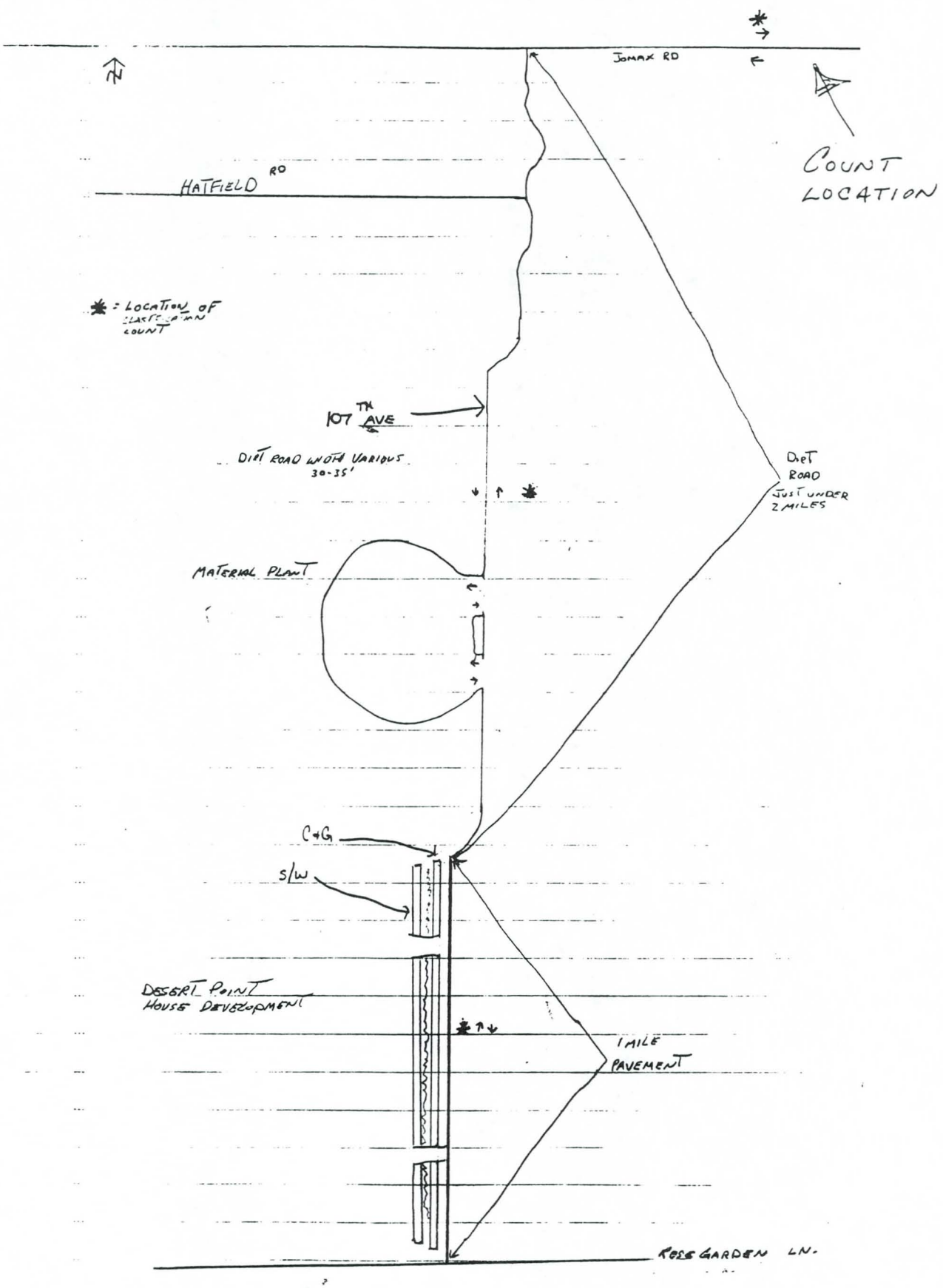
2802	Mike Brannan	8/2/96	Sent request for CLASSIFICATION COUNT to Scott Hamlin.
2868	Mike Brannan	8/5/96	Counters set out over the 5th and 6th of August for traffic east of 107th Avenue on Jomax Road.
2869	Mike Brannan	8/16/96	Turned count data over to Kent McLain. NO FURTHER ACTION.

Work Order Number ID:
Work Order Type:
Work Order Written By:
Date Written:
Date Installed:

Work Order Description:

Reponse Sent: Classification Counts Date Study Complete: 8/16/96

(2)


JOMAX RD
HATFIELD RD
COUNT LOCATION
* = LOCATION OF CLASS 6 MN COUNT
107TH AVE
DIRT ROAD WIDTH VARIOUS 30-35'
DIRT ROAD JUST UNDER 2 MILES
MATERIAL PLANT
C+G
S/W
DESERT POINT HOUSE DEVELOPMENT
1 MILE PAVEMENT
ROSE GARDEN LN.

SITE MAP

Weather : MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY 2901 W DURANGO ST Site Code : 000000000000
Board # : PHOENIX AZ, 85009 Start Date: 08/05/96
Other : File I.D. : JOMAX200

Street name :JOMAX RD Cross street:E/O 107TH AVE W/B Page : 1

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>5 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	0	4	2	0	0	0	0	0	0	0	0	0	1	7
09:00	0	4	3	0	0	1	0	0	0	0	0	0	0	8
10:00	0	2	4	0	0	0	0	1	0	0	0	0	0	7
11:00	0	3	1	0	1	0	0	0	0	0	0	0	1	6
12:00 pm	0	0	0	0	0	1	0	2	0	0	0	0	0	3
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02:00	0	1	0	0	0	0	0	3	0	0	0	0	0	4
03:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
07:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
08:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
09:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
10:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Day Totals	*	30	16	*	2	2	*	7	3	*	*	*	2	62
12:00 08/06	0	0	1	0	0	0	0	0	0	0	0	0	0	1
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02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
04:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
05:00	0	2	1	0	0	0	0	0	0	0	1	0	0	4
06:00	0	0	1	0	0	0	0	1	1	0	0	0	0	3
07:00	0	5	0	0	0	1	0	0	3	0	0	0	0	9
Totals	0	39	21	0	2	3	0	8	7	0	1	0	2	83
Percent	.0%	46.9%	25.3%	.0%	2.4%	3.6%	.0%	9.6%	8.4%	.0%	1.2%	.0%	2.4%	

Weather : MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY 2901 W DURANGO ST Site Code : 000000000000
Board # : PHOENIX AZ, 85009 Start Date: 08/05/96
Other : File I.D. : JOMAX200

Street name :JOMAX RD Cross street:E/O 107TH AVE E/B

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	6 Tire	2 Axle Single	3 Axle Single	4 Axle Double	<5 Axl Double	5 Axle Double	>5 Axl Multi	<6 Axl Multi	6 Axle Multi	>6 Axl Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	0	6	2	0	0	0	0	0	1	0	0	0	1	10
09:00	0	8	3	0	0	1	0	0	3	0	0	0	0	15
10:00	0	4	3	0	0	0	1	0	3	0	0	0	0	11
11:00	0	7	2	0	0	1	1	0	2	0	1	0	1	15
12:00 pm	0	2	2	0	0	1	0	0	4	0	0	0	0	9
01:00	0	8	1	0	0	1	1	1	6	0	0	1	0	19
02:00	0	4	1	0	0	0	0	0	4	0	0	0	0	9
03:00	0	6	4	0	0	0	0	0	2	0	0	0	0	12
04:00	0	7	1	0	0	0	0	0	0	0	0	1	0	9
05:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
06:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
07:00	0	4	5	0	0	0	0	0	0	0	0	0	0	9
08:00	1	4	2	0	0	0	0	0	0	0	0	0	0	7
09:00	0	5	0	0	0	0	0	0	0	0	0	0	0	5
10:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
11:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Day Totals	1	73	28	*	*	4	3	1	25	*	1	2	2	140
12:00 08/06	0	0	1	0	0	0	0	0	0	0	0	0	0	1
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
04:00	0	1	0	0	0	0	0	0	3	0	0	0	0	4
05:00	0	2	3	0	0	0	0	0	2	0	0	1	0	8
06:00	0	0	2	0	0	0	0	0	0	2	0	0	0	4
07:00	0	7	0	0	0	1	0	0	3	0	0	0	1	12
Totals	1	86	36	0	0	5	3	1	33	2	1	3	3	174
Percent	.5%	49.4%	20.6%	.0%	.0%	2.8%	1.7%	.5%	18.9%	1.1%	.5%	1.7%	1.7%	

Weather :

MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY
Board # :
Other :

2901 W DURANGO ST
PHOENIX AZ, 85009

Site Code : 000000000000
Start Date: 08/05/96
File I.D. : 107TH3

Street name :107TH AVE Cross street:N/O MATERIAL PLANT N/B

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>5 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	0	6	1	0	0	1	2	0	1	0	1	0	1	13
10:00	0	1	1	0	0	1	0	0	1	0	0	0	0	4
11:00	0	0	1	0	0	2	0	0	3	0	0	0	0	6
12:00 pm	0	2	1	0	1	0	0	0	0	0	0	0	0	4
01:00	1	4	0	0	0	1	0	0	2	0	0	0	0	8
02:00	0	3	2	0	0	1	0	0	0	0	0	0	0	6
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
05:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
06:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
07:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
09:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
10:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
11:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Day Totals	1	31	10	*	1	6	2	*	7	*	1	*	1	60
12:00 08/06	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	1	0	0	0	0	0	0	1	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	2	0	0	0	0	2
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
06:00	0	1	3	0	0	1	0	0	0	0	0	0	0	5
07:00	0	1	1	0	0	0	0	0	2	0	1	0	0	5
08:00	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Totals	1	36	14	0	1	7	2	0	14	0	2	0	1	78
Percent	1.2%	46.1%	17.9%	.0%	1.2%	8.9%	2.5%	.0%	17.9%	.0%	2.5%	.0%	1.2%	

Weather :

MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY
Board # :
Other :

2901 W DURANGO ST
PHOENIX AZ, 85009

Site Code : 000000000000
Start Date: 08/05/96
File I.D. : 107TH1

Street name :107TH AVE Cross street:N/O MATERIAL PLANT S/B Page : 1

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	6 Tire	2 Axle Single	3 Axle Single	4 Axle Double	<5 Axl Double	5 Axle Double	>5 Axl Multi	<6 Axl Multi	6 Axle Multi	>6 Axl	Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*		*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*		*
09:00	0	3	1	1	0	1	0	0	1	2	1	0	1		11
10:00	0	3	1	0	0	1	0	0	2	0	0	0	0		7
11:00	0	1	0	0	0	3	0	0	0	0	0	0	0		4
12:00 pm	0	1	0	0	0	0	0	0	3	0	0	0	0		4
01:00	0	1	2	0	0	1	0	1	0	0	0	0	0		5
02:00	0	2	2	0	0	1	0	0	1	0	0	0	0		6
03:00	0	1	1	0	0	0	0	0	0	0	0	0	0		2
04:00	0	2	0	0	0	0	0	0	0	0	0	0	0		2
05:00	0	1	0	0	0	0	0	0	0	0	0	0	0		1
06:00	0	2	0	0	0	0	0	0	0	0	0	0	0		2
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
08:00	0	1	0	0	0	0	0	0	0	0	0	0	0		1
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
11:00	0	1	0	0	0	0	0	0	0	0	0	0	0		1
Day Totals	*	19	7	1	*	7	*	1	7	2	1	*	1		46
12:00 08/06	0	0	0	0	0	0	0	0	0	0	0	0	0		0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0
05:00	0	1	0	0	0	0	0	0	1	0	0	0	0		2
06:00	0	1	0	0	0	1	0	1	1	0	0	0	0		4
07:00	0	3	0	0	0	1	0	0	1	0	0	0	0		5
08:00	0	0	1	0	0	0	0	0	2	0	0	0	0		3
Totals	0	24	8	1	0	9	0	2	12	2	1	0	1		60
Percent	.0%	40.0%	13.3%	1.6%	.0%	15.0%	.0%	3.3%	20.0%	3.3%	1.6%	.0%	1.6%		

Weather :

MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY
Board # :
Other :

2901 W DURANGO ST
PHOENIX AZ, 85009

Site Code : 000000000000
Start Date: 08/05/96
File I.D. : 105THS3

Street name :107TH AVE Cross street:S/O MATERIAL PLANT N/B Page : 1

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>5 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	3	3	0	0	0	2	0	1	7	0	2	0	2	20
10:00	0	2	3	0	0	1	0	0	3	0	1	0	0	10
11:00	0	4	3	0	0	5	0	0	9	0	1	0	0	22
12:00 pm	0	4	3	0	0	6	0	0	9	0	1	0	0	23
01:00	0	7	3	0	0	2	0	0	2	0	0	0	0	14
02:00	0	5	1	0	0	2	0	0	5	0	0	0	0	13
03:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
04:00	0	9	3	0	0	1	0	0	0	0	0	0	0	13
05:00	0	6	2	0	0	0	0	0	0	0	0	0	0	8
06:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
07:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
08:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
09:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	0	0	3	0	0	0	0	0	0	0	0	0	0	3
11:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Day Totals	3	54	21	*	*	19	*	1	35	*	5	*	2	140
12:00 08/06	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	6	1	0	0	0	0	0	1	0	0	0	0	8
04:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
05:00	0	7	2	0	0	0	1	0	3	0	2	0	0	15
06:00	1	5	2	0	0	0	0	0	2	0	9	0	0	19
07:00	0	1	3	0	0	5	0	0	8	0	12	0	0	29
08:00	0	0	0	0	0	6	0	0	2	0	9	0	0	17
Totals	4	83	30	0	0	30	1	1	51	0	37	0	2	239
Percent	1.6%	34.7%	12.5%	.0%	.0%	12.5%	.4%	.4%	21.3%	.0%	15.4%	.0%	.8%	

Weather :

MARICOPA COUNTY DEPT OF TRANSPORTATION

Counted by:DAVID M DRAY
Board # :
Other :

2901 W DURANGO ST
PHOENIX AZ, 85009

Site Code : 000000000000
Start Date: 08/05/96
File I.D. : 107THS1

Street name :107TH AVE Cross street:S/O MATERIAL PLANT S/B

Begin Time	Bikes	Cars& Tlrs	2 Axle Long	Buses	6 Tire	2 Axle Single	3 Axle Single	4 Axle Double	<5 Axl Double	5 Axle Double	>5 Axl Multi	<6 Axl Multi	6 Axle Multi	>6 Axl Total
12:00 08/05	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	1	4	4	0	0	1	3	0	7	0	2	0	1	23
10:00	0	3	2	0	0	2	0	0	4	0	1	0	0	12
11:00	0	4	3	0	0	1	1	0	7	0	1	0	0	17
12:00 pm	0	5	1	0	0	1	1	0	5	0	2	0	0	15
01:00	0	7	2	0	0	0	4	1	7	0	0	0	0	21
02:00	0	6	6	0	0	0	1	1	2	0	0	0	0	16
03:00	0	7	4	0	0	0	0	0	4	0	0	0	0	15
04:00	0	8	4	0	0	0	0	0	0	0	0	0	0	12
05:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
06:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
07:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
08:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
09:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
10:00	0	4	2	0	0	0	0	0	0	0	0	0	0	6
11:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Day Totals	1	62	30	*	*	5	10	2	36	*	6	*	1	153
12:00 08/06	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:00	0	5	0	0	0	1	1	0	0	0	0	0	0	7
05:00	0	4	0	0	0	1	3	0	1	0	0	0	0	9
06:00	0	4	0	0	0	1	2	1	2	0	7	0	0	17
07:00	0	2	3	0	0	3	1	0	2	0	13	0	0	24
08:00	0	4	4	0	0	0	2	1	11	0	12	0	0	34
Totals	1	82	37	0	0	11	19	4	52	0	39	0	1	246
Percent	.4%	33.3%	15.0%	.0%	.0%	4.4%	7.7%	1.6%	21.1%	.0%	15.8%	.0%	.4%	

APPENDIX B

Gannett Fleming Vehicle Counts
and
Interview Results/Calculations

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT TRAFFIC COUNTS
107th AVE @ Sunward Mtrl
BY DSF DATE 5-1-97 CHKD. BY RLC DATE 5-2-97

SHEET NO. 1 OF 8
JOB NO. 31510
McDOT # 68932

COUNT LOCATION WAS AT THE SUNWARD MATERIALS YARD, SUN CITY, LOCATED ON 107th AVENUE.

VEHICLE TYPES

P – ALL PASSENGER VEHICLES AND TRUCKS UNDER 8,000 lbs GVW.

INBOUND WERE VEHICLES TRAVELING NORTH, SOUTHBOUND VEHICLES WERE COUNTED AS OUT BOUND. NOT ALL P VEHICLES ORIGINATED AND/OR TERMINATED AT THE SUNWARD YARD.

SU – SINGLE UNIT VEHICLES. THIS CATEGORY INCLUDES ALL CEMENT MIXERS. AXLE CONFIGURATIONS RANGED FROM TWO TO SIX AXLES. ALSO INCLUDES DUMP TRUCKS WITH SEVERAL DIFFERENT AXLE CONFIGURATIONS.

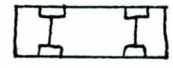
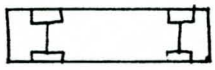
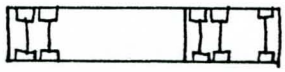
WB-15 – THIS CATEGORY INCLUDES ALL SEMI-TRACTORS WITH A SINGLE TRAILER. AXLE CONFIGURATIONS WERE EITHER FOUR OR FIVE AXLES.

WB-18 – THIS CATEGORY INCLUDES ALL SEMI-TRACTORS WITH TWO TRAILERS & 10-WHEEL TRUCKS WITH TRANSFER TRAILERS, TYPICAL CONFIGURATION IS FIVE AXLES.

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT TRAFFIC COUNTS
107th AVENUE
BY DSF DATE 5/1/97 CHKD. BY RLC DATE 5-2-97

SHEET NO. 2 of 8 OF 2
JOB NO. 31510
MCDOT 68932

	P		SU		WB-15		WB-18	
	 5.8 m		 9.1m		 16.7 m		 19.9 m	
	OUTBOUND	INBOUND	OUTBOUND	INBOUND	OUTBOUND	INBOUND	OUTBOUND	INBOUND
5:00-5:15 AM	1 (1)	1 (1)	III (3)					
5:15-5:30		𝍸 (5)	III (3)		1 (1)			1 (1)
5:30-5:45		III (3)	II (2)		1 (1)	1 (1)		
5:45-6:00		𝍸 1 (6)	II (2)			IIII (4)	1 (1)	
6:00-6:15		III (3)	II (2)	1 (H_2O)	IIII (4)	II (2)		
6:15-6:30		1 (1)	III (3)	1 (H_2O)	II (2)	1 (1)		
6:30-6:45	1 (1)	1 (1)	II Bus (3)	1 (1) 1 (H_2O)	III (3)	II (2)		II (2)
6:45-7:00	III (3)	1 (1)	1 (1) 1 (H_2O)	1 (1) 1 (H_2O)	1 (1)	1 (1)	II (2)	II (2)

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT TRAFFIC COUNTS
107th AVENUE
BY DSF DATE 5/1/97 CHKD. BY RLC DATE 5-2-97

SHEET NO. 3 of 8 2 OF 2
JOB NO. 31510
MDOT 68932

	P		SU		WB-15		WB-18	
	OUT	IN	OUT	IN	OUT	IN	OUT	IN
7:00-7:15 AM	I (1)	II (2)	II (2) I (H_2O)	I (1) I (H_2O)	I (1)	III (3)	I (1)	II (2)
7:15-7:30	I (1)			III (3)	III (3)	III (3)	II (2)	
7:30-7:45	IIII (4)		II Bus (3)	II (2)	III (3)	I (1)	II (2)	I (1)
7:45-8:00	I (1)	I (1)	~~IIII~~ Bus (6) I (H_2O)	II (2)	I (1)	II (2)		I (1)
8:00-8:15	III (3)	III (3)	I (1) I (H_2O)	I (1) I (H_2O)	III (3)	III (3)		
8:15-8:30	III (3)		I (1)	II (2) I (H_2O)	I (1)	II (2)	I (1)	III (3)
8:30-8:45	I (1)		III (3)	II (2)	I (1)	III (3)	III (3)	
8:45-9:00	II (2)	I (1)	II (2)		~~IIII~~ (5)	I (1)		

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT TRAFFIC COUNTS
107th Avenue @ Sunward Mfg
BY DSF DATE 5-1-97 CHKD. BY RLC DATE 5-2-97

SHEET NO. 4 OF 8
JOB NO. 31510
MCDOT 68932

LEIGH JOHNSON, PLANT MANAGER, OF SUNWARD MATERIALS PROVIDED DATA FROM 1996 WHICH WILL BE USED TO FORECAST AVERAGE DAILY TRIPS.

1996 MATERIAL DELIVERED / SOLD

945,000 TONS AGGREGATE

154,000 C.Y. CONCRETE

AGGREGATE

ASSUME 24 TONS OF AGGREGATE PER VEHICLE TRIP

$$(945{,}000 \text{ TONS}) \left(\frac{\text{TRIP}}{24 \text{ TONS}}\right) = 39{,}375 \text{ TRIPS}$$

ASSUME 5 DAYS PER WEEK OF OPERATION.

$$(\text{YEAR})\left(52 \frac{\text{WEEKS}}{\text{YEAR}}\right)\left(\frac{5 \text{ DAYS}}{\text{WEEK}}\right) = 260 \text{ DAYS OPERATION}^{*}$$

* SOME AGGREGATE IS DELIVERED ON SATURDAYS, BUT ASSUMING 24 TONS PER VEHICLE IS CONSERVATIVE AND OFFSETS THE SATURDAY DELIVERIES.

$$\frac{39{,}375 \text{ TRIPS}}{260 \text{ DAYS}} = 151 \frac{\text{TRIPS}}{\text{DAY}} \quad \text{(ONE-WAY TRIPS)}$$

Gannett Fleming
ENGINEERS AND PLANNERS

SUBJECT TRAFFIC COUNTS
107th Avenue @ Sunward Mtl
BY DSF DATE 5-1-97 CHKD. BY RLC DATE 5-2-97

SHEET NO. 5 OF 8
JOB NO. 31510
MCDOT 68932

CONCRETE

ASSUME 10 CY PER VEHICLE TRIP

$$(154{,}000\ CY)\left(\frac{VEHICLE\ TRIP}{10\ CY}\right) = 15{,}400\ TRIPS$$

ASSUME 5 DAYS PER WEEK OPERATION.

260 DAYS OPERATION EACH YEAR

$$\frac{15{,}400\ TRIPS}{260\ DAYS} = 59\ TRIPS\ PER\ DAY\ (ONE\ WAY)$$

THIS GIVES A TOTAL OF ONE WAY TRIPS OF

$$210\ \frac{TRIPS}{DAY}\ .\quad (= 59 + 151)$$

ALL OF THE VEHICLES WILL MAKE THE RETURN TRIP DURING THE DAY. ✓

7 ×

210
×2
420 ADT for Sunward only
42 ADT other
462 use 500 ADT

5-2-97
RLC

Left turns @ Sunward 210 ADT

COMPARE CALCULATED TRIPS GENERATED BY PLANT TO ACTUAL COUNT OF 5-1-97.

SU VEHICLES

37 TOTAL IN 4 HOURS, OUTBOUND ONLY.

OF THIS TOTAL 3 SU VEHICLES WERE SCHOOL BUSES, ONE WAS AN SR.P. SERVICE VEHICLE, ONE WAS A MARICOPA COUNTY D.O.T. WATER TRUCK, ONE WAS A DELIVERY VEHICLE, AND ONE WAS A 3 AXLE DUMP TRUCK.

other = 7 × 24 hr/day / 4 study = 42 ADT

37 − 3 − 1 − 1 − 1 − 1 = 30 VEHICLES TRIPS.

THIS 30 VEHICLES CONSISTED OF CONCRETE MIXERS.

ASSUME 8 HOURS OF PLANT OPERATION.

$\left(\frac{30 \text{ TRIPS}}{4 \text{ hours}}\right) / 8 \text{ hours} = 60 \text{ TRIPS}$

60 ≈ 59 TRIPS/DAY (ONE WAY)

ACTUAL PREDICTED

WB VEHICLES

42 TOTAL IN 4 HOURS, OUTBOUND ONLY

OF THESE TRIPS, 3 WERE PORTLAND CEMENT DELIVERY TRUCKS. ADD ONE FOR DUMP TRUCK HAULING ABC.

$42 - 3 + 1 = 40$ VEHICLE TRIPS.

40 VEHICLE TRIPS WERE MADE IN 4 HOURS HAULING AGGREGATE.

ASSUME AGGREGATE HAULING OPERATION TIME OF 12 HOURS. VEHICLES ARRIVED AND LEFT BEFORE COUNT BEGAN AT 5:00 AM. AGGREGATE PLACEMENT DOES NOT REQUIRE A "FINISH" LIKE CONCRETE. CAN BE HAULED AND PLACED EARLIER AND LATER IN THE DAY. LIGHT IS NOT A FACTOR AS IT IS WITH CONCRETE.

$$\left(\frac{40 \text{ TRIPS}}{4 \text{ hours}}\right)\left(12 \text{ hours}\right) = 120 \frac{\text{TRIPS}}{\text{DAY}}$$

120 < 151 TRIPS/DAY
ACTUAL PREDICTED

THIS ~~DIFF~~ DIFFERENCE CAN BE ATTRIBUTED TO THE DAY THAT THE COUNT WAS DONE. THE DISPATCHER

AND PLANT MANAGER BOTH COMMENTED THAT THURSDAY, 5-1-97, WAS A LOW VOLUME DAY. BOTH WERE CONTACTED AFTER THE COUNT WAS PERFORMED AND INTERVIEWED.

USE THE PREDICTED VALUE OF 151 TRIPS/DAY FOR THE ADT FROM THE PLANT FOR AGGREGATE HAULING.

THE TOTAL ADT OF 210 IS ONLY FOR VEHICLES HAULING MATERIAL SOLD BY THE PLANT. IT DOES NOT INCLUDE VEHICLES SUPPLYING THE PLANT.