City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 20, 2001

Bruce M. Thomson, P.E.
Thomson & Associates
1018 Idlewilde SE
Albuquerque, NM 87108

RE: FOUR SEASONS AVIATION, INC. - HANGAR & IMPROVEMENTS (N16-D10) AT ALBUQUERQUE INTERNATIONAL AIRPORT. DRAINAGE REPORT FOR BUILDING AND PAVING PERMIT APPROVALS. ENGINEER'S STAMP Not DATED.

Dear Dr. Thomson:

Based on the information provided on your June 8, 2001 submittal, City Hydrology has the following comments:

Engineer's Seal should be dated. Plates in Report should be sealed, signed and dated. Since the approved Grading and Drainage Plan, i.e., Plate 2, will become part of the construction sets, recommend that it be standard size drawing. Please include the basic calculations on the plan.

Building Permit covers Grading and Paving Permits, but they still may be requested separately.

The Drainage Plan itself is in order and approved herewith.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: Terri Martin
File

DRAINAGE INFORMATION SHEET

N-16/D10

PROJECT TITLE: Hanger # Improvements for Texas Sessions Aviation ZONE MAP/DRG. FILE #: N-16-Z
DRB #: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Albuquerque International Airport
CITY ADDRESS: 3550 Access Road C, Albuquerque NM 87106

ENGINEERING FIRM: Thomson & Assoc. CONTACT: Bruce Thomson
ADDRESS: 1018 Idlewilde SE PHONE: 268-6003
CITY, STATE: Albuquerque NM 87108 ZIP CODE: 87108

OWNER: Ray Sanchez CONTACT: Ray Sanchez
ADDRESS: 3550 Access Road C PHONE: 842-4955
CITY, STATE: Albuquerque NM ZIP CODE: 87106

ARCHITECT: Gordon Hall CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: _____ CONTACT: _____
ADDRESS _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:
- X DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- ____ ENGINEER'S CERTIFICATION
- ____ CLOMR/LOMR
- ____ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- ____ YES
- X NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
- ____ SIA / FINANCIAL GUARANTEE RELEASE
- ____ PRELIMINARY PLAT APPROVAL
- ____ S. DEV. PLAN FOR SUB'D. APPROVAL
- ____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ FOUNDATION PERMIT APPROVAL
- X BUILDING PERMIT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY APPROVAL
- ____ GRADING PERMIT APPROVAL
- X PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ____ OTHER (SPECIFY)

DATE SUBMITTED: 6/8/01 BY: Bruce M Thomson

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope ot the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report**: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

RECEIVED
JUN 0 8 2001
PWD/DESIGN REVIEW

Drainage Plan

Proposed Improvements for

Four Seasons Aviation, Inc.

South General Aviation Lease Site – Area B

Albuquerque International Airport

Prepared by
Bruce M. Thomson, Ph.D., P.E.
Thomson & Associates
1018 Idlewilde SE
Albuquerque, NM 87108

June 6, 2001

Four Seasons Aviation
Albuquerque International Airport
3550 Access Road C
Albuquerque, NM 87106
505-842-4955

June 7, 2001

Loren Meinz, P.E., City Hydrologist
Development & Building Services Division
Public Works Department
600 2nd Street NW
Albuquerque, NM 87102

Dear Mr. Meinz:

As we have discussed, Four Seasons Aviation is intending to build a hangar and pave some of our aircraft tiedown area on land we lease from the Albuquerque International Airport. This report describes our intended improvements and the impacts it will have on drainage. Please contact me if you need additional information. Thank you for your assistance and consideration.

Sincerely,

Ray Sanchez
Owner

Table of Contents

Description of Property and Planned Improvements

Four Seasons Aviation, Inc. (FSA) plans to build a new hangar and pavement for additional aircraft parking on property leased from the Albuquerque International Sunport. The leased land consists of 2.09 acres (91,075 ft^2) located in the South General Aviation Lease Site – Area B. The property is zoned SU-1 Airport and Related Facilities as described on Zone Atlas Page N-16-Z (Appendix 1). The property was surveyed by the City of Albuquerque in March 1999 and a copy of the survey is included as Appendix 2. The property currently contains a 100 ft x 100 ft hangar, an automobile parking lot on the south side and a pave asphalt apron on the north side for parking aircraft. A map of the current facility including 0.5 ft contours is included with this report as Plate 1. All elevations are referenced to Albuquerque Survey Control Monument 1-N16R which is located 127 ft south of the southwest corner of the FSA property and is referenced as elevation 100.000 ft.

The planned improvements will include a new 80 ft x 80 ft (6,400 ft^2 floor space) pre-engineered metal building that will be built near the north corner of the property as shown in Plate 2. In addition, 10,200 ft^2 of unpaved land currently used for aircraft parking and storage area will be paved with 4 in asphalt paving. The improvements are needed to permit continued growth of FSA and to provide improved facilities for aircraft storage.

Hydrologic and Hydraulic Analysis

Most of this site is in a watershed which drains to an existing catch basin and underground storm drainage system constructed by the airport. This system drains storm water from the paved and unpaved aircraft storage areas to a swale located on the Federal Aviation Administration Flight Service Station (FSS) property to the west. A storm drain is located near the northwest corner of this property and is then conveyed off site. Note that much of the flow across the FSA property consists of run-on from neighboring property including RBR Aircraft to the east and Seven-Bar Aviation to the north.

Of the 91,075 ft^2 leased by FSA, an area of 22,000 ft^2 consisting of the front parking lot and half of the existing hangar roof drain to the south east and are not affected by the planned improvements. Therefore, 69,075 ft^2 contribute runoff to the swale located on the FSS property. 44,710 ft^2 of this land is currently either paved or covered by the existing hangar. The proposed improvements will cover 16,600 ft^2 with either pavement or hangar.

The hydrologic impacts were calculated using procedures contained in Section 22.2, Hydrology of the Development Process Manual. The calculations are contained in Appendix 3. They are based on a 100-yr, 6-hr storm event of 2.35 in precipitation. Note that the unpaved dirt lot is currently used for storage of aircraft and equipment, hence is pretty well compacted. Therefore, although it is listed as a surface treatment category C, it is probably closer to surface treatment category D.

The information used in the hydrologic calculations include:

- Total area which will be affected by improvements is 16,600 ft^2
- The total area of the FSA property which contributes runoff to the northwest is 69,080 ft^2. The remaining area drains to the southeast.
- The soil type is Wink Sandy Loam (WaB) based on the SCS soil classification
- The design storm is a 100 year, 6 hour rainfall of 2.35 inches
- The unpaved land is considered to have surface treatment category C
- Land that is under the hangar or is paved with asphalt is considered to have surface treatment category D.

The effects of the improvements to the FSA property are summarized in Table 1. These calculations show that the total volume of runoff to the Flight Service Station swale will increase approximately 15% (from 9,620 ft^3 to 11,090 ft^3) as a result of the hangar construction and pavement.

	Total Site Drainage to Northwest	
Parameter	**Before Improvements**	**After Improvements**
Total Runoff Volume (ft^3)	10,200	11,600
Peak Flow (cfs)	6.58	7.18

Table 1. Summary of hydrologic impacts of site improvements. All calculations based on 100-yr, 6-hr storm.

Plate 2 shows the site drainage plan. The hangar floor will be located at an elevation of 98.5 ft with respect to the survey monument. Note that the existing hangar floor is located at elevation 100.060 with respect to this monument. Flow from the FSA aircraft tiedown area and run-on from RBR Aircraft and Seven-Bar Aviation will be directed around the new hangar to the FSS swale. The swale around the back of the hangar will have a bottom slope of .00625 and side slopes of 1:5. Due to the site contours, approximately half of the flow will be diverted around each side of the hangar. Under peak flow conditions the depth of water in this swale will be 0.499 ft at the back of the hangar. At this location the hangar floor will be approximately 0.75 ft above the bottom of the swale, thus there is a 50% safety factor incorporated in the design.

Summary

- The planned improvements on the FSA property will consist of a new 6,400 ft^2 hangar and pavement 10,200 of asphalt pavement for aircraft parking.
- These improvements will increase the total volume of surface runoff by 14% and peak flow rates 9% during a 100-yr, 6-hr storm.
- The hangar floor elevation will be located approximately 0.5 ft above the aircraft parking area. Water will be diverted around both sides of the hangar by paved swales. Under peak flow conditions the hangar floor will be 50% above the depth of water in the swales at its maximum.

Reference

City of Albuquerque, (1997). "Section 22.2, Hydrology of the Development Process Manual," prepared in cooperation with Bernalillo County, New Mexico, and Albuquerque Metropolitan Arroyo Flood Control Authority, Albuquerque, NM.

Appendix I – Zone Atlas Page N-16-Z

SU-1 AIRPORT & REL FAC

MUNICIPAL

ADDN

NO 9

G1/ABQ INTERNATIONAL AIRPORT

KIRTLAND

AIR FORCE

BASE

LOCATION OF PROPOSED HANGAR

MUNICIPAL

ADDN

NO 9

KIRTLAND

AIR FORCE

BASE

G1/ABQ INTERNATIONAL AIRPORT

SU-1 AIRPORT & REL FAC

M-2

CITY OF Albuquerque

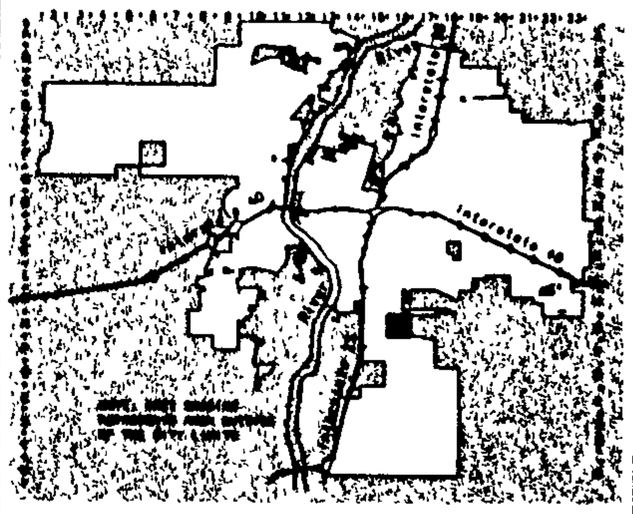
N

W E

S

GRAPHIC SCALE IN FEET

250 0 500 1000



Zone Atlas Page

N-16-Z

Map Amended through
February 24, 1998

Appendix 2 – Copy of Property Survey

SKETCH & DESCRIPTION SHOWING

ALBUQUERQUE INTERNATIONAL SUNPORT
SOUTH GENERAL AVIATION LEASE SITE-AREA B

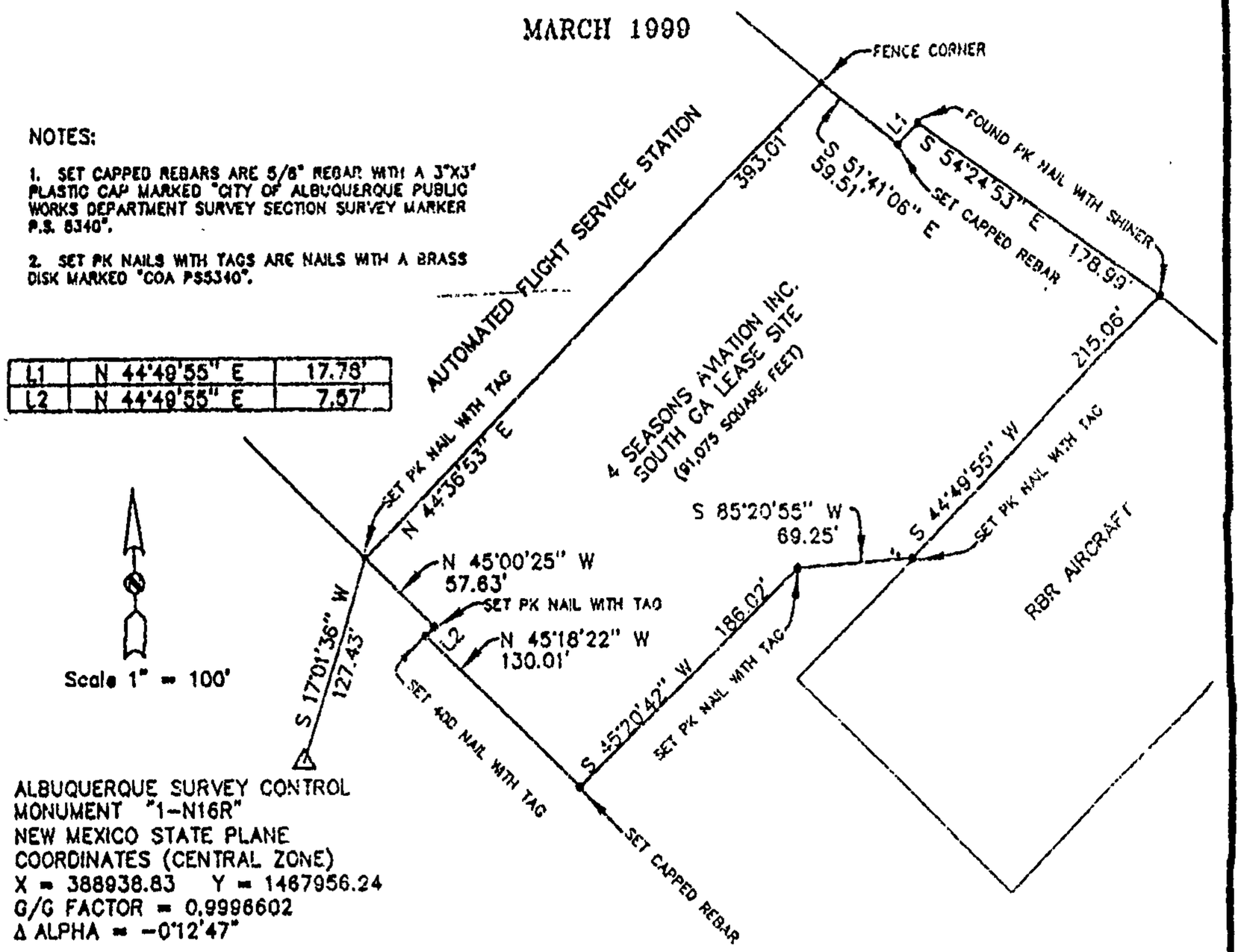
MARCH 1999

NOTES:

1. SET CAPPED REBARS ARE 5/8" REBAR WITH A 3"X3" PLASTIC CAP MARKED "CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT SURVEY SECTION SURVEY MARKER P.S. 8340".

2. SET PK NAILS WITH TAGS ARE NAILS WITH A BRASS DISK MARKED "COA PS5340".

L1	N 44°49'55" E	17.78'
L2	N 44°49'55" E	7.57'



ALBUQUERQUE SURVEY CONTROL
MONUMENT "1-N16R"
NEW MEXICO STATE PLANE
COORDINATES (CENTRAL ZONE)
X = 388938.83 Y = 1467956.24
G/G FACTOR = 0.9996602
Δ ALPHA = -0°12'47"

A parcel of land situate within Section 3, Township 9 North, Range 3 East, New Mexico Principal Meridian and being within the Municipal Addition No. 9 as filed for record in the Office of the County Clerk of Bernalillo County on February 5, 1965 in Volume D3 Folio 105 and within the boundaries of the Albuquerque International Sunport. Said parcel being more particularly described by grid bearings and ground distances as follows:

Beginning at the Northwest corner of said parcel, a set PK nail and tag, from which point the City of Albuquerque Survey Control Monument "1-N16 Reset" bears S 17°01'36" W a distance of 127.43 feet;

Thence N 44°36'53" E a distance of 393.01 feet to a chain link fence corner;

Thence S 51°41'06" E a distance of 59.51 feet to a set capped rebar;

Thence N 44°49'55" E a distance of 17.78 feet to a found PK nail and shiner;

Thence S 54°24'53"E a distance of 178.99 feet to a found PK nail and shiner;

Thence S 44°49'55" W a distance of 215.06 feet to a set PK nail and tag;

Thence S 85°20'55" W a distance of 69.25 feet to a set PK nail and tag;

Thence S 45°20'42" W a distance of 186.02 feet to a set capped rebar;

Thence N 45°18'22" W a distance of 130.01 feet to a set 40D nail and tag;

Thence N 44°49'55" E a distance of 7.57 feet to a set PK nail and tag;

Thence N 45°00'25"W a distance of 57.63 feet to the Point of Beginning and containing 91,075 square feet.

I, Daniel C. Montano, City Surveyor for the City of Albuquerque and Professional Surveyor, hereby certify that this Sketch and Description was prepared from field work performed by me, or under my direct supervision, meets the Minimum Standards for surveys in New Mexico and is true to the best of my knowledge and belief.

Daniel C. Montano
N.M.P.S. No. 5340

032444
Date

DANIEL C. MONTANO NEW MEXICO 5340 REGISTERED LAND SURVEYOR

DMZ

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP
SURVEY SECTION

Appendix 3 – Calculations

FSA RUNOFF CALCULATIONS

BACKGROUND INFORMATION

1. Total property area = 91,075 ft²

* Total FSA That drains to Northwest = 69,080 ft².
FSA drainage area which is paved = 44,710 ft².
FSA area which will be improved = 16,600 ft².

Note: FSA aircraft parking apron experiences considerable run-on from adjacent properties (RBR Aircraft & Seven-Bar Aviation)

2. Land condition (Existing) - (Table A-4 DPM.)
Area to be improved - C - Unpaved parking & storage
Rest of property - D - Paved parking & roofs
3. Land Condition After Improvements — D
4 100 yr - 6 hr rainfall = 2.3 in (DPM Figure C-2).
5 Precipitation zone 2 (Table A-1).

EXCESS PRECIPITATION & VOLUMETRIC RUNOFF

Initial abstraction (Table A-6)

Existing = 0.35 in Improved = 0.10 in.

Infiltration (A-7)

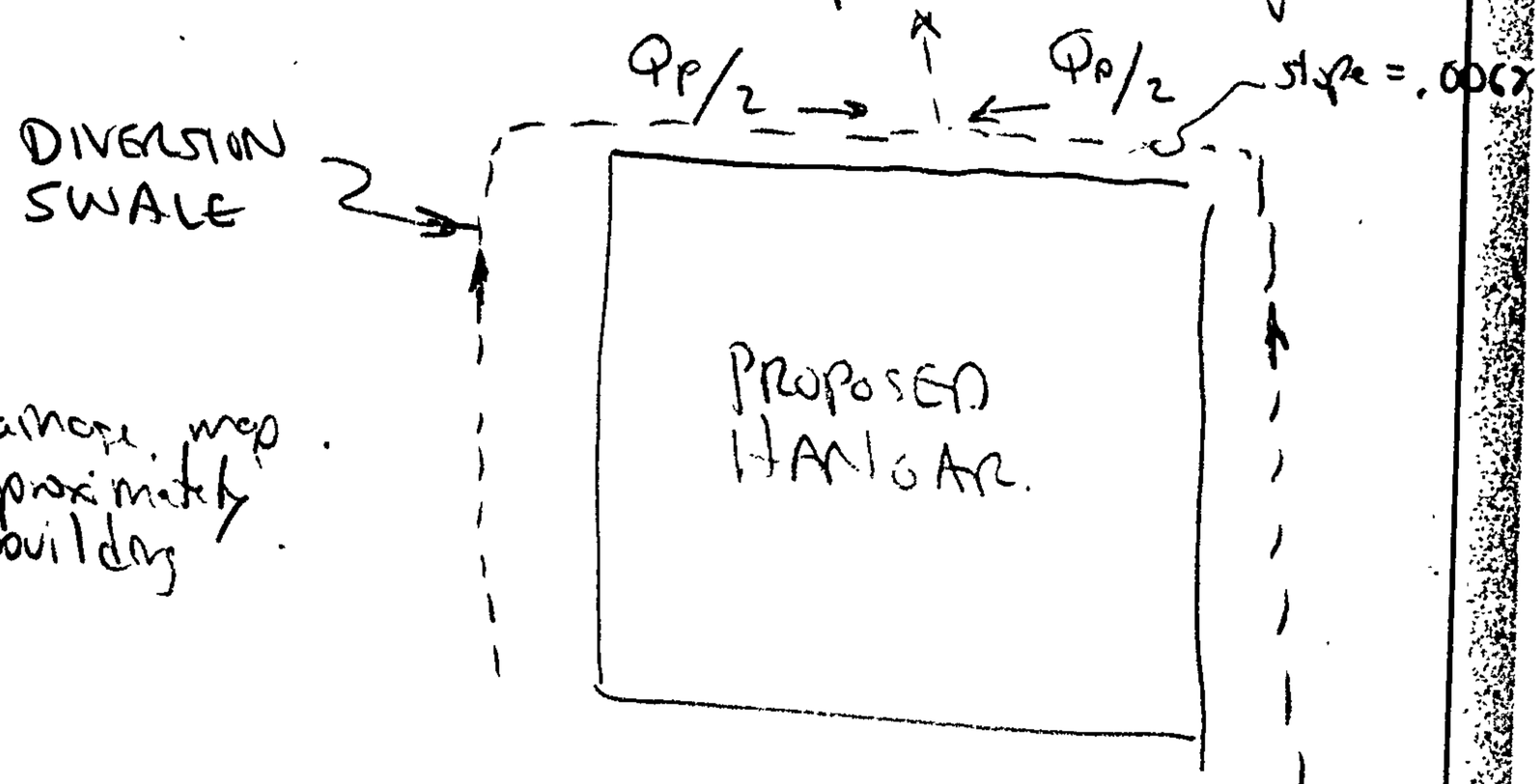
Existing = 0.85 in/hr Improved = 0.04 in/hr

$P_{360,100}$ 2.35 in (Table A-2)

Excess precipitation - 100 yr - 6 hr. storm.
(Table A-8)
Existing condition - 1.13, Improvements - 2.12.

HYDRAULIC ANALYSIS

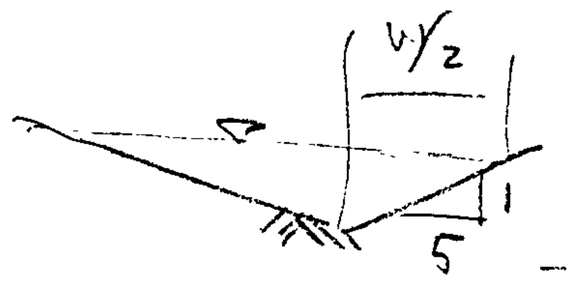
Objective: Calculate depth of water in swales which divert water around proposed hangar.



Based on drainage map flow will be approximately divided around building.

Swale cross section at back of building

1:5 side slopes.



Bottom slope = $\frac{.25 ft}{40 ft}$

Bottom slope = 6.25×10^{-3}

$w/2 = 5d$

Manning Eqn. $Q = \frac{1.49}{n} A R_h^{2/3} \sqrt{S}$

$n = .016$ (Rough Asphalt)

$A = \frac{1}{2} d \cdot w = \frac{1}{2} d \cdot 2 \cdot \frac{w}{2} = 5d^2$

$P = 2\sqrt{d^2 + \left(\frac{w}{2}\right)^2} = 2\sqrt{d^2 + (5d)^2} = d\,2\sqrt{26} = 10.20\,d$

$Q = \frac{1.49}{n} \cdot 5d^2 \left[\frac{5d^2}{10.20\,d}\right]^{\frac{2}{3}} \sqrt{S} = \frac{1.49}{n} 5d^2 [.490\,d]^{\frac{2}{3}} \sqrt{S}.$

$Q = \frac{4.63}{n} \cdot d^{8/3} \sqrt{S}$

$d = \left[\frac{Qn}{4.63\sqrt{S}}\right]^{3/8} = \left[\frac{3.59 \cdot .016}{4.63\sqrt{.00625}}\right]^{3/8} = \boxed{.499 ft = d}$

Volume of runoff:

Weighted Excess Precipitation (E)

$$E_{Existing} = \frac{44{,}710 \cdot 2{,}12 + 24380 \cdot 1{,}13}{69080} = 1.77 \text{ in}$$

$$E_{improved} = \frac{61310 \cdot 2{,}12 + 7780 \cdot 1{,}13}{69080} = 2.01 \text{ in}$$

Volume runoff

$$V_{existing} = E_{existing} \cdot 69080 = 1.22 \times 10^5 \text{ in-ft}^2 = 10{,}200 \text{ ft}^3$$

$$V_{improved} = E_{improved} \cdot 69080 = 11{,}600 \text{ ft}^3$$

PEAK DISCHARGE (Table A-9)

$$Q_{P_{existing}} = 3{,}14 \frac{\text{cfs}}{\text{acre}} \frac{24380 \text{ ft}^2}{43560 \text{ ft}^2/\text{acre}} + 4{,}70 \frac{44710}{43560} = 6{.}58 \text{ cfs}$$

$$Q_{P_{improved}} = 3{,}14 \frac{\text{cfs}}{\text{acre}} \frac{7780 \text{ ft}^2}{43560 \text{ ft}^2/\text{acre}} + 4{,}70 \cdot \frac{61310}{43560} = 7{.}18 \text{ cfs}$$

SUMMARY OF RESULTS

	EXISTING PROPERTY	AFTER IMPROVEMENTS
Total Runoff (V)	10,200 ft³	11,600 ft³
Peak Discharge (Q_p)	6.58 cfs	7.18 cfs

ALBUQUERQUE FLIGHT SERVICE STATION

98.5 ft
99.0 ft
99.0 ft
98.0 ft
97.5 ft
97.0 ft
96.5 ft
96.0 ft
98.0 ft
5 ft SET BACK
FENCE CORNER
35 ft SET BACK
CYCLONE FENCE
Edge of Asphalt
NAIL IN ASPHALT
NAIL IN ASPHALT
Manhole 99.088
Clean Out 99.468
99.5 ft
Proposed Hangar (80' x 80') (Floor Elev. = 98.50 ft)
98.0 ft
CAPPED REBAR
NAIL IN ASPHALT
7-Bar Hangar
New Asphalt Paving (Approx. 10,200 ft²)
99.0 ft
Existing Hangar (100' x 100') (Floor Elevation = 100.060 ft)
PROPERTY BOUNDARY FROM 3/99 SURVEY
98.5 ft
99.0 ft
Sidewalk
99.0 ft
CAPPED REBAR
Manhole 98.860
NAIL WITH TAG
NAIL IN ASPHALT
Valve 98.648
Manhole 98.216
NAIL IN ASPHALT
RBR AIRCRAFT

PLATE 2

Four Seasons Aviation
Site Plan
New Hangar & Drainage
Scale: 1" = 40'


RECEIVED
JUN 0 8 2001
PWD/DESIGN REVIEW

ALBUQUERQUE FLIGHT SERVICE STATION

98.5 ft
99.0 ft
99.0 ft
98.0 ft
97.5 ft
97.0 ft
96.5 ft
96.0 ft

FENCE CORNER

CYCLONE FENCE

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NAIL IN ASPHALT

NAIL IN ASPHALT

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NAIL IN ASPHALT

7-Bar Hangar

99.0 ft

Existing Hangar
(100' x 100')
(Floor Elevation = 100.060 ft)

PROPERTY BOUNDARY
FROM 3/99 SURVEY

98.5 ft

99.0 ft

Sidewalk

99.0 ft

CAPPED REBAR

Manhole
98.860

NAIL WITH TAG

NAIL IN ASPHALT

Valve
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98.216

NAIL IN ASPHALT

RBR AIRCRAFT

PLATE 1

Four Seasons Aviation

Site Plan

Existing Contours & Drainage

Scale: 1" = 40'

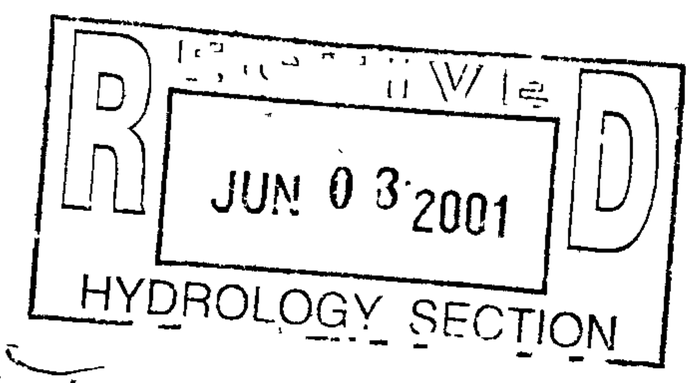
Drainage Plan

Proposed Improvements for

Four Seasons Aviation, Inc.

South General Aviation Lease Site – Area B

Albuquerque International Airport



Prepared by
Bruce M. Thomson, Ph.D., P.E.
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1018 Idlewilde SE
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June 6, 2001

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Plate 2 shows the site drainage plan. The hangar floor will be located at an elevation of 98.5 ft with respect to the survey monument. Note that the existing hangar floor is located at elevation 100.060 with respect to this monument. Flow from the FSA aircraft tiedown area and run-on from RBR Aircraft and Seven-Bar Aviation will be directed around the new hangar to the FSS swale. The swale around the back of the hangar will have a bottom slope of .00625 and side slopes of 1:5. Due to the site contours, approximately half of the flow will be diverted around each side of the hangar. Under peak flow conditions the depth of water in this swale will be 0.499 ft at the back of the hangar. At this location the hangar floor will be approximately 0.75 ft above the bottom of the swale, thus there is a 50% safety factor incorporated in the design.

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Reference

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Appendix I – Zone Atlas Page N-16-Z

SU-1 AIRPORT & REL FAC

MUNICIPAL ADDN NO 9

G1/ABQ INTERNATIONAL AIRPORT

KIRTLAND AIR FORCE BASE

Lan GT 75

Lan 65-70
Lan 70-75

LOCATION OF PROPOSED HANGAR

MUNICIPAL ADDN NO 9

G1/ABQ INTERNATIONAL AIRPORT

SU-1 AIRPORT & REL FAC

KIRTLAND AIR FORCE BASE

M-2

CITY OF Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

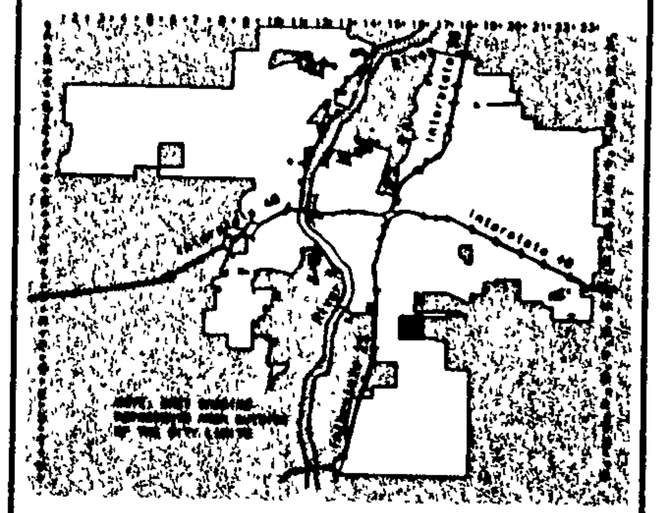
N

W E

S

GRAPHIC SCALE IN FEET

250 0 500 1000



Zone Atlas Page

N-16-Z

Map Amended through
February 28, 1998

Appendix 2 – Copy of Property Survey

SKETCH & DESCRIPTION SHOWING
ALBUQUERQUE INTERNATIONAL SUNPORT
SOUTH GENERAL AVIATION LEASE SITE-AREA B

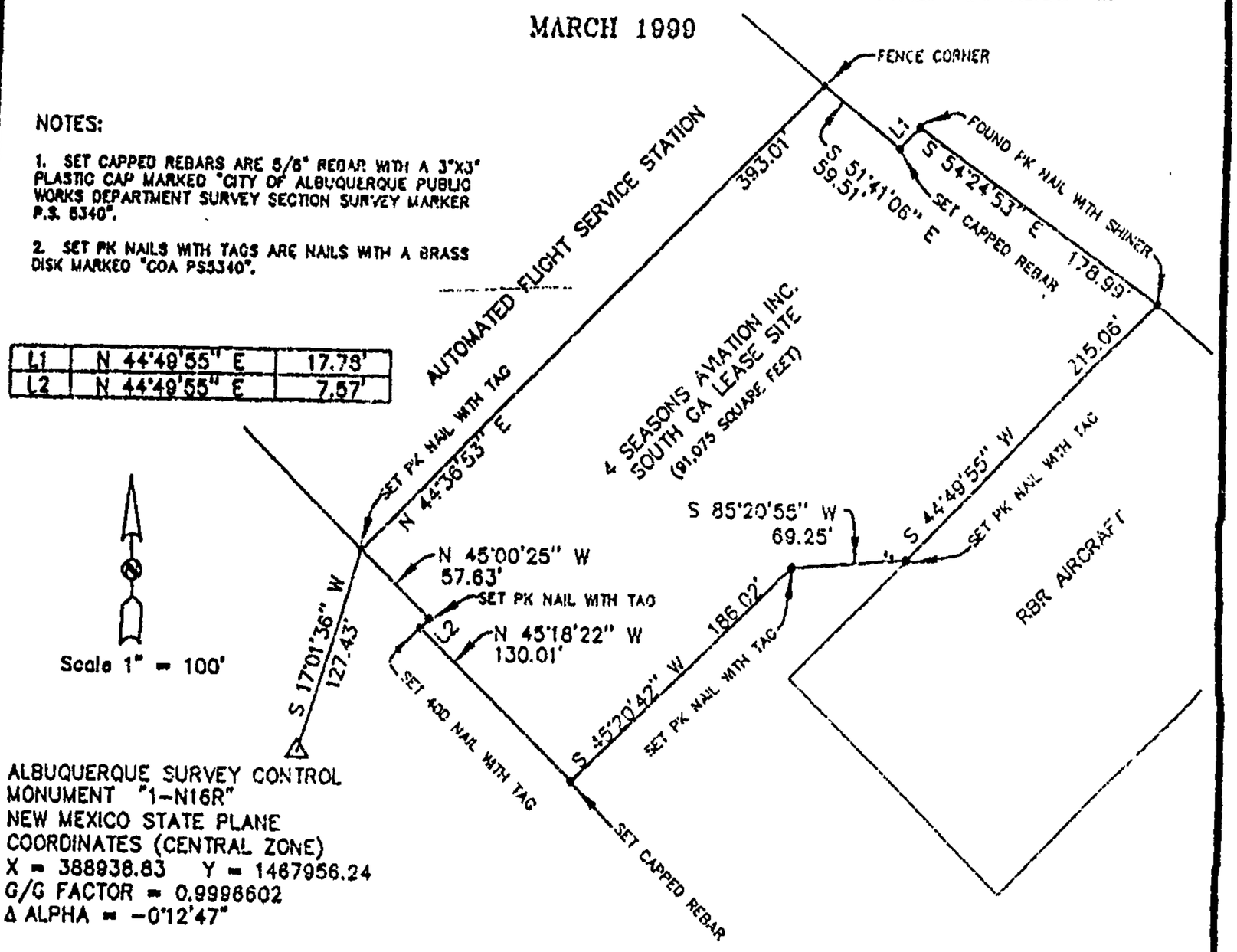
MARCH 1999

NOTES:

1. SET CAPPED REBARS ARE 5/8" REBAR WITH A 3"X3" PLASTIC CAP MARKED "CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT SURVEY SECTION SURVEY MARKER P.S. 5340".

2. SET PK NAILS WITH TAGS ARE NAILS WITH A BRASS DISK MARKED "COA PS5340".

L1	N 44°49'55" E	17.78'
L2	N 44°49'55" E	7.57'



Scale 1" = 100'

ALBUQUERQUE SURVEY CONTROL
MONUMENT "1-N16R"
NEW MEXICO STATE PLANE
COORDINATES (CENTRAL ZONE)
X = 388938.83 Y = 1467956.24
G/G FACTOR = 0.9996602
Δ ALPHA = -0°12'47"

A parcel of land situate within Section 3, Township 9 North, Range 3 East, New Mexico Principal Meridian and being within the Municipal Addition No. 9 as filed for record in the Office of the County Clerk of Bernalillo County on February 5, 1965 in Volume D3 Folio 105 and within the boundaries of the Albuquerque International Sunport. Said parcel being more particularly described by grid bearings and ground distances as follows:

Beginning at the Northwest corner of said parcel, a set PK nail and tag, from which point the City of Albuquerque Survey Control Monument "1-N16 Reset" bears S 17°01'36" W a distance of 127.43 feet;

Thence N 44°36'53" E a distance of 393.01 feet to a chain link fence corner;

Thence S 51°41'06" E a distance of 59.51 feet to a set capped rebar;

Thence N 44°49'55" E a distance of 17.78 feet to a found PK nail and shiner;

Thence S 54°24'53"E a distance of 178.99 feet to a found PK nail and shiner;

Thence S 44°49'55" W a distance of 215.06 feet to a set PK nail and tag;

Thence S 85°20'55" W a distance of 69.25 feet to a set PK nail and tag;

Thence S 45°20'42" W a distance of 186.02 feet to a set capped rebar;

Thence N 45°18'22" W a distance of 130.01 feet to a set 40D nail and tag;

Thence N 44°49'55" E a distance of 7.57 feet to a set PK nail and tag;

Thence N 45°00'25"W a distance of 57.63 feet to the Point of Beginning and containing 91,075 square feet.

I, Daniel C. Montano, City Surveyor for the City of Albuquerque and Professional Surveyor, hereby certify that this Sketch and Description was prepared from field work performed by me, or under my direct supervision, meets the Minimum Standards for surveys in New Mexico and is true to the best of my knowledge and belief.

Daniel C. Montano
N.M.P.S. No. 5340

032444
Date

DANIEL C. MONTANO NEW MEXICO 5340 REGISTERED LAND SURVEYOR

DMZ

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP
SURVEY SECTION

Appendix 3 – Calculations

FSA RUNOFF CALCULATIONS

BACKGROUND INFORMATION

1. Total property area = 91,075 ft²

* Total FSA That drains to Northwest = 69,080 ft².
FSA drainage area which is paved = 44,710 ft².
FSA area which will be improved = 16,600 ft².

Note: FSA aircraft parking apron experiences considerable run-on from adjacent properties (RBR Aircraft & Seven-Bar Aviation)

2. Land condition (Existing) - (Table A-4 DPM.)
Area to be improved - C - Unpaved parking & storage
Rest of property - D - Paved parking & roofs
3. Land Condition After Improvements — D
4. 100 yr - 6 hr rainfall = 2.3 in (DPM Figure C-2).
5. Precipitation zone 2 (Table A-1).

EXCESS PRECIPITATION & VOLUMETRIC RUNOFF

Initial abstraction (Table A-6)
Existing = 0.35 in Improved = 0.10 in.

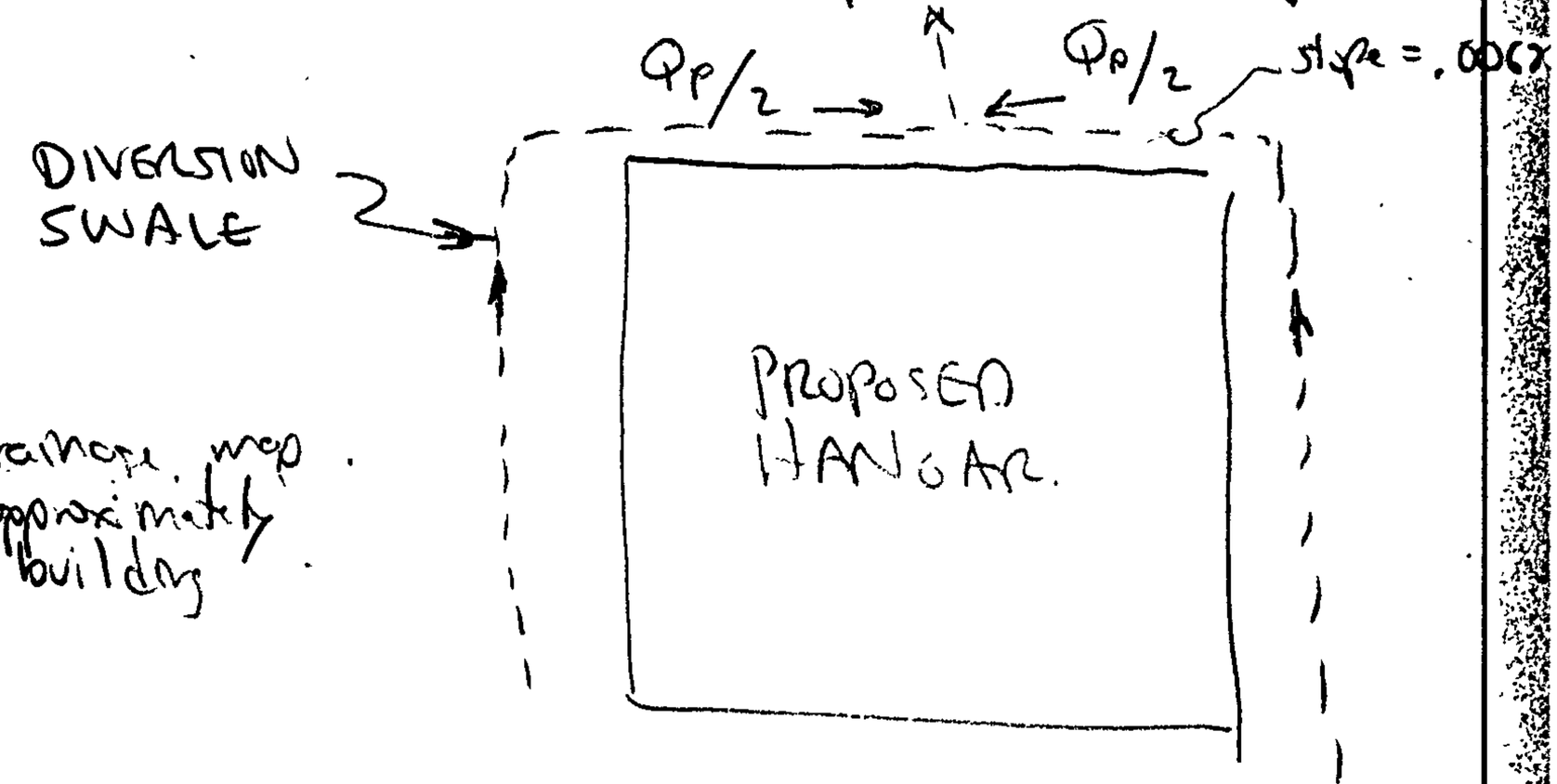
Infiltration (A-7)
Existing = 0.85 in/hr Improved = 0.04 in/hr

$P_{360,100}$ 2.35 in (Table A-2)

Excess precipitation - 100 yr - 6 hr. storm
(Table A-8)
Existing Condition - 1.13, Improvements - 2.12.

HYDRAULIC ANALYSIS

Objective: Calculate depth of water in swales which direct water around proposed hangar.

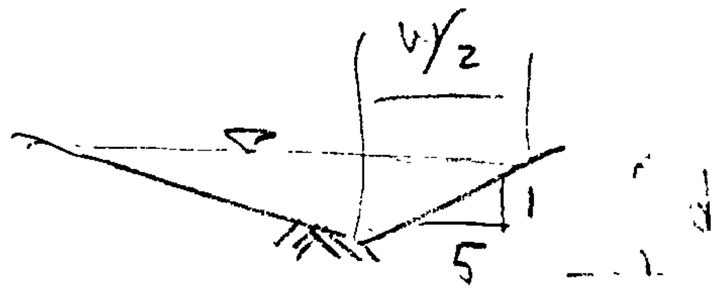


Based on drainage map flow will be approximately divided around building.

Swale cross section at back of building

1:5 side slopes.

Bottom slope = $\frac{.25\text{ft}}{40\text{ft}}$



Bottom slope = 6.25×10^{-3}

$w/2 = 5d$

Manning Eqn. $Q = \frac{1.49}{n} A R_h^{2/3} \sqrt{S}$

$n = .016$ (Rough Asphalt).

$A = \frac{1}{2} d \cdot w = \frac{1}{2} d \cdot 2 \cdot \frac{w}{2} = 5d^2$

$P = 2\sqrt{d^2 + \left(\frac{w}{2}\right)^2} = 2\sqrt{d^2 + (5d)^2} = d\,2\sqrt{26} = 10.20\,d$

$Q = \frac{1.49}{n} \cdot 5d^2 \left[\frac{5d^2}{10.20\,d}\right]^{\frac{2}{3}} \sqrt{S} = \frac{1.49}{n} 5d^2 [.490\,d]^{\frac{2}{3}} \sqrt{S}.$

$Q = \frac{4.63}{n} d^{8/3} \sqrt{S}$

$d = \left[\frac{Qn}{4.63\sqrt{S}}\right]^{3/8} = \left[\frac{3.59 \cdot .016}{4.63\sqrt{.00625}}\right]^{3/8} = \boxed{.499\text{ ft} = d}$

Volume of runoff:

Weighted Excess Precipitation (E)

$$E_{Existing} = \frac{44,710 \cdot 2,12 + 24380 \cdot 1,13}{69080} = 1.77 \text{ in}$$

$$E_{Improved} = \frac{61310 \cdot 2,12 + 7780 \cdot 1,13}{69080} = 2.01 \text{ in}$$

Volume runoff

$V_{existing} = E_{existing} \cdot 69080 = 1.22 \times 10^5 \text{ in-ft}^2 = 10,200 \text{ ft}^3$

$V_{improved} = E_{improved} \cdot 69080 = 11,600 \text{ ft}^3$

PEAK DISCHARGE (Table A-9)

$$Q_{Pexisting} = 3,14 \frac{cfs}{acre} \frac{24380 \text{ ft}^2}{43560 \text{ ft}^2/\text{acre}} + 4.70 \frac{44710}{43560} = 6.58 \text{ cfs}$$

$$Q_{Pimproved} = 3,14 \frac{cfs}{acre} \frac{7780 \text{ ft}^2}{43560 \text{ ft}^2/\text{acre}} + 4.70 \cdot \frac{61310}{43560} = 7.18 \text{ cfs}$$

SUMMARY OF RESULTS

	EXISTING PROPERTY	AFTER IMPROVEMENTS
Total Runoff (V)	10,200 ft³	11,600 ft³
Peak Discharge (Q_p)	6.58 cfs	7.18 cfs

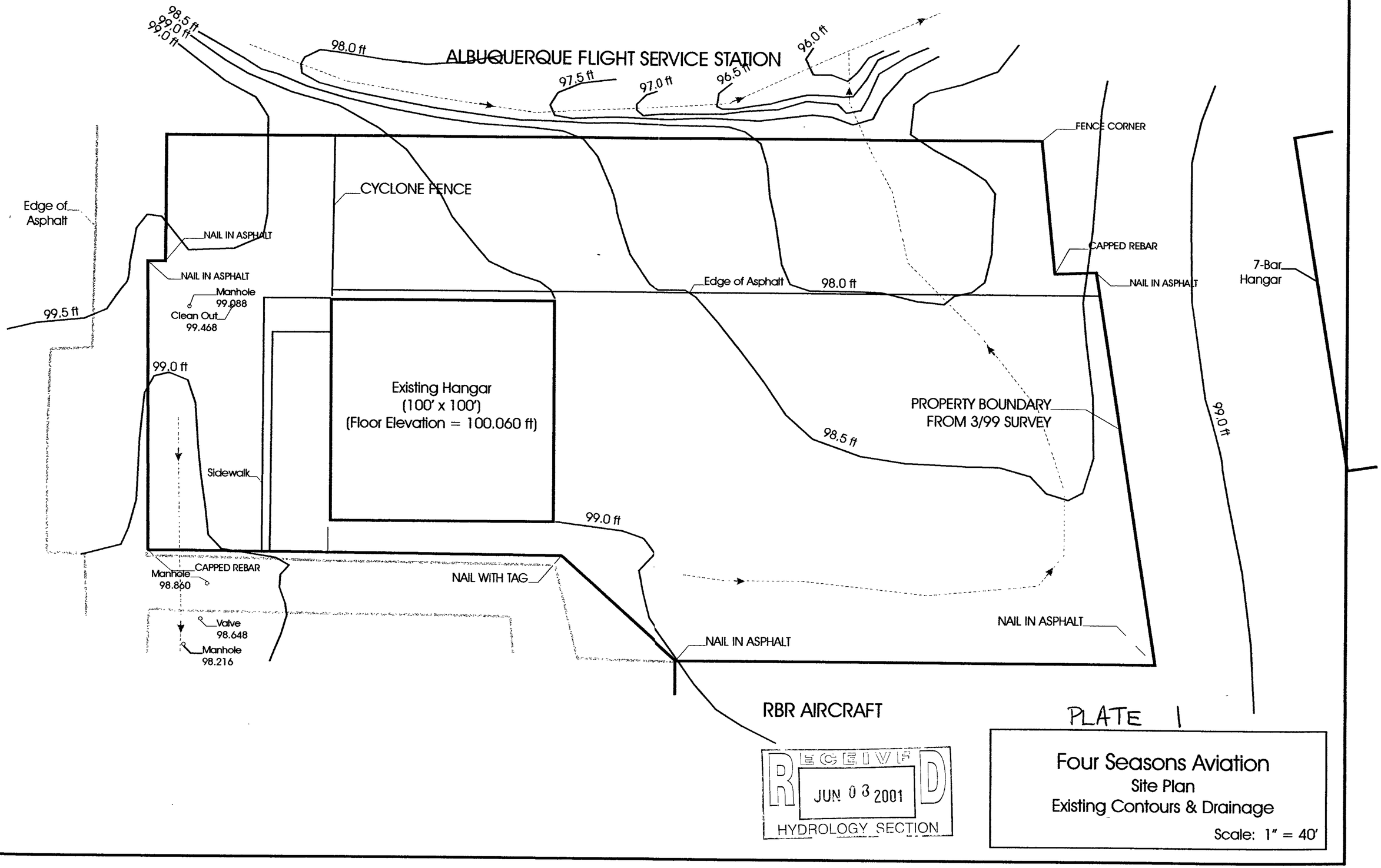


PLATE 1

Four Seasons Aviation

Site Plan

Existing Contours & Drainage

Scale: 1" = 40'

ALBUQUERQUE FLIGHT SERVICE STATION

98.5 ft
99.0 ft
99.0 ft
98.0 ft
97.5 ft
97.0 ft
96.5 ft
96.0 ft
98.0 ft
5 ft SET BACK
FENCE CORNER
35 ft SET BACK
CYCLONE FENCE
Edge of Asphalt
NAIL IN ASPHALT
NAIL IN ASPHALT
Manhole 99.088
Clean Out 99.468
99.5 ft
Proposed Hangar (80' x 80') (Floor Elev. = 98.50 ft)
98.0 ft
CAPPED REBAR
NAIL IN ASPHALT
7-Bar Hangar
New Asphalt Paving (Approx. 10,200 ft²)
99.0 ft
Existing Hangar (100' x 100') (Floor Elevation = 100.060 ft)
PROPERTY BOUNDARY FROM 3/99 SURVEY
98.5 ft
99.0 ft
Sidewalk
99.0 ft
CAPPED REBAR
Manhole 98.860
NAIL WITH TAG
NAIL IN ASPHALT
Valve 98.648
Manhole 98.216
NAIL IN ASPHALT
RBR AIRCRAFT

PLATE 2

RECEIVED
JUN 08 2001
HYDROLOGY SECTION

Four Seasons Aviation
Site Plan
New Hangar & Drainage
Scale: 1" = 40'