County of Bernalillo

State of New Mexico

2400 BROADWAY, S.E.
ALBUQUERQUE, NEW MEXICO 87102
PUBLIC WORKS (505) 848-1500

October 29, 1998

Philip Clark, P.E.
Clark Consulting Engineers
19 Ryan Road
Edgewood, New Mexico 87015

RE: Grading and Drainage Plan for Hinman Residence, Lot 24, Block 10, Tract 2, Unit 1, NAA (C22/D42) (PWD-98-154) Submitted for Building Permit Approval, Engineer's Stamp Dated 10/1/98.

Dear Mr. Clark:

Based on the information provided, the above referenced plan is approved for Building Permit release.

As you are aware, the Engineer's Certification plan is required prior to Certificate of Occupancy release for this residence. This certification must include the as-built floodwall elevations.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology
Kevin Hinman, Owner
Brad Catanach, P.E., Bernalillo County Public Works Division
Lisa Ann Manwill, P.E., Albuquerque Metropolitan Arroyo Flood Control Authority
File

GRADING & DRAINAGE PLAN

THE PROPOSED RESIDENTIAL HOME IS LOCATED IN NORTH ALBUQUERQUE ACRES, UNIT 1, APPROXIMATELY 11 MILES NORTHEAST OF THE DOWNTOWN CORE OF ALBUQUERQUE, NEW MEXICO. THE GRADING AND DRAINAGE SCHEME HEREON IS IN COMPLIANCE WITH THE BERNALILLO COUNTY FLOOD HAZARD ORDINANCE, NO.88-46, AND STORM DRAINAGE, NO.96-5. THE PLAN IS REQUIRED IN ORDER TO FACILITATE THE OWNER'S REQUEST FOR BUILDING PERMIT. THE PROPOSED PLAN SHOWS:

1.) EXISTING AND NEW CONTOURS WITH EXISTING AND NEW SPOT ELEVATIONS.
2.) PROPOSED IMPROVEMENTS; RESIDENCE, GRAVEL DRIVE, SEPTIC LOCATION CONCRETE PADS, FLOOD WALL CONSTRUCTION,AND NEW GRADE ELEVATIONS.
3.) CONTINUITY BETWEEN EXISTING AND PROPOSED ELEVATIONS.
4.) QUANTIFICATION AND ACCEPTANCE OF UPSTREAM, OFF-SITE FLOWS WHICH CONTRIBUTE TO THE DEVELOPED FLOWS GENERATED BY THE IMPROVEMENTS.

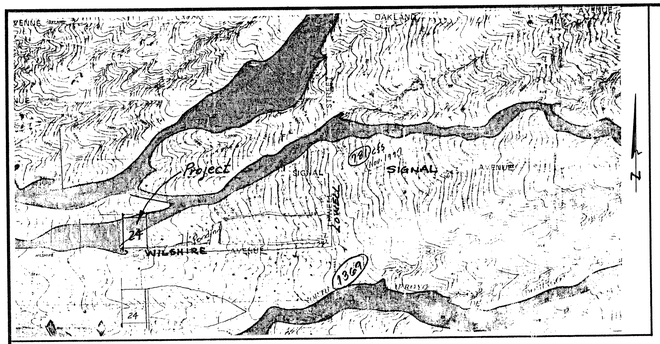
THE PURPOSE OF THE PLAN IS TO ESTABLISH CRITERIA FOR CONTROLLING STORM RUN-OFF GENERATED BY THE PROPOSED IMPROVEMENTS, ESSENTIALLY ALLOWING HISTORIC OFF-SITE AREAS TO DRAIN THROUGH THE PROPERTY AFTER DEVELOPMENT. THE PLAN DETERMINES THE RUN-OFF RESULTING FROM THE 100-YEAR/6-HOUR DURATION STORMS FOR BOTH THE EXISTING AND DEVELOPED CONDITIONS.

PRESENTLY, THE ADJACENT LOT TO THE EAST IS DEVELOPED. WILSHIRE AVENUE ADJACENT ON THE SOUTH IS PRESENTLY GRAVELED, AND MAINTAINED BY BERNALILLO COUNTY. THE ADJACENT PROPERTY TO THE NORTH AND WEST ARE CURRENTLY UNDEVELOPED. THE SITE GENERALLY SLOPES FROM NORTHEAST TO SOUTHWEST, GRADUALLY AT APPROXIMATELY 5 PERCENT. THE PARCEL IS IMPACTED BY A MAJOR DRAINAGE WATERSHED, AND AS A RESULT IS ENCUMBERED BY A DESIGNATED FEMA FLOOD PLAIN, SEE MAP, THIS SHEET.

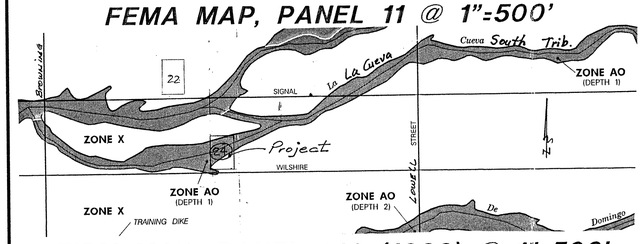
THESE FLOWS ARE QUANTIFIED, ALONG WITH DEVELOPED FLOWS WITHIN WILSHIRE AVENUE, ON THE PLAN. THE PROPOSED RESIDENTIAL STRUCTURE WHILE LOCATED OUTSIDE OF THE COMPUTED MINIMUM EROSION SETBACK IS SITUATED WITHIN THE COMPUTED WATER SURFACE. THEREFORE A REINFORCED CONCRETE FLOOD WALL IS INCORPORATED INTO THE DESIGN IN ORDER TO CONTAIN POTENTIAL WAVE ACTION ALONG THE SOUTHERLY FEMA FLOODPLAIN.

HISTORICAL SITE RUN-OFF OUTFALL LOCATIONS WILL REMAIN UNCHANGED WITH RUN-OFF ALLOWED TO SHEET FLOW TO THE SOUTHWEST AS IT HAS HISTORICALLY. ACCESS WILL BE FROM COUNTY MAINTAINED WILSHIRE AVENUE, THEREFORE MINOR GRADING IMPROVEMENTS ARE PROPOSED WITHIN THE RIGHT-OF-WAY.

FREE DISCHARGE OF STORM RUN-OFF FROM THE SITE IS ACCEPTABLE SINCE THE PROJECT LAND USE INTENSITY IS 1 D.U. PER ACRE, AND DOES NOT EXCEED THE ALLOWABLE FOR NORTH ALBUQUERQUE ACRES. HYDROLOGIC PROCEDURES AND CALCULATIONS ARE IN ACCORDANCE WITH SECTION 22.2, HYDROLOGY, OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 2, DESIGN CRITERIA, REVISED JANUARY 1993, FOR THE CITY OF ALBUQUERQUE, NEW MEXICO, AND ADOPTED BY BERNALILLO COUNTY.



FEMA MAP, PANEL 11 @ 1"=500'



FIRM MAP, PANEL 142 (1996) @ 1"=500'

CALCULATIONS

(SUPPLEMENTAL CALCS. ON FILE CPWDEPT.)

I. DESIGN CRITERIA

HYDROLOGIC METHODS PER SECTION 22.2, HYDROLOGY, OF THE DEVELOPMENT PROCESS MANUAL (DPM), REVISED JANUARY 1993 FOR THE CITY OF ALBUQUERQUE AND ADOPTED BY THE COUNTY OF BERNALILLO.
DISCHARGE RATE: Q = Qpeak x AREA..."PEAK DISCHARGE RATES FOR SMALL WATERSHEDS"
VOLUMETRIC DISCHARGE: VOLUME = Eweighted x AREA
SOIL TYPE: 'B', ENC. EMBUDO SERIES, A GRAVELLY FINE SANDY LOAM AS CLASSIFIED BY THE SOIL CONSERVATION SERVICE
P100 = 2.9 INCHES, ZONE 4 TIME OF CONCENTRATION, TC = 10 MINUTES
DESIGN STORM: 100-year/6-hour, 10-year/6-hour WHERE [ ] = 10 year VALUES

II. EXISTING CONDITIONS

PROJECT AREA = 0.89 ACRES, WHERE EXCESS PRECIPITATION 'A' = 0.80 IN. [0.28]
PEAK DISCHARGE, Q100 = 1.96 CFS [0.8], WHERE UNIT PEAK DISCHARGE 'A' = 2.2 CFS/ACRE [0.87]
THEREFORE: VOLUME100 = 2585 C.F. [905 C.F.]

III. DEVELOPED CONDITIONS

DETERMINE LAND TREATMENTS, PEAK DISCHARGE & WEIGHTED EXCESS PRECIPITATION

	AREA	LAND TREATMENT	UNIT PEAK DISCHARGE	'E'
UNDEVELOPED,	0.54 AC.(61%)	A	2.20[0.87]	0.80[0.28]
LANDSCAPING/REVEG.	0.17 AC.(19%)	B	2.92[1.45]	1.08[0.46]
GRAVEL & COMPACTED SOIL	0.08 AC.(9%)	C	3.73[2.26]	1.46[0.73]
ROOF/PAVEMENT,	0.10 AC.(11%)	D	5.28[3.57]	2.64[1.69]
	0.89 ACRES			

Eweighted = 1.12 IN. [0.51]
Q100 = 2.51 CUBIC FEET PER SECOND (CFS) Q10 = 1.3 CFS; VOL.100 = 3618 CUBIC FEET (CF), VOL10 = 1648 CF

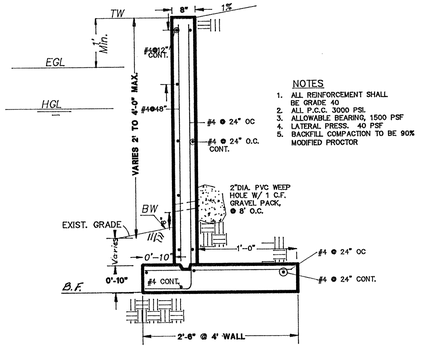
IV. QUANTIFY UP-STREAM RUNOFF IMPACTING THE PROPERTY

THIS SITE IS IMPACTED BY A FEMA FLOOD PLAIN @ NORTHEAST CORNER OF LOT, REFERENCE RESOURCE TECHNOLOGIES, INC. MASTER DRAIANGE PLAN FOR NORTH ALBUQUERQUE ACRES, ON-GOING, DRAFT REPORT JULY 1998, Prepared for AMAFCA.

AND.....County PWD file 97-55, for Adjacent Lot to NORTH.

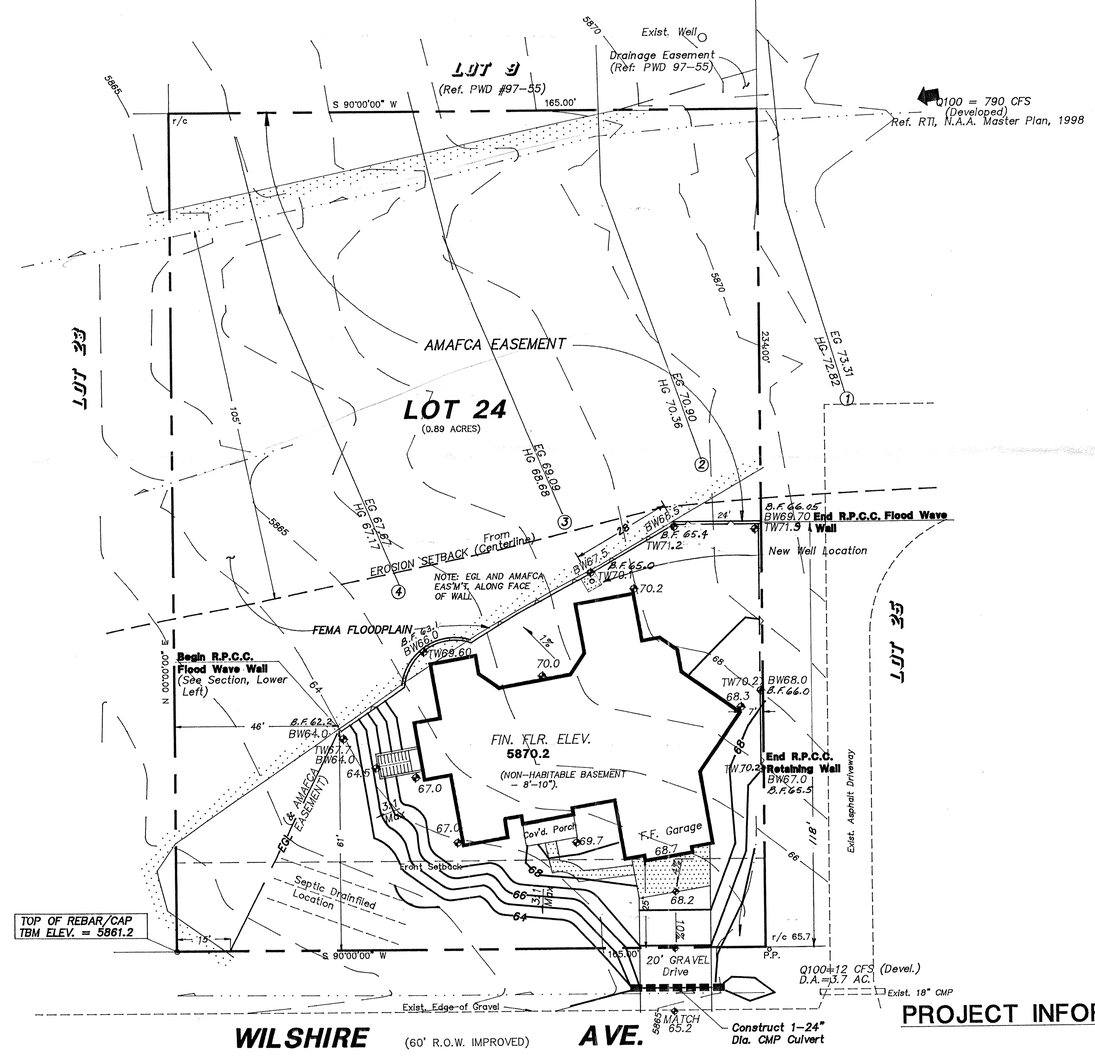
Future Developed Flow @ Lowell, 781 cfs
Potential Avulsion Location Upstream of Site Before Lowell
Use Worst Case.....Q100 = 790 CFS (No Avulsion Control)

DESIGN CONCEPT: *SINCE STRUCTURE IS LOCATED OUTSIDE OF MINIMUM EROSION SETBACK, CONTAIN UPPER REGIME WAVE ACTION WITHIN FEMA EASEMENT + SET FINISH FLOOR 1 FOOT ABOVE COMPUTED ENERGY GRADE ELEVATION. DESIGN REINFORCED CONCRETE WALL WITH TOP OF WALL + 1' ABOVE ENERGY GRADE WITH CONVENTIONAL DEPTH FOOTINGS.*

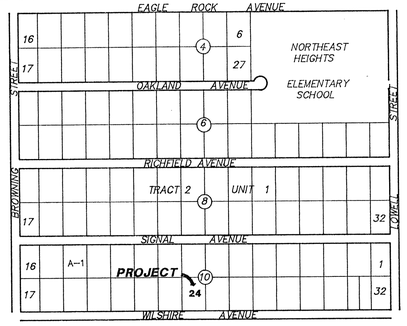


NOTES
1. ALL REINFORCEMENT SHALL BE GRADE 40
2. ALL P.C.C. 3000 PSI.
3. ALLOWABLE BEARING, 1500 PSF
4. LATERAL PRESS. 40 PSF
5. BACKFILL COMPACTION TO BE 90% MODIFIED PROCTOR

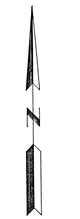
REINFORCED CONCRETE RETAINING WALL



WILSHIRE (60' R.O.W. IMPROVED) AVE.



VICINITY MAP, ZONE C-22 @ 1"=500'



SCALE: 1"=20'

LEGEND

EXIST. SPOT ELEV. + 54.0
EXIST. CONTOUR 55
NEW SPOT ELEV. 34.1
NEW CONTOUR 06
NEW STRUCTURE
NEW CONCRETE
ENERGY GRADE LINE EGL
HEC-2 X-SECTION NO. 2
DRAINAGE SWALE
DRAINAGE FLOW DIRECTION
EXISTING POWER POLE P.P.
FINISH FLOOR ELEVATION Fin. Flr. Elev.
TOP OF WALL TW (Minimum)
BOTTOM OF WALL BW (@ Grade)
Bottom of Footing B.F.

NOTES:

(SEE CPWD FILE FOR HEC-2 ANALYSIS)

1. *PER BERNALILLO COUNTY ORDINANCE NO. 88-13, AN ACCESS PERMIT IS REQUIRED PRIOR TO THE START OF CONSTRUCTION. CONTACT HOSS FOSTER, 848-1523.*
2. *PERIMETER FENCING IS NOT PROPOSED BY THIS PLAN. FUTURE FENCING SHALL NOT BE CONSTRUCTED WITHIN THE AMAFCA EASEMENT WITHOUT COUNTY PUBLIC WORKS DEPT. APPROVAL.*
3. *REVEGETATE ALL AREAS DISTURBED DUE TO CONSTRUCTION PER CITY OF ALBUQUERQUE, NATIVE SEED/MIX, SPEC. 1011.*
4. *THIS PLAN SHOWS A FIXED PERCENT OF THE SITE TO REMAIN UNDISTURBED LAND TREATMENT A. SHOULD THIS AMOUNT BE EXCEEDED DURING CONSTRUCTION, A REVISED PLAN IS REQUIRED TO BE SUBMITTED TO THE COUNTY PUBLIC WORKS DEPT.*

EROSION SETBACK CALCULATIONS

PER "SEDG", RCI FOR AMAFCA 1994

Q100 = 790 CFS THEN Q_D =0.2Q100 = 158 CFS
W_D = 35', BANK SETBACK = 87'
WHERE: LAMDA = 10W_D = 350'
THEREFORE:
CSB, CENTERLINE SETBACK = 105'.....CONTROLS

I, PHILIP W. CLARK, A PROFESSIONAL ENGINEER LICENSED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW MEXICO, DO HEREBY CERTIFY THAT I HAVE VISITED THE SITE SHOWN HEREON, AND THAT THE CONTOURS SHOWN REPRESENT THE EXISTING GROUND CONDITIONS, AND DO FURTHER CERTIFY THAT NO EARTHWORK OF ANY KIND, NOR ANY DISTURBANCE OF THE EXISTING GROUND HAS OCCURRED ON THIS SITE SINCE THE CONTOURS WERE DETERMINED.

PHILIP W. CLARK NMPE #10265

PHILIP W. CLARK 8.5.98 10265 NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

Rev. 10/1/98 CCE

PROJECT INFORMATION

LEGAL DESCRIPTION:
LOT 24, BLOCK 10, TRACT 2, UNIT 1, NORTH ALBUQUERQUE ACRES, BERNALILLO COUNTY, NEW MEXICO

PROJECT BENCHMARK
TOP OF REBAR, LOT 24 SOUTHWEST PROPERTY CORNER, ELEVATION = 5861.2, AS TIED FROM ALBUQUERQUE CONTROL SURVEY, ACS.

PROPERTY ADDRESS:
WILSHIRE AVENUE, ALBUQUERQUE, NM 87122

TOPOGRAPHIC SURVEY:
DIGITIZED FROM MAX DOAK TOPOGRAPHIC SURVEY.

Clark Consulting Engineers
Edgewood, New Mexico 87015
Tele: (505) 281-2444 Fax: (505) 281-2444

DATE	REVISION
10-1-98	Addl. County
	FPA Com'ts

LOT 24, BLOCK 10, TRACT 2, UNIT 1 NORTH ALBUQUERQUE ACRES

HINMAN-CHAN RESIDENCE

GRADING & DRAINAGE PLAN

DESIGNED BY: PWC	DRAWN BY: CCE	JOB No: HINMANGD	SHEET No. 1 of 1
CHECKED BY: PWC	DATE: 8/12/98	FILE No: G&D	

County of Bernalillo

State of New Mexico

BOARD OF COUNTY COMMISSIONERS
STEVE D. GALLEGOS, CHAIRMAN
DISTRICT 2
KEN SANCHEZ, VICE CHAIRMAN
DISTRICT 1
TOM RUTHERFORD, MEMBER
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JUAN R. VIGIL, COUNTY MANAGER

DAVID K. ANDERSON, ASSESSOR
JUDY D. WOODWARD, CLERK
THOMAS J. MESCALL, PROBATE JUDGE
JOE BOWDICH, SHERIFF
ORLANDO VIGIL, TREASURER

2400 BROADWAY, S.E.
ALBUQUERQUE, NEW MEXICO 87102
PUBLIC WORKS (505) 848-1500

September 8, 1998

Philip Clark, P.E.
Clark consulting Engineers
19 Ryan Road
Edgewood, New Mexico 87015

RE: Grading and Drainage Plan for Hinman Residence, Lot 24, Block 10, Tract 2, Unit 1, NAA (C22/D42) (PWD-98-154) Submitted for Building Permit Approval, Engineer's Stamp Dated 8/19/98.

Dear Mr. Clark:

This letter is a compilation of comments from my office as well as from County Public Works and AMAFCA. Prior to Building Permit release, the following comments must be addressed:

1. Please measure the erosion setback (ESB) from the centerline of the existing floodplain instead of from the northern thalweg. It does not appear that the floodplain will be confined to the north side.

2. Your plan shows a portion of the proposed flood wall within the FEMA floodplain. This wall must not encroach in the floodplain. Any alteration of the FEMA floodplain will require a Letter of Map Revision.

3. Please plot the cross-sections from your HEC-2 analyses. The HEC-2 runs indicate that some of the sections were extended vertically. Please provide more points in the sections to make sure that they can contain the runoff.

4. It appears that your energy grade line (EGL) does not "catch" without the wall. Typically the flood wall is provided to the limit of the EGL. On the upstream side, will the east side of the house be protected?

5. Are the top of wall elevations as high as the EGL plus freeboard?

6. The flood wall must be built to scour depth. Provide the scour analysis. The bottom of wall elevations must be the minimum elevation minus the scour depth for each section.

If you have any questions regarding these comments, please call me at 924-3982, or contact Brad Catanach at the County.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology
Kevin Hinman, Owner
Brad Catanach, P.E., Bernalillo County Public Works Division
Lisa Ann Manwill, P.E., Albuquerque Metropolitan Arroyo Flood Control Authority
File

County of Bernalillo

State of New Mexico

ONE CIVIC PLAZA, N.W.
ALBUQUERQUE, NEW MEXICO 87102
ADMINISTRATION (505) 768-4000
COMMISSION (505) 768-4217
FAX (505) 768-4329

June 23, 1995

Jackie S. McDowell, P.E.
McDowell Engineering, Inc.
7200 Valley Forge Pl. NE
Albuquerque, New Mexico

RE: GRADING AND DRAINAGE PLAN FOR LOTS 9 & 24, BLOCK 10, TRACT 2, UNIT 1, NAA (C22/D42)(PWD-95-99) SUBMITTED FOR BUILDING PERMIT APPROVAL, ENGINEER'S STAMP DATED 5/26/95.

Dear Ms. McDowell:

This letter incorporates my comments along with those of Bernalillo County and AMAFCA. Prior to plan approval for Building Permit release, the following comments must be addressed:

1. As you are aware, the proposed house on Lot 24 is located in the floodplain of a major arroyo. It appears that this location may not be prudent depending on whether the arroyo is in an aggradational or degradational state. Please address this issue.

2. The plan indicates that the 100-year flow in the La Cueva Arroyo is 621 cfs in Tributary C and 1090 cfs in Tributary B. These flow rates appear to be low compared to new hydrology prepared for the FEMA remapping in this area. How do these numbers compare to the flow determined using the new hydrology, per the latest D.P.M. methods? Design must be based on new hydrology. Please revise the HEC-2 runs accordingly.

3. Typically, HEC-2 analyses begin further upstream of the area being studied, therefore, please provide additional cross sections upstream of the lots.

4. HEC-2 analyses for the proposed conditions must be done in order to analyze the proposed lot grading. The runs for the proposed conditions will show any flow changes within the floodplain. If the proposed improvements alter the existing floodplain, then a Letter of Map Revision must be obtained from FEMA. Any requests for a map revision must be submitted through my office.

5. The limits of the existing FEMA floodplain must be shown on the drainage plan. The cross-sections used in the HEC-2 analyses should also be shown on the plan. Also plot the hydraulic grade lines (HGL) and the energy grade lines (EGL) for both the existing and proposed conditions for all tributaries, including the small tributary across the southern portion of Lot 24.

6. Please address the flows entering Lot 9 from the east.

7. Please calculate the limits of the erosion setback for each tributary per the Sediment and Erosion Design Guide and plot the erosion setback lines on the plan. Considering that there are three major flow paths through these lots (above, midway and below) will there be sufficient area left for development after all of the erosion setbacks are established?

8. Please provide a cross section showing the anticipated EGL, HGL, scour depths, extended footing depths and finished floor elevations for each lot.

9. What type of erosion control will be provided for the area between the proposed dwellings? What will be proposed where slopes are greater than 3:1?

10. For the scour calculations at the stem walls, a velocity value of 5.35 fps is used from HEC-2 section no. 1. However, at section no. 2, the velocity is 7.95 fps, which would result in a scour depth of approximately 1' deeper. Please address this condition.

11. The computed scour depth should be taken from the existing invert of the arroyo adjacent to the building pad. It appears that such conditions will require stem walls approaching 15' deep. As you are aware, the structural design for these walls must be prepared and stamped by a registered professional engineer.

12. FEMA requires that for any development within a floodplain, the finished floor elevation of the lowest floor, including basements, must be greater than the base flood elevation. Therefore, no basements will be allowed for the structures within the FEMA floodplain.

13. The drainage easements for the floodplains must be approved by and dedicated to AMAFCA prior to final approval of this drainage plan. The limits of the easements are based on the energy grade line, sequent depth or the existing FEMA floodplain boundary, whichever is largest. Please show the proposed easement boundaries on the plan.

14. Due to the required easements and erosion setbacks for these two lots, no fencing, either perimeter or internal, will be allowed.

15. Proposed wells and septic drain fields must not be located in any erosion setback. Please review the County Environmental Health requirements regarding septic tank placement criteria and provide details and elevations.

16. Please show the proposed driveways on the plan.

17. Further review of these two sites and the resubmitted grading and drainage plan may generate additional comments.

If you should have any questions regarding these comments, please do not hesitate to call me at 768-2650.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Chris Rivera, City Hydrology
Kurt Browning, AMAFCA
Roger Paul, M-C, County PWD
Lori Thompson, Owner
File

HOLD HARMLESS?

ATTACHMENT NO. 1

SUPPLEMENTAL CALCULATIONS TO

DMT, INC.
NORTH ALBUQUERQUE ACRES
LOTS 9 & 24
BLOCK 10, TRACT 2, UNIT 1

GRADING & DRAINAGE PLAN

May 26, 1995

I, Jackie S. McDowell, Registered Professional Engineer, No. 10903, hereby certify that I have prepared the attached calculations.

JACKIE S. McDOWELL NEW MEXICO 10903 REGISTERED PROFESSIONAL ENGINEER

Jackie S. McDowell, P.E 5-26-95
Date

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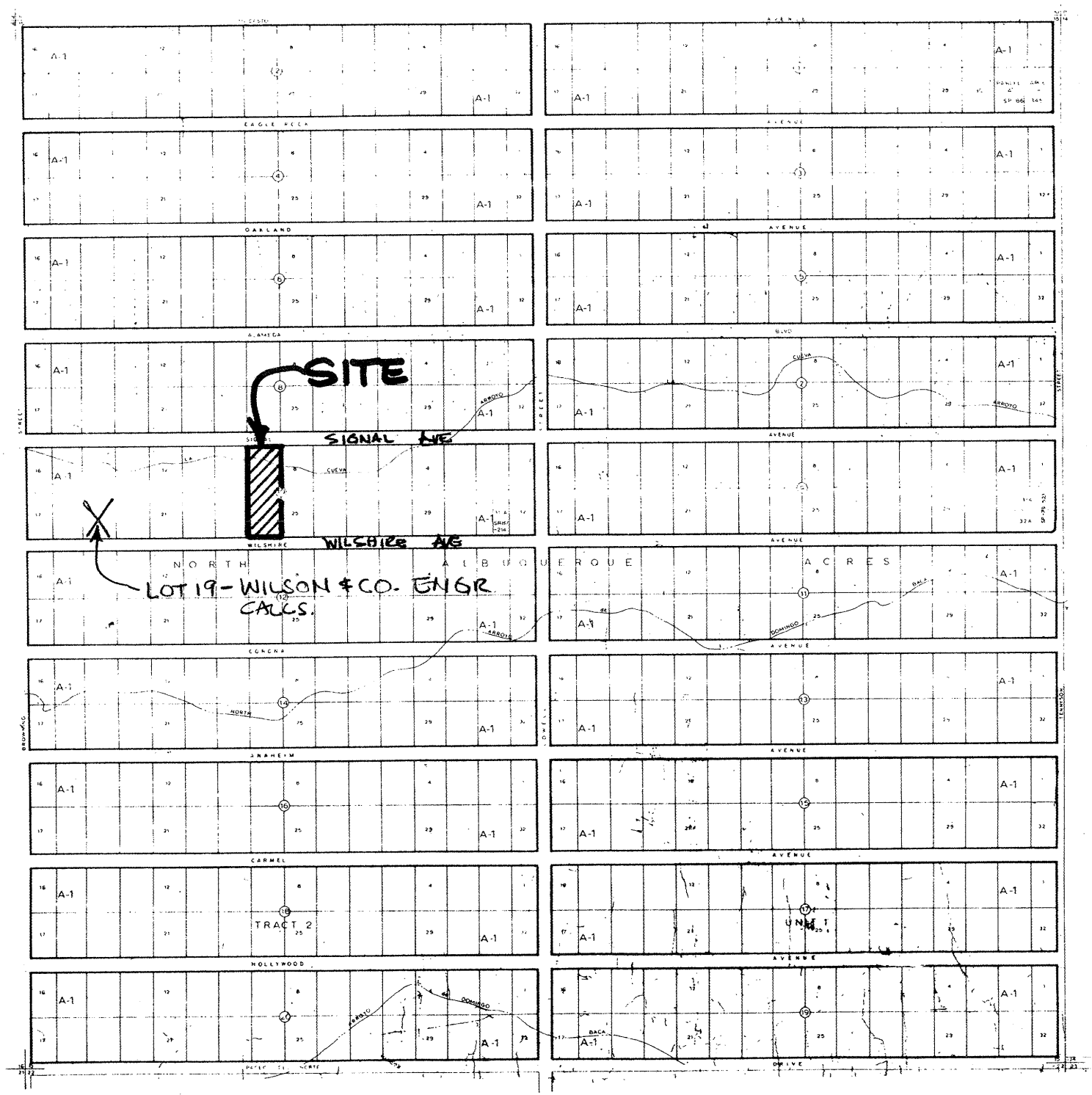
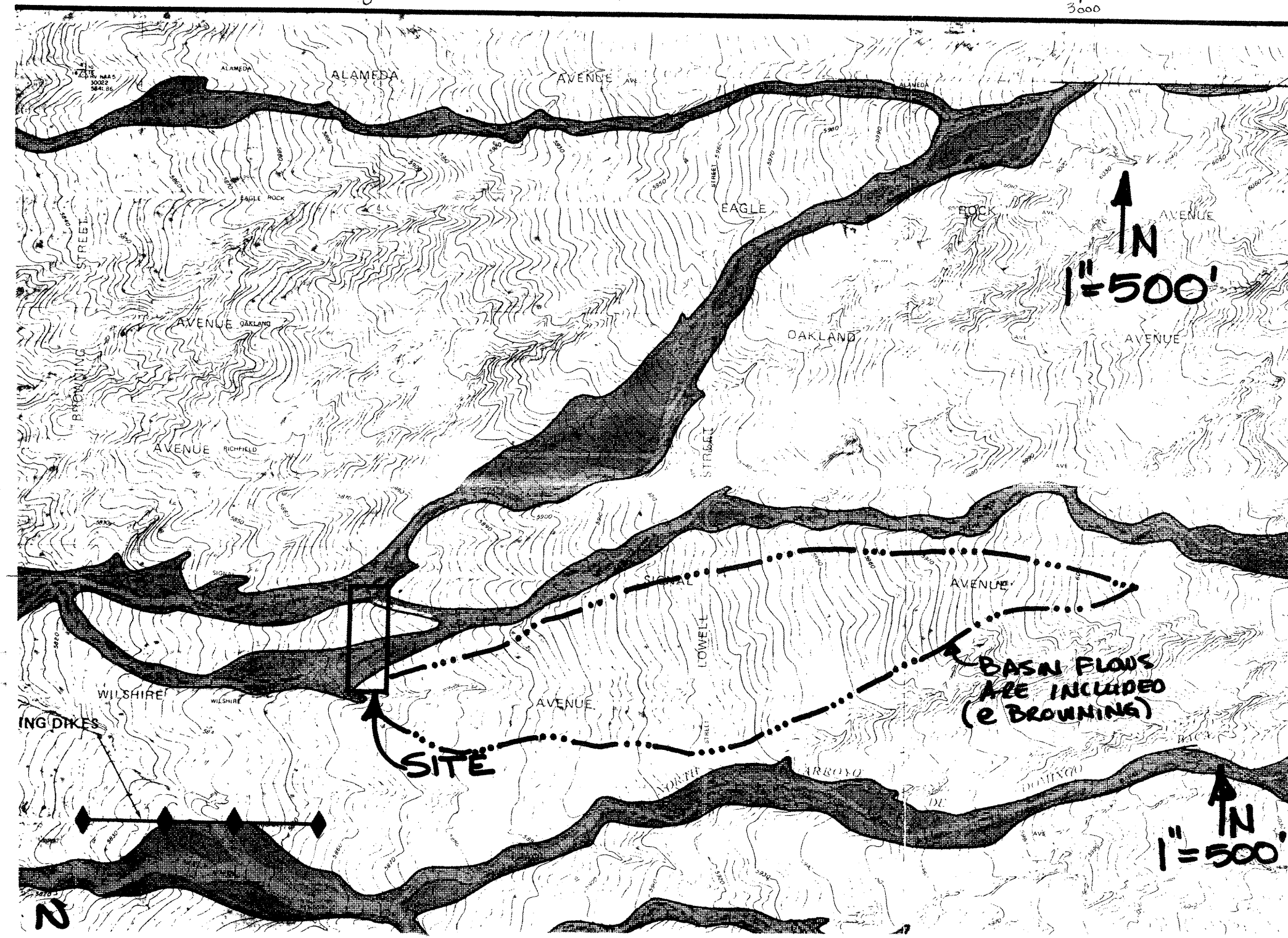

SITE
SIGNAL AVE
WILSHIRE AVE
LOT 19 - WILSON & CO. ENGR
CALCS.
NORTH ALBUQUERQUE ACRES
TRACT 2
UNIT 1
EAGLE ROCK
OAKLAND
ALAMEDA
WILSHIRE
CUCHARA
ANAHEIM
CARMEL
HOLLYWOOD
AVENUE
BLVD
STREET
DRIVE
A-1
ARROYO
CUEVA
DOMINGO
BACA
NORTH
LA
SCALE
UNIFORM PROPERTY CODE
1 022 064
ORD NO. 213
COUNTY ZONING MAP
ADOPTED
COUNTY COMMISSION CHAIRMAN
MAP AMENDED THROUGH
DECEMBER, 1989
C-22-Z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ALAMEDA
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AVENUE
OAKLAND
AVENUE
RICHFIELD
AVENUE
OAKLAND
AVENUE
SIGNAL STREET
AVENUE
LOWELL STREET
WILSHIRE
AVENUE
ING DIKES
SITE
BASIN FLOWS ARE INCLUDED (e BROWNING)
N
1"=500'
N
1"=500'
N

DRAINAGE PLAN

SCOPE:

Pursuant to Bernalillo County Ordinance No. 90-6, Section 11.E, the Drainage Plan shown hereon outlines the drainage management criteria for controlling developed runoff on and exiting the project site. Two single family homes are proposed on the subject properties, with associated access, landscaping, and utility improvements.

EXISTING CONDITIONS:

Presently the two 0.89 acre sites (two lots) are undeveloped. The site is bounded on the north by Signal Avenue, on the east and west by undeveloped residential lots, and on the south by Wilshire Avenue. The site is well vegetated with native grasses and shrubs. Site topography slopes from the east to the west at approximately 5 percent. Offsite flows currently enter the property from the east. Tributary B and C of the La Cueva Arroyo flow through the site. Tributary B flows through Lot 9 and Tributary C flows through Lot 24. Flow rates for these tributaries were taken from the "Review and Refinement of the Northeast Heights Drainage Management Plan" by Espey-Huston dated May 1980. Drainage easements will be dedicated to AMAFCA for the entire lots less the "as-built" building footprints and septic drain fields at the time of issuance of the Certificate of Occupancy.

PROPOSED CONDITIONS:

The home site for Lot 9 is located at the southeast corner of the lot and the home site for Lot 24 is located at the northeast corner of the lot. Flows from the east will continue to cross the lots as they are presently doing so. The finished floor elevations for the homes are set at a minimum of 5874.00 feet, which is the calculated elevation of the energy grade line plus freeboard. On site flows will drain around the homes via swales, and flow to the west. All roof drainage will discharge from the roof to the lot and be directed around the structure to existing drainage paths. Access will be taken from Wilshire Avenue for Lot 24 and from Signal Avenue for Lot 9. These roads are currently maintained by Bernalillo County.

Supplemental calculation have been provided to the Bernalillo County Public Works Department identified as Attachment No. 1.

The plan shows the proposed location of the septic drain fields and the well. The two lots will be served by a well located at the northwest corner of Lot 24.

CALCULATIONS:

The calculations shown hereon define the 100 year-6 hour design storm falling within the project area under existing and developed conditions. The Hydrology is per "Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria, for the City of Albuquerque, New Mexico in cooperation with Bernalillo County, New Mexico and the Albuquerque Metropolitan Arroyo Flood Control Authority, dated January, 1993.

PROPERTY ADDRESS:

Signal Avenue NE and Wilshire Avenue NE

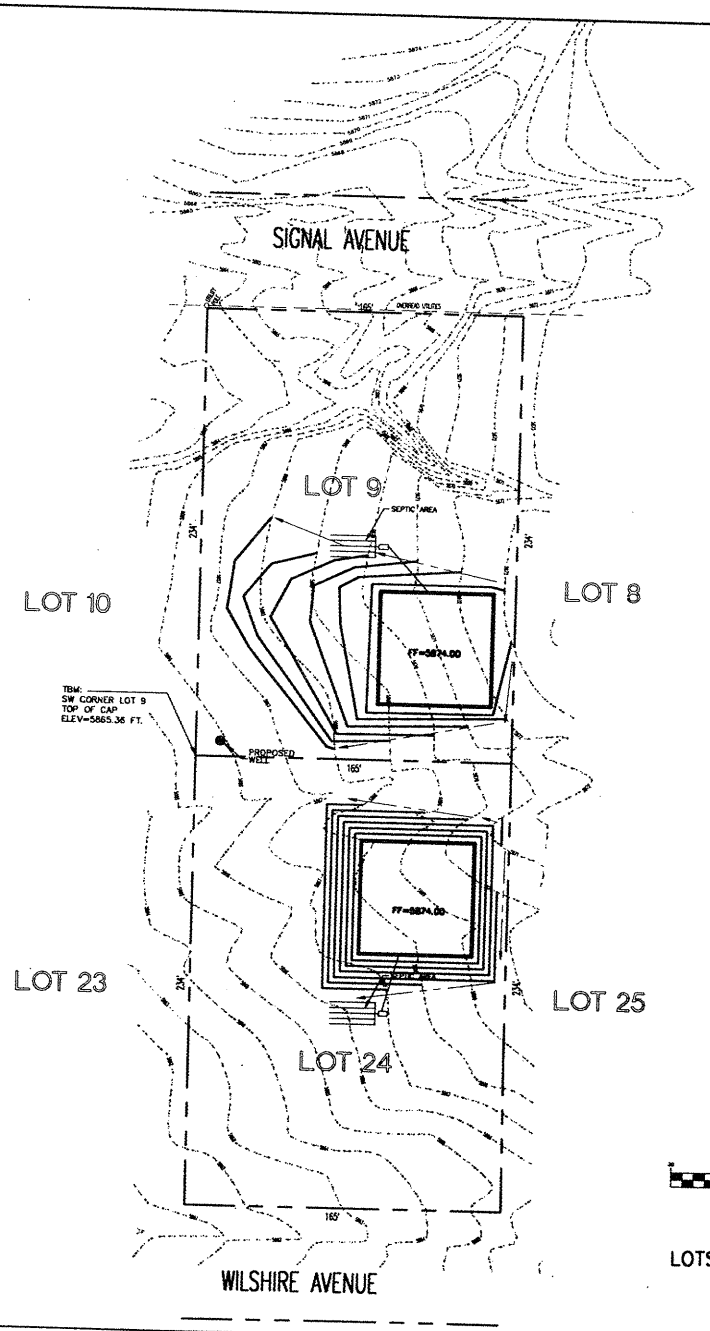
PROJECT BENCHMARKS:

ACS BM 4-D22

TBM:
SW CORNER OF LOT 9
ELEV=5865.36 FT

SURVEY:

Topographic survey provided by E. Maxwell Dook, dated December 1994.



LEGEND

	EXISTING	PROPOSED
CONTOUR	5675	5683
PROPERTY LINE		
ROAD		

FLOODWAY AND OFFSITE DRAINAGE MAP

N

1" = 500'

THE TOPOGRAPHY SHOWN DOES NOT REFLECT RECENT DEVELOPMENT, BUT THE DRAINAGE BASINS REMAIN UNCHANGED

VICINITY MAP

N

1" = 750'

ZONE ATLAS: C-22

TOPOGRAPHIC SURVEY NOTES

BASIS OF ELEVATION: ACS 4-D22

HORIZONTAL AND VERTICAL LOCATION MEASURED WITH NIKON DTM A-20LG TOTAL STATION

TOPOGRAPHIC MAP COMPILED AND PRODUCED USING L. I. CONTOUR LINKED WITH AUTODESK SOFTWARE

THIS IS NOT A BOUNDARY SURVEY, APPARENT PROPERTY CORNERS ARE SHOWN FOR ORIENTATION ONLY. BOUNDARY DATA SHOWN IS FROM THE PLAT OF RECORD OR A PREVIOUS SURVEY REFERENCED HEREON

LEGAL DESCRIPTION:

LOTS NUMBERED NINE (9) AND TWENTY-FOUR (24) IN BLOCK NUMBERED TEN (10), TRACT NUMBERED TWO (2), UNIT NUMBERED ONE (1) OF NORTH ALBUQUERQUE ACRES, BERNALILLO COUNTY, NEW MEXICO, AS THE SAME IS SHOWN AND DESIGNATED ON THE MAP OF SAID SUBDIVISION, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO ON SEPTEMBER 10, 1931.

NOTE:
NO FENCING SHALL BE CONSTRUCTED WITHIN ANY DRAINAGE EASEMENT AREA UNLESS SPECIFICALLY APPROVED BY THE BERNALILLO COUNTY PUBLIC WORKS DEPARTMENT. ANY FUTURE FENCING ALONG THE PERIMETER PROPERTY LINES MUST ADDRESS HOW OFFSITE FLOWS ARE CONVEYED THROUGH THE SITE AND BE APPROVED BY THE BERNALILLO COUNTY PUBLIC WORKS DEPARTMENT.

N

GRAPHIC SCALE

(IN FEET)
1 inch = 30 ft.

LOTS 9 & 24, BLOCK 10,
TRACT 2, UNIT 1
NORTH ALBUQUERQUE ACRES
BERNALILLO COUNTY, NEW MEXICO

JACKIE S. McDOWELL NEW MEXICO 10903 REGISTERED PROFESSIONAL ENGINEER

ENGINEER'S CERTIFICATION:

I, Jackie S. McDowell, hereby certify that I personally inpsected the site shown on this plan on April 12, 1995, and as of that date it appeared that no filling, grading, or excavation had occurred thereon since completion of the topographic survey used to prepare this plan.

BERNALILLO COUNTY NEW MEXICO

GRADING & DRAINAGE PLAN
LOTS 9 & 24, BLOCK 10, TRACT 2, UNIT 1
NORTH ALBUQUERQUE ACRES

THOMPSON NAA LOTS

McDowell Engineering, Inc.

Designed	Drawn	Checked	Sheet	of
JSM	STAFF	JSM	1	1

File TH001951 Date MAY, 1995

26-May-95

Calculations: Total Basin

Calculations are based on "Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, New Mexico, January 1993 - basins < 40 acres".

Precipitation Zone = 4

Depth at 100-year, 6-hour storm: (Table A-2) P = 2.90 inches

Land Treatments:

From Table 5 - Percent Treatment D

Single Family Residential =

7*SQR((N*N) +(5*N))

where N = units/acre

N = ---------- = ------, ok < 6 N = 0.00

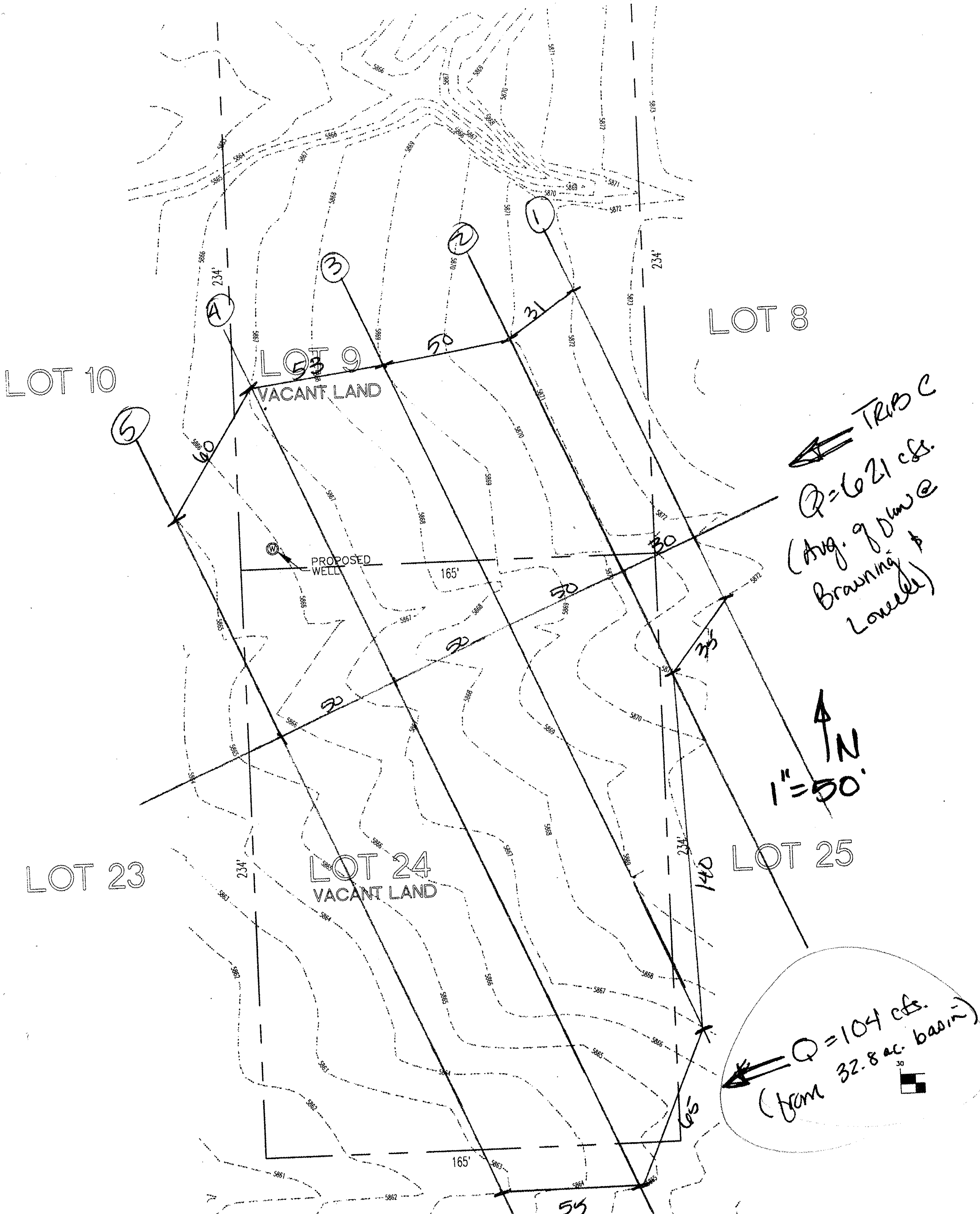
Therefore Percent Treatment D = 0.00%

(includes local streets)

Areas: (acres)	Existing	Proposed
Treatment A	1.78	0.77
Treatment B	0.00	0.36
Treatment C	0.00	0.36
Treatment D	0.00	0.29
Total (acres) =	1.78	1.78

Volume	100 year Existing	100 year Proposed	10 year Existing	10 year Proposed	2 year Existing	2 year Proposed
Volume (acre-feet) =	0.12	0.19	0.04	0.09	0.00	0.04
Volume (cubic feet) =	5,169	8,334	1,809	4,117	129	1,616

Total Q(p), cfs:	100 year Existing Q(p)*A	100 year Proposed Q(p)*A	10 year Existing Q(p)*A	10 year Proposed Q(p)*A	2 year Existing Q(p)*A	2 year Proposed Q(p)*A
Treatment A	3.92	1.69	1.55	0.67	0.09	0.04
Treatment B	0.00	1.05	0.00	0.52	0.00	0.14
Treatment C	0.00	1.34	0.00	0.81	0.00	0.36
Treatment D	0.00	1.52	0.00	1.04	0.00	0.63
Total Q (cfs) =	3.92	5.61	1.55	3.04	0.09	1.16



LOT 8
LOT 9
VACANT LAND
LOT 10
LOT 23
LOT 24
VACANT LAND
LOT 25
PROPOSED WELL
165'
234'
TRIB C
Q=621 cfs.
(Avg. g plus @ Browning & Lowell)
Q=104 cfs.
(from 32.8 ac. basin)
N
1"=50'

```
*******************************************************
*  WATER SURFACE PROFILES                             *
*  VERSION OF SEPTEMBER 1988                          *
*  ERROR: 01,02                                       *
*  UPDATED:  4 APRIL    1989                          *
*  RUN DATE     5/23/95   TIME   12:32:31             *
*******************************************************
```

```
************************************
*  U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENTER
*  609 SECOND STREET, SUITE D
*  DAVIS, CALIFORNIA 95616-4687
*  (916) 756-1104, (916) 551-1748
************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

END OF BANNER

THIS RUN EXECUTED 5/23/95 12:32:31

```
**************************************************
 HEC2 RELEASE DATED SEP 88 UPDATED APR  1989


 ERROR CORR -  01,02
 MODIFICATION -
**************************************************


T1   THOMPSON NAA LOTS 9 & 24, BLOCK 10, TRACT 2, UNIT 1
T2   HEC-2 RUN FOR SUPERCRITICAL FLOW
T3   OFFSITE BASIN - TRIBUTARY C - Q = 621 CFS


J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        0.        0.       1.0      -1.0       0.        0.       621       0.        0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1         0.        0.        0.        0.        0.       -1.0       0.        0.        0.


NC    0.035     0.035     0.035      .1        .3        0.        0.        0.        0.        0.

X1      1.0         7         0       136        35        31        30        0.        0.        0.
GR       72         0      71.4        10        72        25      71.5        30        72        35
GR     72.6        85        72       136


X1      2.0         8         0       147       140        50        50        0.        0.        0.
GR       71         0      71.3        14        71        22      70.2        30      70.1        43
GR     70.9        65      70.9       120        71       147


X1      3.0        14         0       293        65        53        50        0.        0.        0.
GR       67         0        68        22        69        65      68.5       110        69       126
GR     69.4       145        69       160      68.4       180        68       192      67.8       194
GR       68       197      68.7       210      68.4       240        69       293


X1      4.0        16         0       353        55        60        50        0.        0.        0.
GR       65         0      64.4        32        65        62        66        75      66.7        86
GR     66.5       140        67       157      67.3       177        67       203      66.8       207
GR       67       211      67.5       227        67       240      66.4       253        67       328
GR       67       353


X1      5.0        14         0       295        0.        0.        0.        0.        0.        0.
GR       63         0      62.8        10        63        14        64        53        65       137
GR     65.4       156        65       170      64.8       175        65       178      65.8       210
GR       65       212      64.6       238        65       245        65       295
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
3280 CROSS SECTION 1.00 EXTENDED 1.00 FEET

3720 CRITICAL DEPTH ASSUMED

1.00	1.60	73.00	73.00	.00	73.45	.44	.00	.00	72.00
621.	0.	621.	0.	0.	116.	0.	0.	0.	72.00
.00	.00	5.35	.00	.000	.035	.000	.000	71.40	.00
.019849	0.	0.	0.	0	31	0	.00	136.00	136.00

*SECNO 2.000
3280 CROSS SECTION 2.00 EXTENDED .34 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.03

2.00	1.24	71.34	71.61	.00	72.32	.98	1.07	.05	71.00
621.	0.	621.	0.	0.	78.	0.	0.	0.	71.00
.00	.00	7.95	.00	.000	.035	.000	.000	70.10	.00
.081973	35.	30.	31.	7	11	0	.00	147.00	147.00

*SECNO 3.000

3265 DIVIDED FLOW

3280 CROSS SECTION 3.00 EXTENDED 1.96 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .70

3.00	1.96	68.96	69.04	.00	69.38	.42	2.77	.17	67.00
621.	0.	621.	0.	0.	120.	0.	0.	0.	69.00
.00	.00	5.19	.00	.000	.035	.000	.000	67.00	.00
.040000	140.	50.	50.	3	17	0	.00	248.91	289.89

*SECNO 4.000
3280 CROSS SECTION 4.00 EXTENDED .74 FEET

3301 HV CHANGED MORE THAN HVINS

4.00	1.34	65.74	66.13	.00	67.04	1.31	2.25	.09	65.00
621.	0.	621.	0.	0.	68.	0.	0.	1.	67.00
.01	.00	9.17	.00	.000	.035	.000	.000	64.40	.00
.050959	65.	50.	53.	6	12	0	.00	71.56	71.56

*SECNO 5.000

3265 DIVIDED FLOW

3280 CROSS SECTION 5.00 EXTENDED 1.94 FEET

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5.00	2.14	64.94	64.94	.00	65.31	.37	1.46	.95	63.00
621.	0.	621.	0.	0.	128.	0.	0.	1.	65.00
.01	.00	4.86	.00	.000	.035	.000	.000	62.80	.00
.018998	55.	50.	60.	20	14	0	.00	166.43	244.02

THIS RUN EXECUTED 5/23/95 12:32:31

****
HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02
MODIFICATION -
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SITE BASIN - TRIBUTARY C

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.000	.00	.00	.00	71.40	621.00	73.00	73.00	73.45	198.49	5.35	116.03	44.08
*	2.000	30.00	.00	.00	70.10	621.00	71.34	71.61	72.32	819.73	7.95	78.12	21.69
*	3.000	50.00	.00	.00	67.00	621.00	68.96	69.04	69.38	400.00	5.19	119.76	31.05
	4.000	50.00	.00	.00	64.40	621.00	65.74	66.13	67.04	509.59	9.17	67.71	27.51
*	5.000	50.00	.00	.00	62.80	621.00	64.94	64.94	65.31	189.98	4.86	127.65	45.05

SITE BASIN - TRIBUTARY C

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.000	621.00	73.00	.00	.00	.00	136.00	.00
*	2.000	621.00	71.34	.00	-1.66	.00	147.00	30.00
*	3.000	621.00	68.96	.00	-2.38	.00	248.91	50.00
	4.000	621.00	65.74	.00	-3.23	.00	71.56	50.00
*	5.000	621.00	64.94	.00	-.79	.00	166.43	50.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

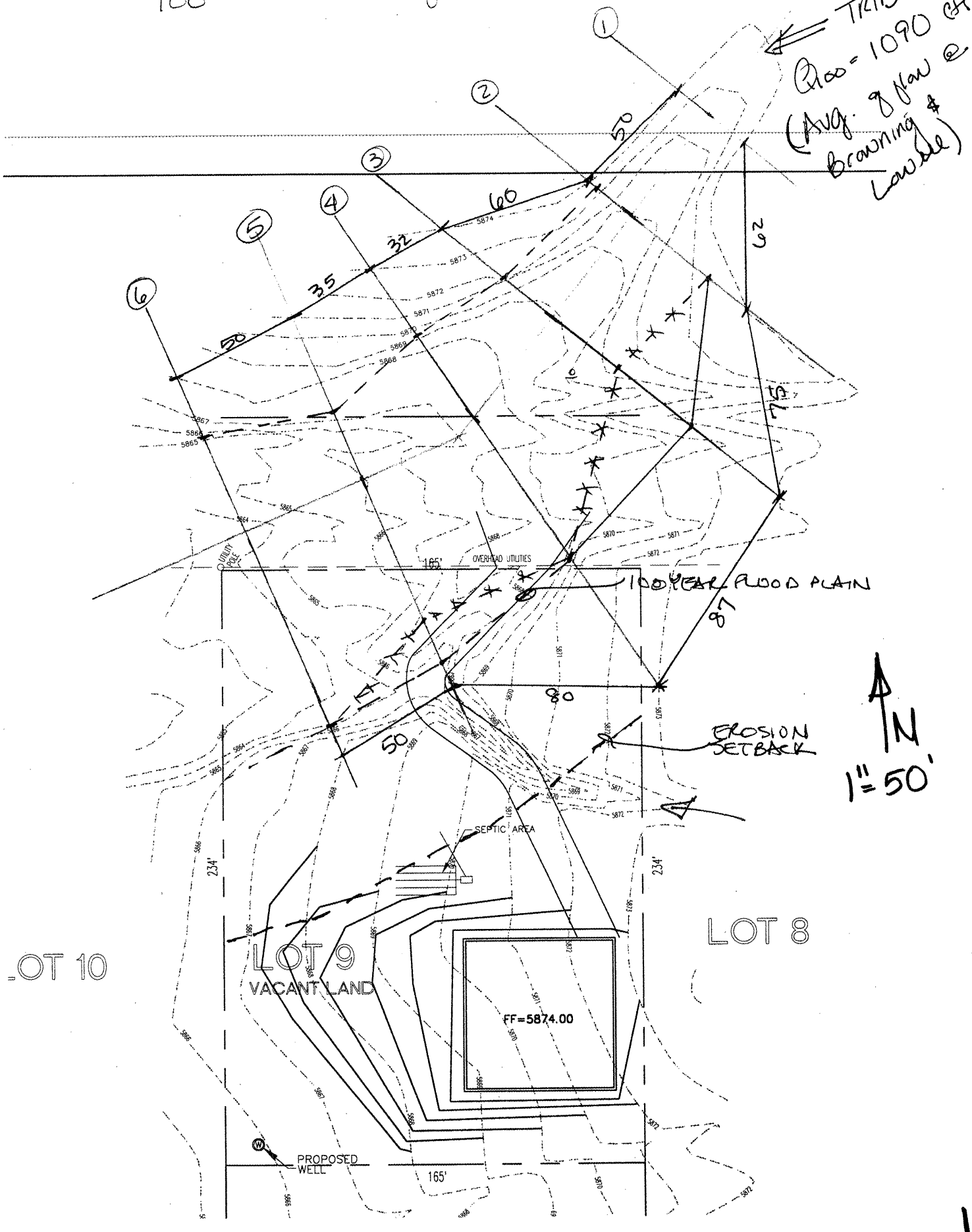
WARNING SECNO= 2.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 3.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 5.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 5.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 5.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

Erosion Setback:

$\frac{1090}{100} \times 6' = 65.4$ feet.



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*******************************************************
*  WATER SURFACE PROFILES                             *
*  VERSION OF SEPTEMBER 1988                          *
*  ERROR: 01,02                                       *
*  UPDATED:  4 APRIL    1989                          *
*  RUN DATE     5/23/95   TIME   10:35:49             *
*******************************************************
```

```
************************************
*  U.S. ARMY CORPS OF ENGINEERS
*  THE HYDROLOGIC ENGINEERING CENTER
*  609 SECOND STREET, SUITE D
*  DAVIS, CALIFORNIA 95616-4687
*  (916) 756-1104, (916) 551-1748
************************************
```

```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

END OF BANNER

THIS RUN EXECUTED 5/23/95 10:35:49

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**************************************************
 HEC2 RELEASE DATED SEP 88 UPDATED APR  1989


 ERROR CORR -  01,02
 MODIFICATION -
**************************************************


T1   THOMPSON NAA LOTS 9 & 24, BLOCK 10, TRACT 2, UNIT 1
T2   HEC-2 RUN FOR SUPERCRITICAL FLOW
T3   OFFSITE BASIN - TRIBUTARY B - Q = 1090 CFS


J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0.        0.        0.       1.0      -1.0       0.        0.      1090       0.        0.

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     -1         0.        0.        0.        0.        0.      -1.0       0.        0.        0.

NC    0.035     0.035     0.035      .1        .3        0.        0.        0.        0.        0.

X1      1.0         5         0        33        62        50        50        0.        0.        0.
GR       74         0        73         5      72.5        16        73        25        74        33

X1      2.0         9         0        80        75        60        50        0.        0.        0.
GR       74         0        73        27        72        40        71        46      70.8        52
GR       71        62        72        67        73        72        74        80

X1      3.0        18         0       170        87        32        50        0.        0.        0.
GR       73         0        72        20        71        33        72        46        72        50
GR       71        57      70.1        65        71        75        71        88        70        96
GR       69       110      68.8       114        69       124        70       131        71       139
GR       72       140        73       153        74       170

X1      4.0        14         0       200        80        35        50        0.        0.        0.
GR       73         0        72        30        71        54        70        58        69        62
GR     68.5        80        68       112      67.4       127        68       160        69       165
GR       70       170        71       176        72       185        73       200

X1      5.0        20         0       158        50        50        50        0.        0.        0.
GR       67         0        66         5      65.8        12        66        15        67        20
GR       67        30        66        36      65.7        40        66        44        66        65
GR     65.7        70        66        75        66       100      65.4       105        66       110
GR       67       115        68       130        69       138        70       148        71       158
```

X1	6.0	14	0	162	0.	0.	0.	0.	0.	0.
GR	68	0	67	8	66	10	65	13	64	22
GR	63.7	37	64	60	64	86	63.7	95	64	102
GR	65	135	66	138	67	142	68	162		

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
3280 CROSS SECTION 1.00 EXTENDED 2.28 FEET

3720 CRITICAL DEPTH ASSUMED

1.00	3.78	76.28	76.28	.00	77.90	1.62	.00	.00	74.00
1090.	0.	1090.	0.	0.	107.	0.	0.	0.	74.00
.00	.00	10.21	.00	.000	.035	.000	.000	72.50	.00
.013324	0.	0.	0.	0	25	0	.00	33.00	33.00

*SECNO 2.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.37

2.00	2.56	73.36	74.25	.00	76.44	3.08	1.32	.15	74.00
1090.	0.	1090.	0.	0.	77.	0.	0.	0.	74.00
.00	.00	14.09	.00	.000	.035	.000	.000	70.80	17.37
.074655	62.	50.	50.	5	15	0	.00	57.49	74.85

*SECNO 3.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3.00	2.53	71.33	71.83	.00	72.98	1.65	3.03	.43	73.00
1090.	0.	1090.	0.	0.	106.	0.	0.	0.	74.00
.00	.00	10.30	.00	.000	.035	.000	.000	68.80	28.73
.050105	75.	50.	60.	6	11	0	.00	93.17	139.33

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4.000

4.00	1.82	69.22	69.61	.00	70.59	1.36	2.31	.09	73.00
1090.	0.	1090.	0.	0.	116.	0.	0.	0.	73.00
.00	.00	9.38	.00	.000	.035	.000	.000	67.40	61.12
.042652	87.	50.	32.	6	15	0	.00	104.98	166.10

*SECNO 5.000

3280 CROSS SECTION 5.00 EXTENDED .18 FEET

5.00	1.77	67.17	67.53	.00	68.41	1.24	2.14	.04	67.00
1090.	0.	1090.	0.	0.	122.	0.	0.	0.	71.00
.01	.00	8.95	.00	.000	.035	.000	.000	65.40	.00
.042822	80.	50.	35.	5	11	0	.00	117.65	117.65

*SECNO 6.000

6.00	1.43	65.13	65.46	.00	66.31	1.17	2.09	.02	68.00
1090.	0.	1090.	0.	0.	126.	0.	1.	1.	68.00
.01	.00	8.68	.00	.000	.035	.000	.000	63.70	12.60
.040645	50.	50.	50.	6	5	0	.00	122.81	135.40

THIS RUN EXECUTED 5/23/95 10:35:50

****
HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02
MODIFICATION -
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SITE BASIN - TRIBUTARY B

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	1.000	.00	.00	.00	72.50	1090.00	76.28	76.28	77.90	133.24	10.21	106.71	94.43
*	2.000	50.00	.00	.00	70.80	1090.00	73.36	74.25	76.44	746.55	14.09	77.39	39.89
	3.000	50.00	.00	.00	68.80	1090.00	71.33	71.83	72.98	501.05	10.30	105.78	48.70
	4.000	50.00	.00	.00	67.40	1090.00	69.22	69.61	70.59	426.52	9.38	116.26	52.78
	5.000	50.00	.00	.00	65.40	1090.00	67.17	67.53	68.41	428.22	8.95	121.74	52.67
	6.000	50.00	.00	.00	63.70	1090.00	65.13	65.46	66.31	406.45	8.68	125.56	54.07

SITE BASIN - TRIBUTARY B

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	1.000	1090.00	76.28	.00	.00	.00	33.00	.00
*	2.000	1090.00	73.36	.00	-2.92	.00	57.49	50.00
	3.000	1090.00	71.33	.00	-2.03	.00	93.17	50.00
	4.000	1090.00	69.22	.00	-2.11	.00	104.98	50.00
	5.000	1090.00	67.17	.00	-2.05	.00	117.65	50.00
	6.000	1090.00	65.13	.00	-2.03	.00	122.81	50.00

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 1.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

WARNING SECNO= 2.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

McDowell Engineering, Inc.

7200 Valley Forge Pl. NE
Albuquerque, New Mexico 87109
Tele: (505)828-2430

Project: NAA LOTS 9 & 24

Project No.: [illegible] Date: 5-23-95

Subject: Hydrology & Storm Calcs

By: SM Sheet 1 of 3

IN AN EFFORT TO EXPEDITE THE REVIEW & APPROVAL PROCESS FOR THE DEVELOPMENT OF THE REFERENCED LOTS, WE HAVE FOLLOWED THE APPROVED CALCULATIONS PREPARED BY WILSON & CO. FOR THE NAA LOT LOCATED 4 LOTS WEST OF THE SUBJECT LOTS. THE APPROVED DRAINAGE REPORT FOR LOT 19, BLOCK 10, TRACT 2, UNIT 1, DATED 7-2-92 FOLLOWS THE CURRENT CRITERIA FOR DRAINAGE PLANS IN BERNALILLO COUNTY. WE HAVE INCLUDED COPIES OF PORTIONS OF THE PERTINENT CALCULATIONS FROM THE APPROVED WILSON REPORT TO ASSIST IN THE REVIEW & APPROVAL OF THIS DRAINAGE REPORT.

McDowell Engineering, Inc.

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Tele: (505)828-2430

Project: NAA Lots 9 & 24

Project No.: THO #194L Date: 5-23-95

Subject: Freeboard & Scour Calcs

By: [illegible] Sheet 2 of 3

FREEBOARD (FB) = $0.7\left[2.0 + 0.025\sqrt[3]{Q}\right]$

@ X-SEC ②:

$V = 7.95$ ft/sec

$d = 1.24$ ft

$FB = 1.55$ ft

MIN. FF @ X-SEC ② = EG + FB = 72.32 + 1.55 = 73.87

MIN. FF = 5873.87 → USE 5874.00

TOTAL SCOUR DEPTH = LOCAL SCOUR + CONTRACTION SCOUR

LOCAL SCOUR ⇒ $\frac{Y_s}{Y_1} = 4\,Fr^{0.33}$ (Eqn. 3.88)

@ X-SEC ①: $Y_1 = 1.60$

$Fr = \frac{V}{\sqrt{gY}}$ (Eqn. 3.24)

$Fr = \frac{5.35}{\sqrt{g(1.60)}} = 0.75$

Then $Y_s = 1.60\,(0.75)^{0.33}\,(4) = 5.82$ ft. = LOCAL SCOUR

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Subject: Scour calcs

By: JSM Sheet 3 of 3

CONTRACTION SCOUR:

$Y_s = Y_2 - Y_1$

$Y_2 = 1.24$

$Y_1 = 1.60$

$Y_s = 1.60 - 1.24 = 0.36$ ft

TOTAL SCOUR = 5.82 + 0.36 = 6.18 FT.

PROTECTION OF FOUNDATION:

5874.0 - 6.18 = 5867.87 exist. ground @ 68 ±

∴ INSTALL A 6.5 FT STEM WALL (MIN.) OR A ~~DEEPER~~ BASEMENT WALL not in fp TO PROTECT AGAINST SCOUR ... SIMILAR TO THE APPROVED DRAINAGE PLAN FOR LOT 19, LOCATED 4 LOTS WEST OF THE SUBJECT DEVELOPMENT.

COMPUTE MANNING's n for CHANNEL

$n = (n_b + n_1 + n_2 + n_3 + n_4)m$

$n_b = .022$ bed material = 0.5mm median
$n_1 = .008$ Moderate Irregularity
$n_2 = .001$ Alternating Occassionally
$n_3 = .004$ Obstructions negligible
$n_4 = .009$ Vegetation Small
$m = 1.0$ Minor SINUOSITY

$n = .039$ = USE .035

COMPUTE THE FREEBOARD FOR THE CHANNEL

FREEBOARD = $2.0 + .025 V \sqrt[3]{d}$.

AT X-SECTION 5 $V = 4.29$ FPS $d = 1.24$

FREEBOARD = $2.0 + .025(4.29)\sqrt[3]{1.24}$
= 2.1 FT

AT X-SECTION 5 WSEL = 38.24
ENERGY GRADE = 38.52

EG + FREEBOARD = FF ELEVATION

38.52 + 2.1 = 40.6 FINISH FLOOR

CALCULATE LOCAL SCOUR

AT X-SECTION 5

$A = 172.35$ SF

$T = 373.50$ FT

$V = 4.29$ FPS

$Y_1 = 1.29$ FT

$$D = \frac{A}{T} = \frac{172.35}{373.50} = 0.4614$$

$$F = \frac{V}{\sqrt{gD}} = \frac{4.29}{\sqrt{32.2(.4614)}} = 1.11$$

DEPTH OF SCOUR

SIMONS + LI, EQ 3-9

$$\frac{Y_s}{Y_1} = 4 F_1^{0.33}$$

$$Y_s = 4(1.11)^{.33} 1.29$$

$$Y_s = 5.14 \text{ FT}$$

CALCULATE CONTRACTION SCOUR

$$\frac{Y_2}{Y_1} = \left(\frac{Q_{mc2}}{Q_{mc1}}\right)^{6/7} \left(\frac{W_1}{W_2}\right)^{K_1} \left(\frac{n_2}{n_1}\right)^{K_2}$$

$Q_{mc1} = Q_{mc2} = 740$ CFS

$W_1 = 300$ $\qquad Y_1 = 0.87$

$W_2 = 200$

$n_1 = .035$

$n_2 = .055$ (increased for obstruction

$K_1 = 0.64$

$K_2 = 0.21$

$$Y_2 = 0.87(1)\left(\frac{300}{200}\right)^{.64}\left(\frac{.055}{.035}\right)^{.21} = 1.29$$

FROM HEC 2 RUNS

$Y_2 = 1.37$ $Y_1 = 0.87$

$Y_S = 1.37 - 0.87 = 0.5$ FT

TOTAL SCOUR

$5.1 + 1.24 = 6.34$ FT

NEED TO PROTECT FOUNDATION TO ELEVATION

$5840.6 - 6.34 = 5834.3$

INSTALL A 6.5 FT STEM WALL
TO PROTECT AGAINST SCOUR