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File PP-1995-157
Date 10/5/99

Present	Scanned	
		A few items are denoted with an asterisk (*), which means they are to be scanned for permanent record on the ISYS retrieval system. In some instances, not all entries designated to be scanned, are present in the file. There are also documents specific to certain files, not found on the standard list. For this reason, a checklist has been included. **Remaining items, (not selected for scanning), will be marked present on the checklist. This index can serve as a quick guide for the contents of each file.** **Files denoted with (**) are to be located using the ISYS Query System. Planning Clearance will need to be typed in full, as well as other entries such as Ordinances, Resolutions, Board of Appeals, and etc.**
X	X	***Summary Sheet – Table of Contents**
X	X	Application form
		Receipts for fees paid for anything
X	X	***Submittal checklist**
X	X	***General project report**
		Reduced copy of final plans or drawings
		Reduction of assessor's map
		Evidence of title, deeds
X	X	***Mailing list**
		Public notice cards
		Record of certified mail
X		Legal description
		Appraisal of raw land
		Reduction of any maps – final copy
		***Final reports for drainage and soils (geotechnical reports)**
		Other bound or nonbound reports
		Traffic studies
X		Individual review comments from agencies
X	X	***Consolidated.review comments list**
X	X	***Petitioner's response to comments**
X	X	***Staff Reports**
		***Planning Commission staff report and exhibits**
		***City Council staff report and exhibits**
		***Summary sheet of final conditions**
		***Letters and correspondence dated after the date of final approval (pertaining to change in conditions or expiration date)**

DOCUMENTS SPECIFIC TO THIS DEVELOPMENT FILE:

X	X	Letter from Kathy Portner to Brian Stowell – 3/12/96	X	X	Letter from Edward Morris to Dave Wens re: Engineering Geology Investigation - 9/25/95
X	X	Letter from James Soule to Kathy Portner – 10/2/95	X	X	Revised Drainage Calculations – 6/15/93
X	X	E-mail to Kathy Portner to Hank Masterson – 10/9/95	X	X	Map - Revised Preliminary Plan
X	X	Aerial Photo	X	X	Memo to City Council from Ed and Peggy Lippoth – 4/10/96
X	X	E-mail from Marcia Rabideaux from Jody Kliska re: drainage – 12/29/95	X		Photographs of MSE wall Along I-70 Near Edwards, Ridges Subdivision, Intersection of S. Broadway /S. Camp Rd., Water Tanks from Wingate Elem. School, View of Co. Nat. Monument from Mesa Top Looking West , Eagle Crest Subdivision and Park Ridge / Pine Terrace Subdivision
X	X	Roadway Plan and Profile with Stationing	X	X	Preliminary Drainage Analysis for Trails West Village
X	X	Letter from Philip Hart to Kathy Portner – 1/2/95	X	X	Revised Drainage Calculations – 6/15/93
X	X	Computer Developed Line-of-Sight Profiles	X		Unmarked envelopes containing slides
X		Computer Generated Aerial View of Site Showing Road Leading to Mesa Top			
X	X	Letter from Ralph Ohm to Kathy Portner – 12/20/95	X		Public Posting of Notice Signs
X	X	E-mail from Hank Masterson to Kathy Portner re: hydrants- 11/22/95	X	X	Submittal Checklist – Preliminary & Final
X	X	Letter from Katherine Portner to Brian Stowell – 11/22/95	X	X	Map – Preliminary Plan
X	X	Letter from Kathy Portner to Dave Wens – 9/27/95	X	X	Letter from Ed Morris to Dave Wens re: Hydrological Report – 11/21/95
X	X	Standard Specifications from Redlands Water & Power Co.-no date	X	X	City Council Minutes - ** - 2/7/96, 2/21/96

X	X	Report Checklist and Outline - Geotechnical Report	X	X	Letter from Brian Stowell to Kathy Portner re: appeal - 1/12/96
X	X	Drawing Standards Checklist Prelimary Plan – Graphic Standards			Handwritten note to Kathy Portner re: public hearing – 1/5/96
X	X	Report Checklist and Outline – Preliminary Drainage Report	X	X	Letter from Richard Morris to Dave Wens – 12/9/95
X	X	Volume Warrants for Left – Turn Deceleration Lanes – Figure 5	X	X	Hydrology of Unnamed Major Basin
X	X	Existing Drainage Conditions	X	X	General Site/Basin Location Diagram, Test Pit Location and Geologic Features, General Geology/Geomorphology, Major Basin Drainage Map Outline
X	X	Design Criteria and Approach	X		Letter from Kathy Portner to Brian Stowell – 10/13/95
X	X	Preliminary Drainage Report – 9/1/95	X		Letter from Brian Stowell to Kathy Portner – 10/10/95
X	X	Cimarron Subdivision – Drainage Report	X		Abstract from Abstract & Title Co.
X	X	Letter from Brian Stowell to Kathy Portner re: meeting – 11/30/95	X	X	Preliminary Geotechnical Investigation
X	X	Letter from CO Geological Survey to Mesa Co. Planning – 11/20/90	X	X	Traffic Study – 8/18/95
X		Utility Composite	X		Street Plan and Profile – Preliminary Plan
			X		Road Profile

SUBMITTAL CHECKLIST

MAJOR SUBDIVISION: PRELIMINARY

Location: South Camp Road Project Name: TRAILS WEST VILLAGE

Date Received 9-1-95

Receipt # 2846

File # PP-95-157

any others? $1210

ITEMS DESCRIPTION	SSID REFERENCE	● City Community Development	● City Dev. Eng.	● City Utility Eng.	● City Property Agent	● City Parks/Recreation	● City Fire Department	● City Attorney	● City G.J.P.C. (8 sets)	○ City Downtown Dev. Auth.	● City Police	● County Planning	○ Walker Field	● School District #51	● Irrigation District – Redlands Water & Power	○ Drainage District	● Water District (1st)	○ Sewer District	● U.S. West	● Public Service	○ GVRP	○ CDOT	○ Corps of Engineers	● Colorado Geological Survey	● U.S. Postal Service	○ Persigo WWTF	● TCI Cable	Separate check to Colorado Geological Survey - $595.00	TOTAL REQ'D.
● Application Fee $410 + $15/acre	VII-1	1																											
● Submittal Checklist*	VII-3	1																											
● Review Agency Cover Sheet*	VII-3	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● Application Form*	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● Reduction of Assessor's Map	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● Evidence of Title	VII-2	1			1			1																					
● Names and Addresses	VII-2	1																											
● Legal Desdription	VII-2	1			1																								
● General Project Report	X-7	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● Location Map	IX-21	1																											
● Preliminary Plan	IX-26	1	2	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● 11"x17" Reduction of Prelim. Plan	IX-26	1				1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
● Preliminary Drainage Report	X-12	1	2																										
● Geotechnical Report	X-8	1	1																					1					
● Traffic Impact Study	X-15	1	2																										
● Roadway Plan and Profile	IX-28	1	3																										
BRIAN STOWELL																													

NOTES: * An asterisk in the item description column indicates that a form is supplied by the City.

SUBMITTAL CHECKLIST

MAJOR SUBDIVISION: FINAL *Filings 1 and 2*

Location: *South Camp Road* Project Name: *Trails West Village*

Date Received ______

Receipt # ______

File # ______

ITEMS: DESCRIPTION	SSID REFERENCE	● City Community Development	● City Dev. Eng.	● City Utility Eng.	● City Property Agent	● City Parks/Recreation	● City Fire Department	● City Attorney	● City G.J.P.C. (8 sets)	O City Downtown Dev. Auth.	● City Police	● County Planning	O County Building Department	● County Surveyor	O Walker Field	● School Dist. #51	● Irrigation District *Redlands Water & Power*	O Drainage District	● Water District *Ute*	O Sewer District	● U.S. West	● Public Service	O GVRP	O CDOT	O Corps of Engineers	O Colorado Geologic Survey	O U.S. Postal Service	● ~~Persigo WWTF~~	● TCI Cable			TOTAL REQ'D.
● Application Fee	VII-1	1																														
● Submittal Checklist*	VII-3	1																														
● Review Agency Cover Sheet*	VII-3	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
● Application Form*	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
● Reduction of Assessor's Map	VII-1	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
● Evidence of Title	VII-2	1			1			1																								
O Appraisal of Raw Land	VII-1	1			1	1																										
● Names and Addresses*	VII-2	1																														
● Legal Description*	VII-2	1			1																											
O Deeds	VII-1	1			1			1																								
O Easements	VII-2	1	1	1	1			1													1	1	1						1			
O Avigation Easement	VII-1	1			1			1							1																	
O ROW	VII-2	1	1	1	1			1													1	1	1						1			
● Covenants, Conditions & Restrictions	VII-1	1	1					1																								
O Common Space Agreements	VII-1	1	1					1																								
● County Treasurer's Tax Cert.	VII-1	1																														
● Improvements Agreement/Guarantee*	VII-2	1	1	1				1																								
O CDOT Access Permit	VII-3	1	1																													
O 404 Permit	VII-3	1	1																													
O Floodplain Permit*	VII-4	1	1																													
● General Project Report	X-7	1	1	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1			
● Composite Plan	IX-10	1	2	1	1																											
● 11"x17" Reduction Composite Plan	IX-10	1				1	1	1	8	1	1	1	1				1	1	1	1	1	1	1	1	1	1		1	1			
● Final Plat	IX-15	1	2	1	1	1	1	1	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
● 11"X17" Reduction of Final Plat	IX-15	1							8	1	1	1			1	1	1	1	1	1	1	1	1				1		1			
● Cover Sheet	IX-11	1	2																													
● Grading & Stormwater Mgmt Plan	IX-17	1	2															1							1	1			1			
● Storm Drainage Plan and Profile	IX-30	1	2															1			1	1	1						1			
● Water and Sewer Plan and Profile	IX-34	1	2	1			1												1	1	1	1	1					1	1			
● Roadway Plan and Profile	IX-28	1	2															1														
● Road Cross-sections *S. CAMP*	IX-27	1	2																													
● Detail Sheet	IX-12	1	2																													
O Landscape Plan	IX-20	2	1	1					8																							
● ~~Geotechnical Report~~ *submitted w/ prelim*	X-8	1	1																							1						
O Phase I & II Environmental Report	X-10,11	1	1																													
● Final Drainage Report	X-5,6	1	2															1														
● Stormwater Management Plan	X-14	1	2															1							1							
O Sewer System Design Report	X-13	1	2	1																1												
O Water System Design Report	X-16	1	2	1															1													
O Traffic Impact Study	X-15	1	2																					1								
O Site Plan	IX-29	1	2	1	1		1		8																							

NOTES: * An asterisk in the item description column indicates that a form is supplied by the City.

REPORT CHECKLIST AND OUTLINE

GEOTECHNICAL REPORT

CHECKLIST	OK	NA
Typed text (appendices may be handwritten)		
Size: 8½ x 11" format		
Bound: Use bar or spiral binder or staple. Do not use a notebook.		
Title Page: a. Name of report and preparer, date of preparation and revision (if any) b. Professional's seal and signature		
Table of Contents: For text and appendices if any (appendices shall be paged)		
Exhibits: Maximum 11" high and 32" wide, bound in report and folded as required to 8½"x11" size		
Maps attached to or contained in the report: (Provide drawings as required to clarify report) — STEEP SLOPES, HAZARDS, ROCK OUTCROPS		

OUTLINE

A. General Soil Classifications
- ✓ Soil classification
- ✓ Geologic hazards
- ✓ Potentially unstable slopes
- ✓ Swell potential
- ✓ Consolidation potential
- ✓ Water table
- ✓ Corrosivity to concrete
- ✓ Rock outcrops
- ✓ Gamma radiation

ROCK RETAINING STRUCTURES REQUIRED BY STATE

B. Grading and Excavation Considerations — SPECIFICALLY, THE 14' CUTS
- ✓ Potential construction difficulties and general recommendations
- ✓ Suitability of native material for trench backfill and structural fill
- ✓ Compaction of fills and subgrades

C. Retained Earth Information
- ✓ Lateral earth pressure s(active and passive)
- ✓ Coefficient of friction to lateral movement
- ✓ Angle of internal friction
- ✓ Backfill compaction

D. Foundations
- ✓ Allowable bearing capacity
- ✓ Soil weights
- ✓ Types of foundations
- ✓ Perimeter drains and groundwater

E. Drainage and Irrigation
- ✓ Permeability of soil
- ✓ Hydrologic soil group (SCS classification)
- ✓ Irrigation practices
- ✓ Grades around buildings

F. Pavement Structures
- ✓ Subgrade compaction
- ✓ Fabrics and/or geogrids
- ✓ R values
- ✓ Base and pavement thickness design (new and over exist. material, as appropriate)
- ✓ Asphalt compaction

G. Boring Logs

COMMENTS

1 It may not be necessary to cover all of the above topics, but the report should address all concerns applicable to the proposed project, even issues not identified above.

DRAWING STANDARDS CHECKLIST

PRELIMINARY PLAN

ITEM		GRAPHIC STANDARDS	OK	NA
SECTION VIII	A	Scale: 1" = 20', 30', 40', or 50'		
	B	Sheet size: 24" x 36"		
	C	There are no primary features on this drawing		
	D	Notation: All non-construction text		
	E	Line weights of existing and proposed features per City standards		
	G	Horizontal control: Subdivisions tied to Section aliquot corners		
	H	Vertical control: Benchmarks on U.S.G.S. datum if public facilities other than SW are proposed		
	I	Orientation and north arrow		
	K	Title block with names, titles, preparation and revision dates		
	M	Legend of symbols used		
	N	List of abbreviations used		
	P	Multiple sheets provided with overall graphical key and match lines		
	Q	Contouring interval and extent		
	R	Neatness and legibility		

ITEM		FEATURES	OK	NA
	1	Name of subdivision and total site acreage		
DRAINAGE INFO.	2	Show subdivision perimeter boundaries		
	3	Identify utility vendors to the site		
	4	Show existing and proposed lots, parcels, tracts, ROW and easements on and adjacent to site. For perimeter streets, show roadway width from curb to curb or edge of pavement to edge of pavement, ROW width and monument or section line		
	5	Show and identify proposed ownership and use of common and public tracts		
	6	Show existing and proposed drainage systems, including retention/detention basins and location of inflow to and outflow from the site, and directional flow arrows on streets and channels		
	7	Show existing contours and any major proposed changes to site grading		
	8	Show location of or reference to arterial and/or collector roads		
	9	Show 100-year floodplains per previous studies or reports		
	10	Show other existing natural or man-made drainageways, wetlands, ponds, etc.		
ADD'L INFO.	11	Indicate land use breakdown by percentage (lots, tracts, ROW), and number of lots		
	12	Show adjacent properties and identify zoning and use		
	13	Show and identify buildings and use which are on and/or immediately adjacent to the site		
	14	Number lots and blocks consecutively		
	15	Show and identify streets, and identify proposed City standard street section		
	16	Show and size existing and proposed water and sewer (not services) and irrigation facilities		
	17	Show other existing utilities, including power, telephone, gas, and cable TV		
DIM.	18	Dimension (approximate only) lot and tract boundaries and street and ROW widths		

COMMENTS

1. Items 1-10 may be used as a base for the Major Basin Drainage Map.
2. Items 1-17 may be used (as subsequently revised) for the Composite Plan.

REPORT CHECKLIST AND OUTLINE

PRELIMINARY DRAINAGE REPORT

CHECKLIST	OK	NA
Typed text		
Size: 8½ x 11" format		
Bound: Use bar or spiral binder or staple. Do not use a notebook.		
Title Page: Name of report and preparer, date of preparation and revision (if any)		
Exhibits: Maximum 11" high and 32" wide, bound in report and folded as required to 8½"x11" size		
Maps attached to or contained in the report: Vicinity Map and Preliminary Major Basin Drainage Map		

OUTLINE

I. GENERAL LOCATION AND DESCRIPTION
- A. Site and Major Basin Location
  1. Streets in the vicinity
  2. Development in the vicinity
- B. Site and Major Basin Description
  1. Acreage
  2. Ground cover types
  3. Hydrologic soil types

II. EXISTING DRAINAGE CONDITIONS
- A. Major Basin
  1. General topography, drainage patterns and features, canals, ditches, wetlands
  2. Previously determined 100-year floodplains
- B. Site
  1. Historic drainage patterns
  2. Inflow characteristics from upstream
  3. Discharge characteristics to downstream sub-basins

III. PROPOSED DRAINAGE CONDITIONS
- A. Changes in Drainage Patterns
  1. Major basin
  2. Site
- B. Maintenance Issues
  1. Access
  2. Ownership and responsibility

IV. DESIGN CRITERIA & APPROACH
- A. General Considerations
  1. Previous drainage studies performed for the area
  2. Master planning issues (large scale considerations)
  3. Constraints imposed by site and other proposed development
- B. Hydrology
  1. Design storms and precipitation
  2. Runoff calculation method
  3. Detention/retention basin design method
  4. Parameter selection procedures
  5. Analysis and design procedures
  6. Justification of proposed methods not presented or referenced in SWMM
- C. Hydraulics
  1. Hydraulic calculation methods
  2. Parameter selection procedures
  3. Analysis and design procedures
  4. Justification of proposed methods not presented or referenced in SWMM

COMMENTS

1. No calculations are required for the Preliminary Drainage Report.
2. It may not be necessary to cover all of the above topics, but the report should address all concerns applicable to the proposed project, even issues not identified above.

DEVELOPMENT APPLICATION

Community Development Department
250 North 5th Street Grand Junction, CO 81501
(303) 244-1430

Receipt _____
Date _____
Rec'd By _____
File No. PP-95-157

We, the undersigned, being the owners of property situated in Mesa County, State of Colorado, as described herein do hereby petition this:

PETITION	PHASE	SIZE	LOCATION	ZONE	LAND USE
[X] Subdivision Plat/Plan	[ ] Minor [X] Major [ ] Resub	40 acres	S. Camp Rd	RSF-4	Residential
[ ] Rezone				From: To:	
[ ] Planned Development	[ ] ODP [ ] Prelim [ ] Final				
[ ] Conditional Use					
[ ] Zone of Annex					
[ ] Variance					
[ ] Special Use					
[ ] Vacation					[ ] Right-of-Way [ ] Easement
[ ] Revocable Permit					

[X] PROPERTY OWNER [ ] DEVELOPER [X] REPRESENTATIVE

PROPERTY OWNER	DEVELOPER	REPRESENTATIVE
Camelot Investments LLC ← same		4) Paul W. Stowell, P.E.
Name c/o Brian L. Stowell	Name	Name
0090 Caballo Rd.	Address	4669 So. Adobe Ln.
Address		Address
Carbondale, CO 81623	City/State/Zip	Littleton, Colo. 80127
City/State/Zip		City/State/Zip
970 · 920·1028	Business Phone No.	303·972·2715
Business Phone No.		Business Phone No.

(2) Dave Wens
3024 F 3/4 Rd.
Grand Junction, CO 81504

NOTE: Legal property owner is owner of record on date of submittal.

We hereby acknowledge that we have familiarized ourselves with the rules and regulations with respect to the preparation of this submittal, that the foregoing information is true and complete to the best of our knowledge, and that we assume the responsibility to monitor the status of the application and the review comments. We recognize that we or our representative(s) must be present at all hearings. In the event that the petitioner is not represented, the item will be dropped from the agenda, and an additional fee charged to cover rescheduling expenses before it can again be placed on the agenda.

Brian L Stowell — 12/8/95
Signature of Person Completing Application — Date

Brian L Stowell
Signature of Property Owner(s) - Attach Additional Sheets if Necessary

DEVELOPMENT APPLICATION

Community Development Department
250 North 5th Street, Grand Junction, CO 81501
(303) 244-1430

Receipt _____
Date _____
Rec'd By _____
File No. PP-95-157

We, the undersigned, being the owners of property situated in Mesa County, State of Colorado, as described herein do hereby petition this:

PETITION	PHASE	SIZE	LOCATION	ZONE	LAND USE
☒ Subdivision Plat/Plan	☐ Minor ☒ Major ☐ Resub	40 acres	S. Camp Rd	RSF-4	Residential
☐ Rezone				From: To:	
☐ Planned Development	☐ ODP ☐ Prelim ☐ Final				
☐ Conditional Use					
☐ Zone of Annex					
☐ Variance					
☐ Special Use					
☐ Vacation					☐ Right-of Way ☐ Easement
☐ Revocable Permit					

☒ PROPERTY OWNER	☒ DEVELOPER	☒ REPRESENTATIVE
Camelot Investments LLC	DAVE WENS	Wayne H. Lizer
Name	Name	Name
0090 Caballo Rd	3024 F 3/4 Rd	576 25 Rd
Address	Address	Address
Carbondale / Colorado / 81623	GRAND JUNCTION CO 81504	Grand Jct CO 81505
City/State/Zip	City/State/Zip	City/State/Zip
970-963-0627	434-4448	970 241-1129
Business Phone No.	Business Phone No.	Business Phone No.

NOTE: Legal property owner is owner of record on date of submittal.

We hereby acknowledge that we have familiarized ourselves with the rules and regulations with respect to the preparation of this submittal, that the foregoing information is true and complete to the best of our knowledge, and that we assume the responsibility to monitor the status of the application and the review comments. We recognize that we or our representative(s) must be present at all required hearings. In the event that the petitioner is not represented, the item will be dropped from the agenda, and an additional fee charged to cover rescheduling expenses before it can again be placed on the agenda.

X _____ 8/14/95
Signature of Person Completing Application — Date

X Brian L Howell manager/member 8/4/95
Signature of Property Owner(s) - attach additional sheets if necessary — Date

GENERAL PROJECT REPORT

A. Project Description

To develop 40 acres in the Redlands into 69 single family units.

1. Location: Trails West Village is located east of South Camp Road 1/2 miles South of South Broadway.
2. Acreage: Approximately 40 acres in size.
3. Proposed use: To be developed into 69 single family units

B. Public Benefit

Trails West Village will provide attractive building lots in a very desirable location.

C. Project Compliance, Compatibility, and Impact

1. The project complies with the RSF-4 zoning designated by the city.
2. Land use in the surrounding area: The Ridges is behind the hill to the east. There is a large area of 1/2 acre lots to the west. A large area of 1/2 acre lots to the South. A church is located to the North, and Wingate Elementary to the southwest about 1/2 mile. Other uses are larger acreages and agriculture.
3. Site access and traffic patterns: Site access would be obtained by two entrances off of South Camp Road Traffic patterns will be gentle curves and short culdesacs, with a long culdesac to the upper elevations.
4. Availability of utilities, including proximity of fire hydrants: All utilities are readily available to the project. Fire hydrants will be placed at intervals no farther than five hundred feet apart.
5. Special or unusual demands on utilities: There will be no unusual demand on the utilities.
6. Effects on public facilities: There are no foreseen demands on public facilities.
7. Site soils and geology: There is an escarpment on the property which has raised concerns about falling rock. These areas will be designated as no build zones. All soil testing has been positive with a minimum thirteen foot water table.
8. Impact of project on site geology and geological hazards, if any: The fourth phase will require a road through the escarpment, but will be engineered in a way to avoid geological hazards. No building on slopes over 30%.
9. Hours of operation: Hours of operation will be from 7:00 a.m. to 10:00 a.m.
10. Signage plans: Adequate signage will be placed at the appropriate areas through out the subdivision. A large promotional sign will be placed at the entrance.

D. Development Schedule and Phasing:

Four phases have been planned.

Trails West Village
Adj. Property Owners

2945-183-00-002

Elaine F Chew Trust-Etal
c/o Don Larrance
101 S. Madison St.
Denver, CO 80209-3003

2945-183-00-005

Edwin L & Ann B Oberto
872 S. Milwaukee Ave #229
Libertyville, IL 60048-3227

2945-183-00-006

Edward M & N L Lippoth
2246 Knollwood Ln
Grand Junction, CO 81505-7003

2945-183-00-009

Robert L Cooney
Sharon D & Shawn R
380 Hidden Valley Cr
Grand Junction, CO 81503

2945-183-00-041

Elmer & Ginger A Schneider
424 S. Camp Rd.
Grand Junction, CO 81503-2538

2945-183-00-061 & -01-001

Anita Gorski
404 S. Camp Rd.
Grand Junction, CO 81503-2538

2945-183-00-062

Miriam F Doell
14704 S. Murray Ln
Olathe, KS 66062-2610

2945-192-00-086

Genie Inc
P O Box 3299
Grand Junction, CO 81502-3299

2945-192-00-089; -090; -098

Dynamic Investments Inc
391 1/2 Hillview Dr
Grand Junction, CO 81503-4606

2945-192-00-115

Eugene B Fletcher, Inc
P O Box 821
Rancho Santa Fe, CA 92067-0821

2947-264-00-030

Robert L & R A Sutton
413 S. Camp Rd.
Grand Junction, CO 81503-2537

2947-264-00-058

James A Crittenden
Ann B Olewnik
397 S. Camp Rd.
Grand Junction, CO 81503-2545

2947-264-02-007

Michael C & Mabel A Mason
2196 Avenal Ln
Grand Junction, CO 81503-2542

2947-264-02-008

Joel H & Marcia A Williams
427 S. Camp Road
Grand Junction, CO 81503-2541

2947-264-03-001

Phyllis A Cook
425 S Camp Rd
Grand Junction, CO 81503-2537

2947-264-03-002

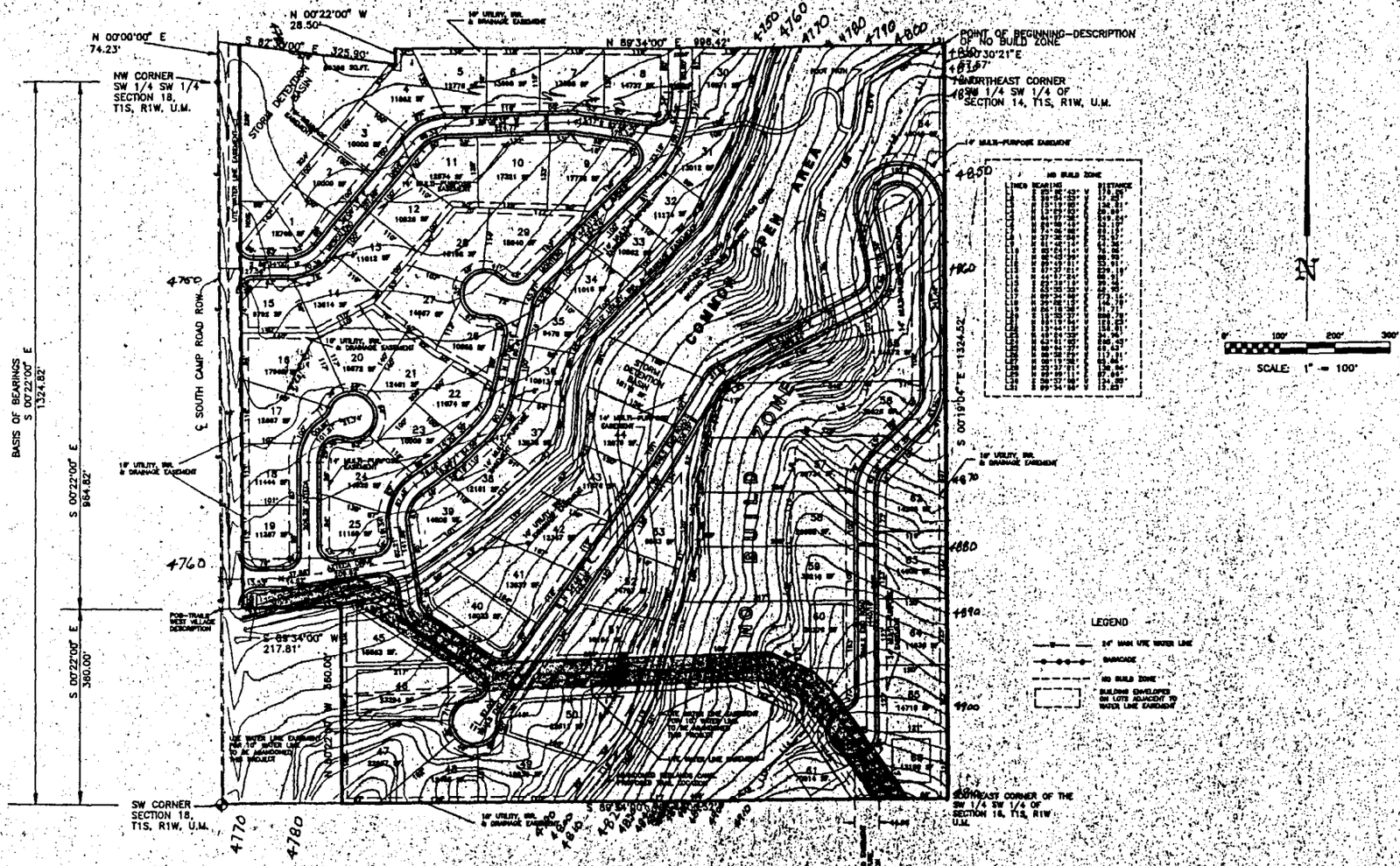
Ray W & Helen E Carlson
2195 Avenal Ln
Grand Junction, CO 81503-2509

Brian Stowell, Mgr.
Camelot Investments LLC
0090 Caballo Rd.
Carbondale, Colorado 81623

Dave Wens
3024 F 3/4 Rd
Grand Junction, CO 81504

Wayne H Lizer, P.E., P.L.S.
W H Lizer & Associates
576 25 Road #8
Grand Junction, CO 81505

City of Grand Junction
Community Development Dept.
250 N 5th Street
Grand Junction, CO 81501



LAND USE SUMMARY

LOTS	26.7 AC.	66.7%
STORM DETENTION	1.6 AC.	3.9%
REDLANDS 2ND LIFT CANAL	1.5 AC.	3.7%
STREETS	7.5 AC.	18.7%
COMMON OPEN AREA	2.1 AC.	5.3%
PROPOSED TRAIL	0.7 AC.	1.7%
TOTAL	40.1 AC.	100.0%

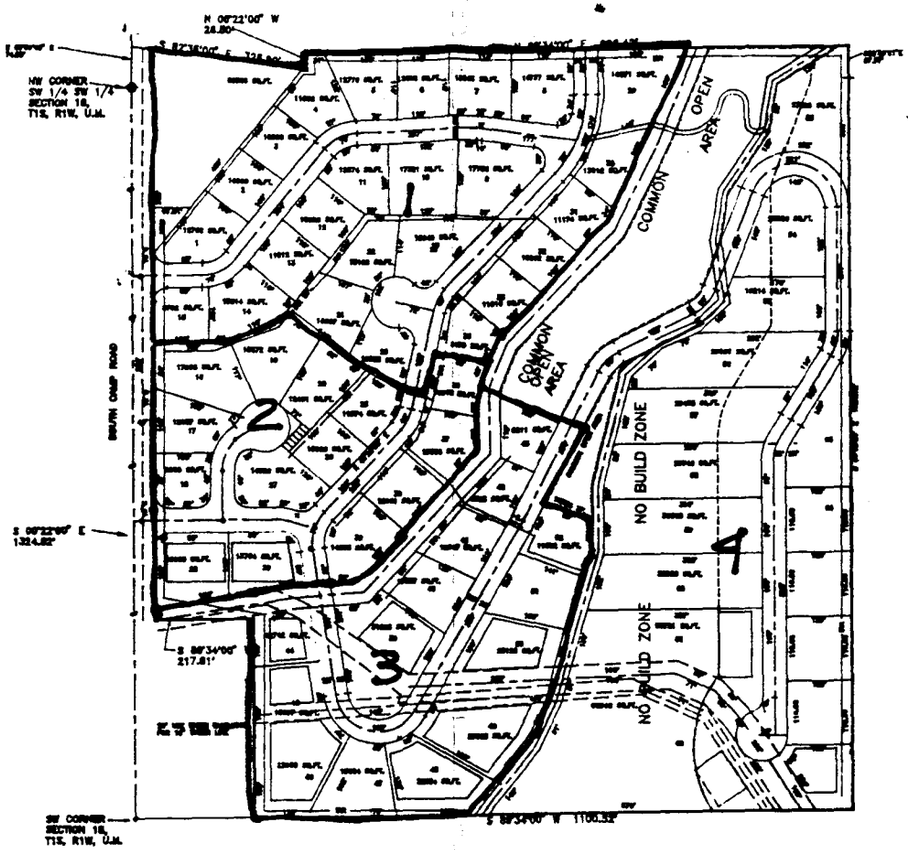
DENSITY : 66 LOTS/40.1 AC. = 1.64 UNITS/ACRE

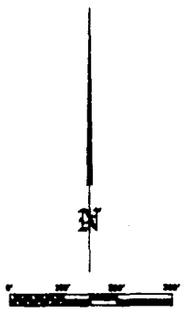
NUMBER	REVISION	DATE	BY
F			
E			
D	STREET REVISIONS AND FINAL LOCATION OF SECOND LIFT CANAL	11/17/98	WHL
C	REVISE STREET LAYOUT OVER UTE WATER LINES AS PER UTE WATER DIST.	10/24/98	WHL
B	10/20 ROAD ADJUSTMENTS	10/98	WHL
A	REVISE STREET AND LOT	9/98	WHL

PRELIMINARY PLAN
FOR TRAILS WEST VILLAGE
IN SECTION 18, T1S, R1W, U.M.
A PART OF THE SW 1/4, SECTION 8, T. 1 S., R. 1 E., U.M.
MESA COUNTY, COLORADO

W.H. LIZER AND ASSOCIATES
ENGINEERING CONSULTING AND LAND SURVEYING
576 26 ROAD--UNIT 6
GRAND TION, COLORADO

DATE	PROJ. NO.	SCA.	FILE NAME	DRAWN BY	CHECK'D BY





LAND USE SUMMARY

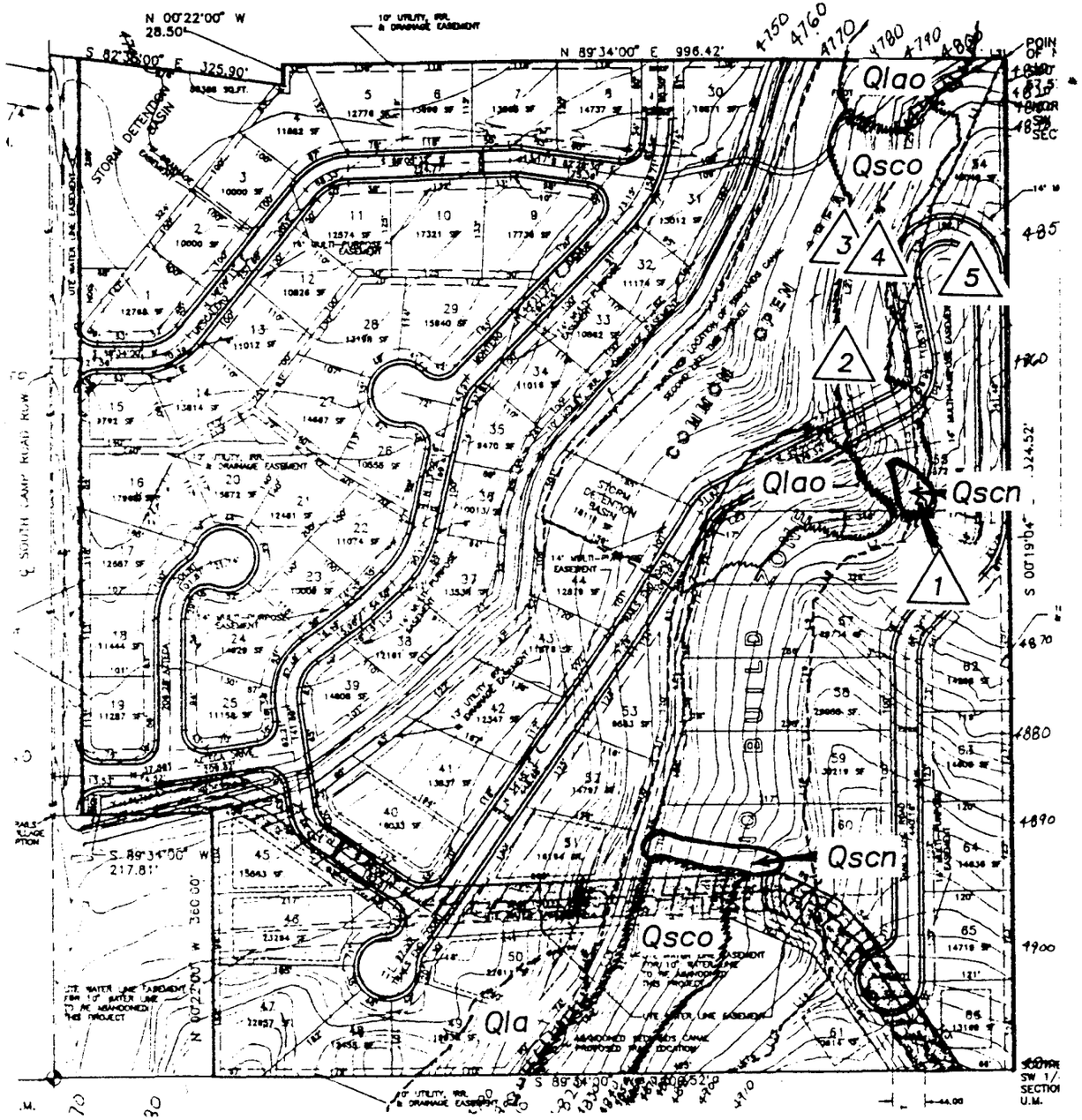
LOTS	26.7 AC.	66.7%
STORM DETENTION	1.2 AC.	3.0%
REDLANDS 2ND LIFT CANAL	1.5 AC.	3.7%
STREETS	7.5 AC.	18.7%
COMMON OPEN AREA	2.5 AC.	6.2%
PROPOSED TRAIL	0.7 AC.	1.7%
TOTAL	40.1 AC.	100.0%
DENSITY	68 LOTS/40.1 AC. = 1.7 UNITS/ACRE	

VERSION "A"

REVISED PRELIMINARY PLAN
FOR [illegible] VIEW VILLAGE
A PART OF THE [illegible]

V.H. LIZER AND ASSOCIATES
[illegible]

DATE	FILE NO.	SCALE	SHEET NO.	SHEET NO.	DRAWN BY
SEPT. 6, 1979	[illegible]	1" = 100'	[illegible]	1	[illegible]



LEGEND

Qla ANCIENT LANDSLIDE DEPOSIT
WELL DEFINED – MAY AFFECT BUILDING DESIGN
MAY REQUIRE SITE SPECIFIC REVIEW
BRUSHY BASIN Member OF MORRISON FORMATION

Qlao ANCIENT LANDSLIDE – VERY ERODED
DEPOSITS ARE LESS THAN 4 Feet THICK
BRUSHY BASIN Member OF MORRISON FORMATION

Qscn SOIL CREEP – NEW – ACTIVE
GENERALLY LESS THAN 2 FEET THICK
COMPOSED OF COLLUVIAL SOILS
IN AREAS OF CONCENTRATED DRAINAGE

Qsco SOIL CREEP – OLD – INACTIVE
GENERALLY LESS THAN 2 FEET THICK
COMPOSED OF COLLUVIAL SOILS
IN AREAS OF CONCENTRATED DRAINAGE

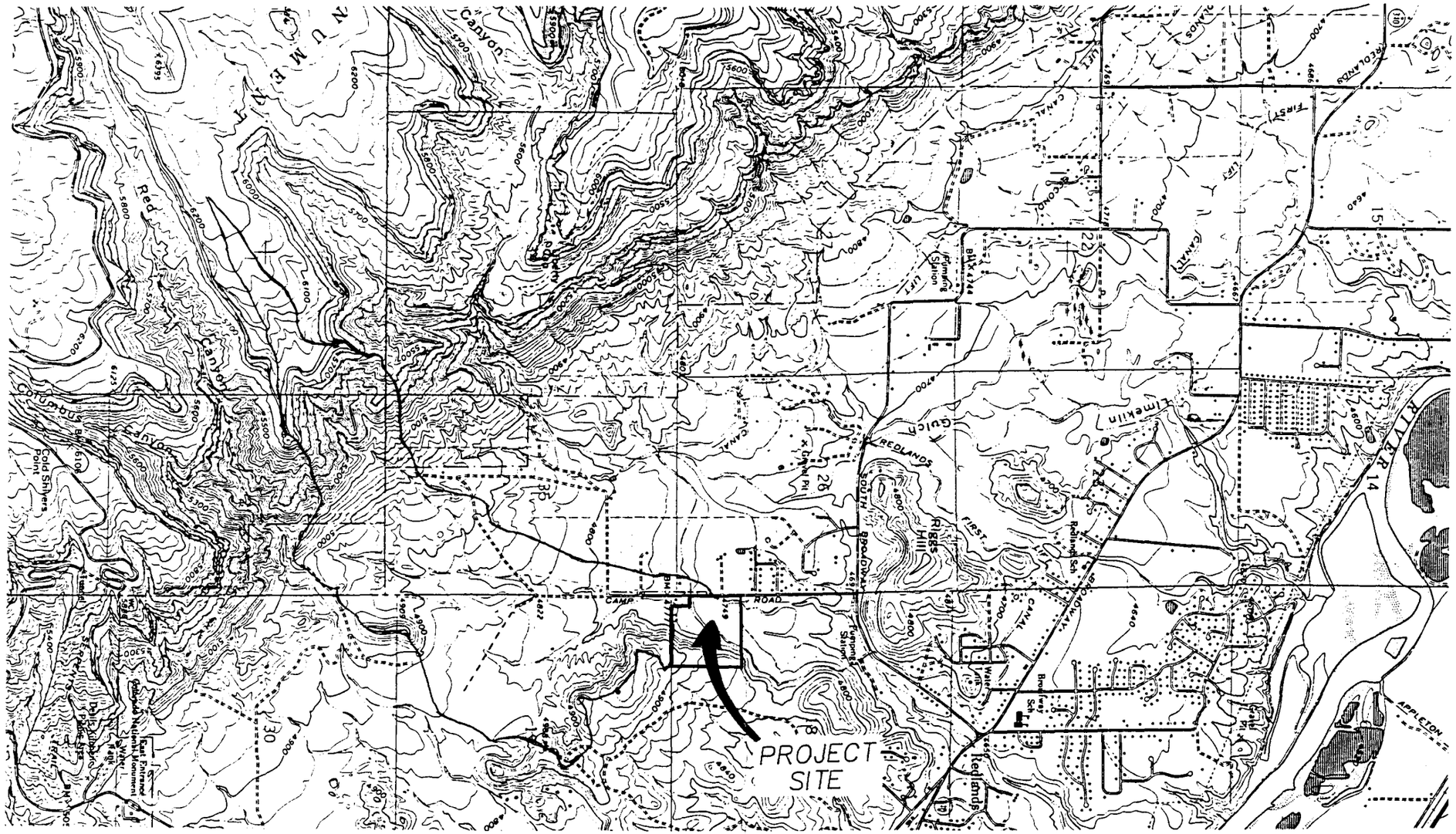
BUILDING CONSTRUCTION LIMIT
DEFINED BY POTENTIAL SLOPE INSTABILITY
and POTENTIAL ROCK/BOULDER ROLLING/SLIDING

1 EXPLORATION/TEST PIT LOCATION

0 100 500 300
APPROXIMATE SCALE

TEST PIT LOCATION/GEOLOGIC FEATURES
Proposed TRAILS WEST VILLAGE SUBDIVISION
REDLANDS AREA, GRAND JUNCTION, CO.

LINCOLN DeVORE ENGINEERS · GEOLOGISTS	1441 MOTOR STREET GRAND JCT. COLORADO COLO. SPRINGS–PUEBLO	
	JOB # 84157-J	SHEET 2 OF
DRAWN BY E.M. MORRIS	SCALE NO SCALE	DATE 12-8-95
CHECKED BY	CONT. INT. 20'	REV.



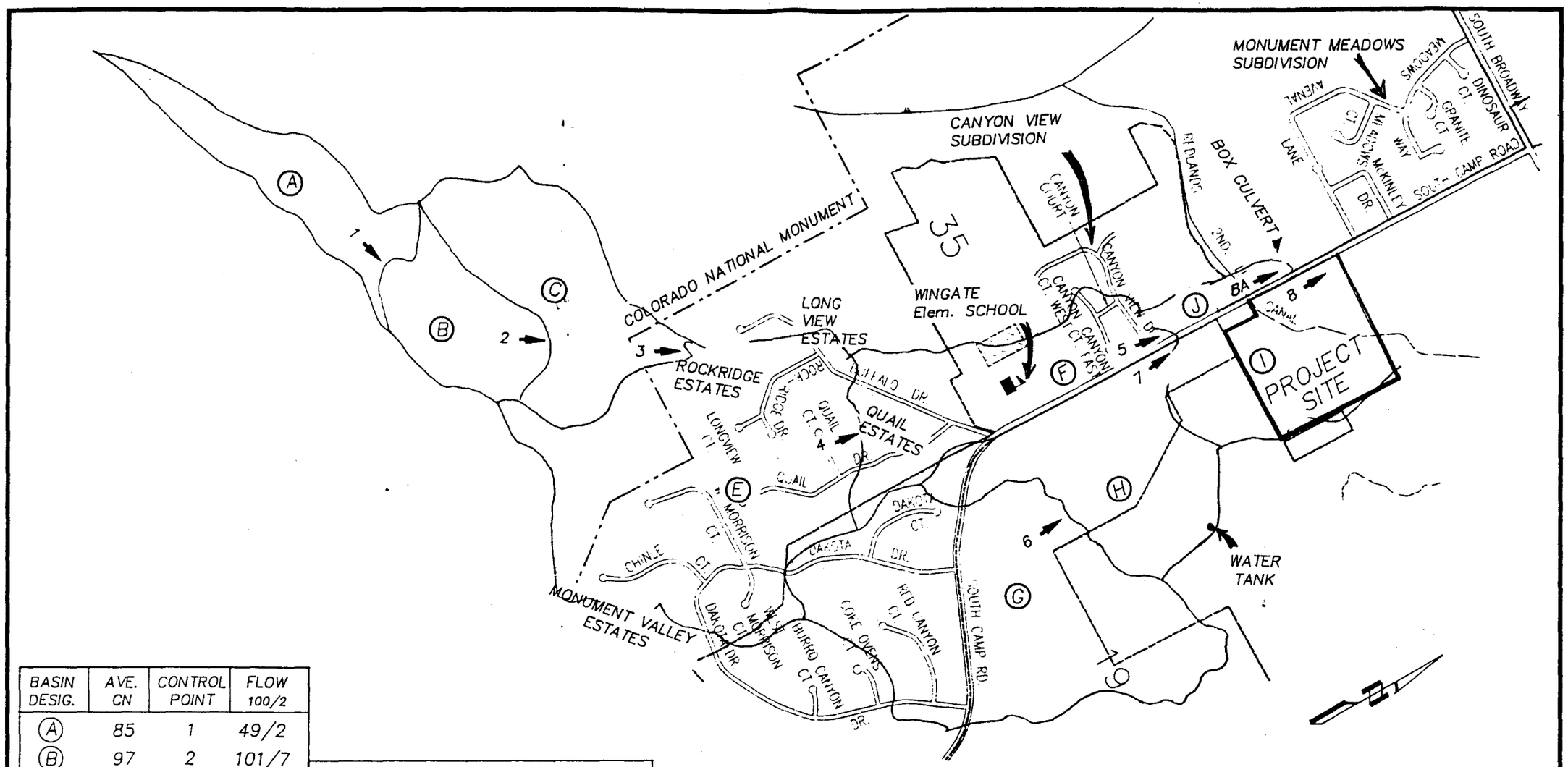
GENERAL SITE/BASIN LOCATION DIAGRAM
Proposed TRAILS WEST VILLAGE SUBDIVISION
REDLANDS AREA, GRAND JUNCTION, CO.

Mapping from U.S.Geological Survey
7-1/2 minute, Colorado National Monument, Colo. Quadrangle

LINCOLN DeVORE
ENGINEERS-GEOLOGISTS

1441 MOTOR STREET
GRAND JCT., COLORADO
COLO. SPRINGS-PUEBLO

	LO # 84157-J	SHEET 1	OF
DRAWN BY E.M. MORRIS	SCALE 1"=2000	DATE 11-30-95	
CHECKED BY	CONT. INT. 20'	REV.	



BASIN DESIG.	AVE. CN	CONTROL POINT	FLOW 100/2
(A)	85	1	49/2
(B)	97	2	101/7
(C)	87	3	186/12
(E)	76	4	237/13
(F)	75	5	254/9
(G)	76	6	76/1
(H)	77	7	100/1
(I)	78	8	364/10
(J)	75	8A	235/10

BASIN DESIG.	CONTROL POINT	FLOW (cfs) 100yr./2yr.
(I)	8 –	364/10 →

GLB	GLENBERG SANDY LOAM Debris Fan Deposits/Redlands Alluvium
Ro	ROCK LAND Talus/Bouldery Colluvium
Rp	ROCK OUTCROP Geologic Formations – Not Shale

LINCOLN–DeVORE, INC.

By:

State of Colorado

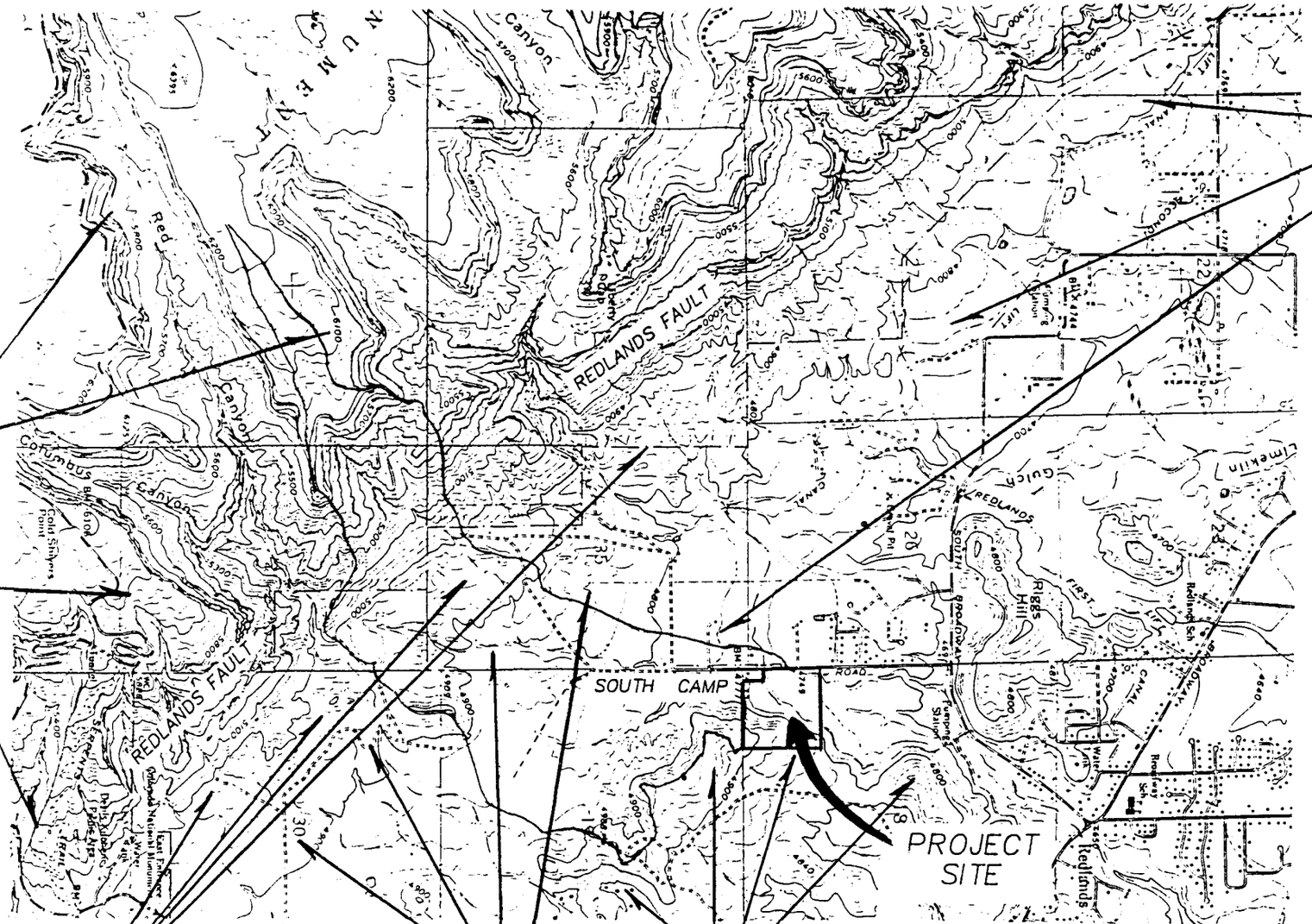
Designed by: RICHARD N. MORRIS, PE

MAJOR BASIN DRAINAGE MAP OUTLINE
Proposed TRAILS WEST VILLAGE SUBDIVISION
REDLANDS AREA, GRAND JUNCTION, CO.

LINCOLN DeVORE ENGINEERS · GEOLOGISTS

1441 MOTOR STREET
GRAND JCT., COLORADO
COLO. SPRINGS–PUEBLO

DRAWN BY: E.M. MORRIS	JOB #: 84157–J	SHEET: 3 OF	
CHECKED BY:	SCALE: 1"=1000	DATE: 12–8–95	
	CONT. INT.: 20'	REV.	



Mapping from U.S. Geological Survey 7–1/2 minute, Colorado National Monument, Colo. Quadrangle

GENERAL GEOLOGY/GEOMORPHOLOGY
Proposed TRAILS WEST VILLAGE SUBDIVISION
REDLANDS AREA, GRAND JUNCTION, CO.

LINCOLN DeVORE
ENGINEERS · GEOLOGISTS

1441 MOTOR STREET
GRAND JCT., COLORADO
COLO. SPRINGS—PUEBLO

DRAWN BY E.M. MORRIS	JOB # 84157–J	SHEET 1 OF
CHECKED BY	SCALE 1"=2000	DATE 11–30–95
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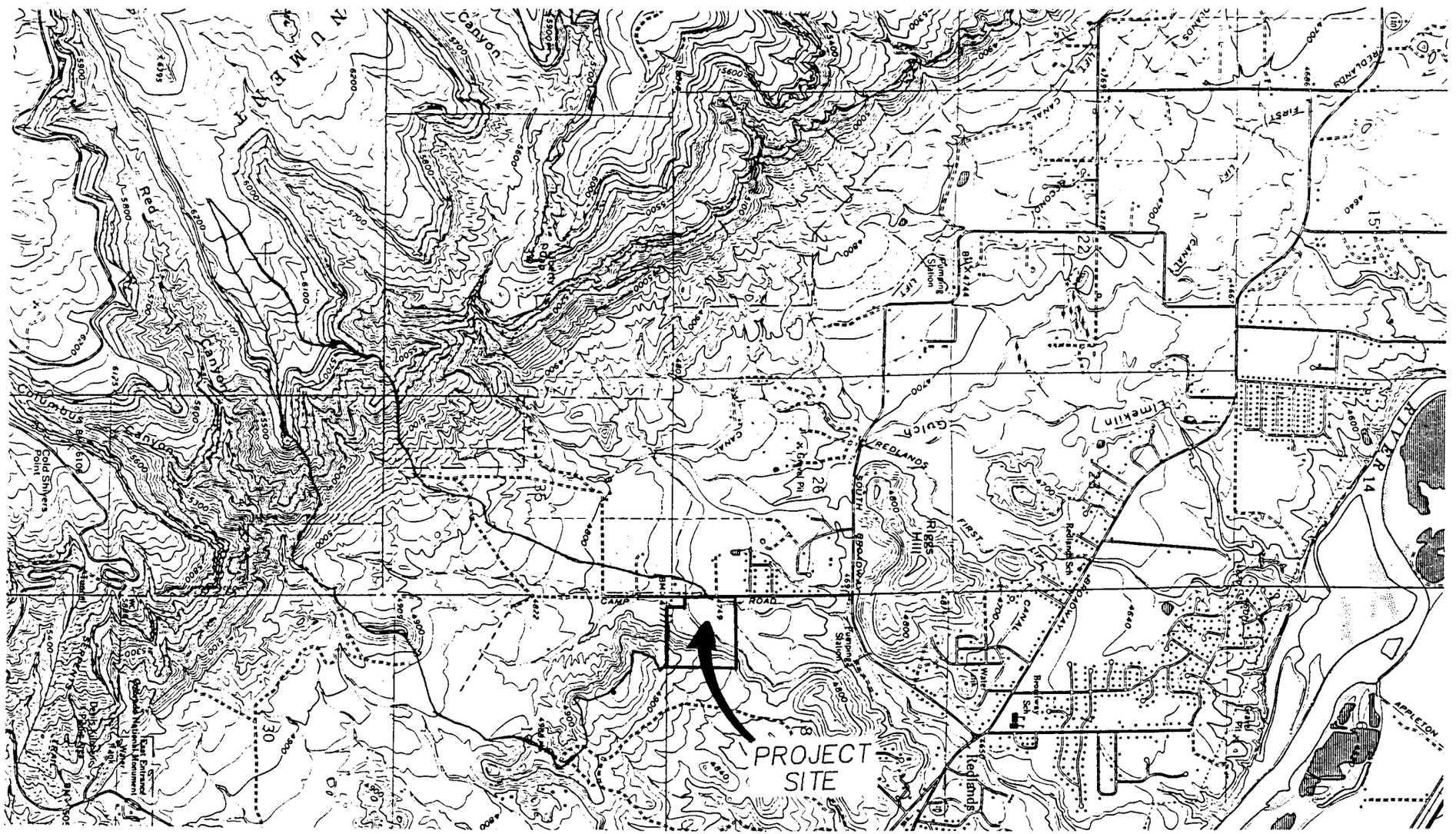


Mapping from U.S.Geological Survey
7-1/2 minute, Colorado National Monument, Colo. Quadrangle

GENERAL SITE/BASIN LOCATION DIAGRAM
Proposed TRAILS WEST VILLAGE SUBDIVISION
REDLANDS AREA, GRAND JUNCTION, CO.

LINCOLN DeVORE
ENGINEERS · GEOLOGISTS

1441 MOTOR STREET
GRAND JCT. COLORADO
COLO. SPRINGS-PUEBLO

LG # 84157-J		SHEET 1	OF
DRAWN BY E.M. MORRIS	SCALE: 1"=2000	DATE 11-30-95	
CHECKED BY	CONT. INT. 20'	REV.	

W.H. LIZER & ASSOCIATES
Engineering Consulting and Land Surveying
576 25 Road, Unit #8
Grand Junction, Colorado 81505
(970) 241-1129

September 1, 1995

PRELIMINARY DRAINAGE REPORT

Trails West Village

Part of the SW 1/4 SW 1/4 of
Section 18, T.1S., R.1W., of the
the Ute Meridian, City of Grand Junction
Mesa County, Colorado

General

The site is located at the Northeast corner of South Camp Road and "C" line. The site for the most part is located in the SW 1/4 SW 1/4 of Section 18, T.1S., R.1W., U.M., City of Grand Junction, Mesa County, Colorado, and contains approximately 40.1 acres.

The site generally drains from the Southeast to Northwest with a total relief of approximately 180 feet. There is approximately 2 acres of exterior contribution at the Southeast corner of the site.

In addition, there is a drainage along the West side of the parcel which drains approximately 580 acres upstream from the site.

Assumption

It is assumed that the Redlands 2nd Lift Canal will not have any carrying capacity and storm water runoff above the canal will sheet flow across the canal.

Drainage Patterns - After Development

Runoff will generally be picked up by drainage swales along the road sites and be carried to a proposed storm detention basin at the Northwest corner of the site.

A final drainage analysis may indicate that interum detention basins will be required based on flow rates and street swale carrying capacities.

Drainage will generally be from Northwest to Southeast and will be picked up by swales along side the streets which will ultimately carry the runoff to the main detention basin.

After being discharged from the detention basin, storm water will be carried along the East side of South Camp Road to the North, then along South Broadway and Redlands Parkway until the Colorado River is reached.

Conclusions and Recommendations

There will be approximately four phases of development, the first of which will occur at the Northwest corner of the site.

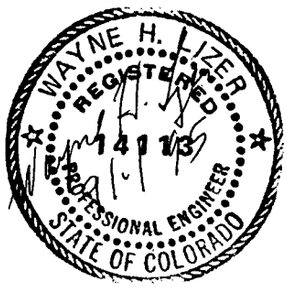
At the submittal of the first final phase, a complete drainage analysis, plan and report should be submitted for the entire project to insure all drainage requirements are met, including a detailed study of the 580 acre water shed above the site.

Respectfully submitted,

Wayne H. Lizer

Wayne H. Lizer, P.E., P.L.S.

WHL:dp



Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(970) 244-1430 FAX (970) 244-1599

September 27, 1995

Dave Wens
Camelot Investments, LLC.
3024 F 3/4 Road
Grand Junction, CO 81504

RE: File #PP-95-157, Trails West Village

Dear Mr. Wens:

City staff has reviewed the response to comments submitted for the proposed Trails West Village Preliminary Plan and find it to be incomplete. The following responses were found to be inadequate:

1. The revised utility composite is not showing the looped water line as required and the hydrants between lots 58 and 54 appear to be exceeding the 500' spacing and exceeding the 250' minimum from any lot frontage.

2. Limits of the no-build zone were not adequately described.

3. The drainage plan does not address the concern of Redlands Water and Power that no additional runoff be allowed into the Redlands Canal.

4. The extend of the floodplain, as identified by the Mesa County Planning Staff comments must be shown and detailed as to the plan for that area.

5. A revised roadway plan and profile with stationing was not submitted.

6. Detail was not submitted on the proposed cut areas to determine if the design is feasible. It also was not shown how the cuts could be lessened.

7. Inadequate geotechnical information to determine if slope stability can be attained.

8. Did not address how lots along steep cuts could be accessed, specifically lot 53.

9. Detail not provided on intersection.

10. Did not adequately address how the required cuts would impact the depth of water lines.

11. Did not address the off-site contribution of drainage. Drainage report and plan not in accordance with SSID requirements.

12. Detention areas not shown.

13. Copies of prior drainage reports not included in response.

14. Geotechnical report not complete. Did not make specific recommendations for road cuts, pavement design or rock fall structures that may be required.

15. Have not adequately justified having a cul-de-sac far exceeding the recommended maximum length of 1,000 feet.

The above deficiencies, especially those related to drainage and geotechnical concerns are critical for the staff and Planning Commission to evaluate the proposed subdivision. Section 6-7-4 of the Zoning and Development Code states:

> A submittal with insufficient information, identified in the review process, which has not been addressed by the applicant, may be withdrawn from the agenda by the Administrator.

Therefore, consideration of the Trails West Preliminary Plan has been pulled from the October 3, 1995 Planning Commission agenda. The above deficiencies must be addressed with a submittal of 4 sets of revised plans and reports by 5:00 p.m., October 18, 1995 for the request to be put on the November 7th Planning Commission agenda or revised plans and reports must be submitted by 5:00 p.m., November 20th for the request to be put on the December 5, 1995 Planning Commission agenda. Failure to respond by November 20, 1995 will invalidate the application and require a new submittal and full fees. Because the item was already advertised for the October Planning Commission hearing, there will be a $50.00 readvertising fee for the November or December hearing. This fee must be submitted with the revised plans.

Please call me at 244-1446 if you have any questions. Thank you for your cooperation.

Sincerely,

Katherine M. Portner

Katherine M. Portner
Planning Supervisor

xc: Camelot Investments, LLC
Wayne Lizer

STATE OF COLORADO

COLORADO GEOLOGICAL SURVEY
Division of Minerals and Geology

Department of Natural Resources
1313 Sherman Street, Room 715
Denver, Colorado 80203
Phone (303) 866-2611
FAX (303) 866-2461

DEPARTMENT OF
NATURAL
RESOURCES

Roy Romer
Governor

James S. Lochhead
Executive Director

Michael B. Long
Division Director

Vicki Cowart
State Geologist
and Director

October 2, 1995 MA-96-0016

City of Grand Junction Community Development Department
Attention: Kathy
250 North 5th Street
Grand Junction, Colorado 81501

Re: Proposed Trails West Village Subdivision (aka Cimmaron) -- Vic. Southeast Corner of South Camp Road and the D 1/4 Road Alignment, Grand Junction

Dear Madam:

At your request, we have reviewed the materials submitted for and made a field inspection of the site of the proposed residential subdivision indicated above. The following comments summarize our findings.

(1) The plat submitted with these materials appears to adequately address the concerns about geologic conditions in this area first discussed by us in Mr. Chris Carroll's letter to the Mesa County Planning and Development Department, dated November 20, 1990. However extreme care should be taken by builders and homeowners with respect to the "no build" zones and their rockfall hazards. This will be especially critical for the fourth phase when a road is planned to be constructed through the ridge that occurs on part of the property. We recommend that the developer retain a qualified geotechnical engineer to review his road-construction and earthwork plans at that time. For all home construction, we recommend that each building site be investigated by a qualified soils and foundation engineer prior to selection of a foundation design. This should include his inspection of the "open hole" and following his recommendations about additional soils testing if any is deemed necessary.

(2) Our only other concern is that surface runoff be adequately directed by the streets and/ or apppropriate drainage easements and structures to the proposed detention basin on the project property. We were not provided a drainage plan to review and, as a partial result, we recommend that drainage plans be reviewed by a qualified drainage engineer prior to your approval of the project.

Sincerely,

James M. Soule

James M. Soule
Engineering Geologist

To: KATHYP (Kathy Portner)
From: Hank Masterson
Subject: Re: Trails West
Date: 10/9/95 Time: 2:39PM

Originated by: KATHYP @ CITYHALL on 10/9/95 7:32AM
Replied by: HANKM @ CITYHALL on 10/9/95 2:39PM

Kathy, based on Ute's comments I need to add the following to my comments: Since water pressure is expected to be 35 to 45 psi at the higher elevations of this subdivision, petitioner must submit calculations signed by a licensed engineer showing that required fire flows of 500 gallons per minute will be available from hydrants in these areas.

file

Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(303) 244-1430 FAX (303) 244-1599

November 22, 1995

Brian L Stowell
Camelot Investments, LLC
0090 Caballo Rd.
Carbondale, CO 81623

RE: File #PP-95-157, Trails West Village

Dear Mr. Stowell:

We have received your response to comments for the Trails West Village development. As you know, the response did not include the drainage study. We agreed to allow one additional day for the submittal of the drainage study, which would have been Tuesday, November 21st. On Tuesday, we received a copy of a letter from Edward M. Morris to Dave Wens indicating that the hydrological report was still not complete and would not be for at least another few days. Although we sympathize with the scheduling problem created by the illness of the person doing the study, we cannot proceed with the review of the project without the drainage basin study. It appears now that the soonest the study would be submitted would still be after the date that our final staff reviews are due for the Planning Commission notebooks.

The revised deadlines we gave for the resubmittal already gave us very limited time to review the information for the benefit of Planning Commission. We simply cannot accommodate any further delays for the December 5th hearing agenda. Therefore, we must once again pull Trails West from the Planning Commission agenda. We will, however, schedule it for the January 9, 1996 hearing if the complete drainage study is submitted by 5:00 p.m., December 11, 1995 and the balance of the response is found to be complete.

Please call me at 244-1446 if you have any questions. The additional information you have submitted looks like it will be very useful for the Planning Commission in making their decision.

Sincerely,

Katherine M. Portner

Katherine M. Portner
Planning Supervisor

Lincoln DeVore, Inc.
Geotechnical Consultants
1441 Motor St.
Grand Junction, CO 81505

TEL: (303) 242-8968
FAX: (303) 242-1561

December 9, 1995

Mr. Dave Wens, Camelot Investments, LLC
3024 F-3/4 Road
Grand Junction, Colorado 81504

Re: HYDROLOGY of UNNAMED MAJOR BASIN

TRAILS WEST VILLAGE SUBDIVISION

GRAND JUNCTION, COLORADO

Dear Sir:

Transmitted herein are the results of a Hydrologic Study of the Unnamed Major Basin which contains the proposed TRAILS WEST VILLAGE SUBDIVISION, in the Redlands Area of Grand Junction, CO.. This study was prepared by the undersigned.

If you have any questions after reviewing this report, please feel free to contact this office at any time. This opportunity to provide Hydrologic Engineering services is appreciated.

Respectfully submitted,

LINCOLN-DeVORE, INC.

COLORADO REGISTERED RICHARD N. MORRIS 12/09/95 25068 PROFESSIONAL ENGINEER

By: _____
Richard N. Morris, PE
Consulting Engineer and Geologist
Grand Junction, Colorado

COLORADO REGISTERED EDWARD M. MORRIS 30590 12-9-95 PROFESSIONAL ENGINEER

Reviewed by: _____
Edward M. Morris
Western Slope Branch Manager
Grand Junction, Office

LDTL Job No. 84157-J
RNM/

UTE WATER CONSERVANCY DISTRICT
560 25 Road, P.O. Box 460
Grand Junction, CO 81502

Office
Telephone: 970-242-7491
FAX: 970-242-9189

Treatment Plant
Telephone: 970-464-5563
FAX: 970-464-5443

December 20, 1995

Kathy Portner
Community Development Department
250 North 5th Street
Grand Junction, Co 81501

Subject: Proposed Trails West Village - File #PP-95-157

Dear Kathy:
Recent review of Proposed Trails West Village located near SE corner on South Camp Road and D.25 line have initiated questions concerning development adjacent to Ute Waters 24" transmission main. Although this is a relativity new pipe line the possibility of pipe failure is not all together remote considering possible seismic activity, hillside subsidence, corrosion or damaged from adjacent construction activities.

The pipeline is made of steel meeting AWWA standard C-200-75. The pipe lining is of cement mortar and the coating is taped wrapped. Class 150 and 250 pipe was used in this area. The pipe line was installed as part of the North Side Transmission Line project constructed 1982 thru 1983.

We would recommend that the developer consider incorporating in his project provisions for directive possible water line break flows away form proposed adjacent homes. The 24 inch main connects to a 5 million gallon tank located above the development. A major line break would result in substantial erosion to the hill side and possible significant damage to any development located within the flow line. The greatest risk for property damage would be to the houses built at the lower elevations directly below the inclined pipeline alignment.

Sincerely,

Ralph W. Ohm P.E.
Supernatant Transmission/Distribution

TRAILS WEST VILLAGE

REVISED PRELIMINARY PLAN

SUBMITTAL NARRATIVE

PETITIONER: CAMELOT INVESTMENTS, LLC
0090 Caballo Road
Carbondale, CO 81623
(970)963-0627

I. INTRODUCTION

Camelot Investments, LLC (Petitioner), is the owner of a 40± acre parcel of property located within City limits lying adjacent to and east of South Camp Road in the Redlands area. The property was recently annexed into the city as part of the Monument Valley annexation and is zoned RSF-4. Petitioner has applied for preliminary plan approval for Trails West Village , a major subdivision, pursuant to Chapter 6 of the Grand Junction Zoning and Development Code. Initial review comments were received from the applicable review agencies and departments on or about September 18, 1995. Petitioner responded with a supplemental submittal on September 22, 1995. The City provided Petitioner with a reply dated September 27, 1995, in which it described several deficiencies with the plan as submitted.

This document and the attached Exhibits represent a revised preliminary plan for the City's evaluation. The revised preliminary plat, attached hereto as Exhibit A, contains several changes from the original preliminary plan.[1] The City's chief concerns appear to involve Petitioner's plans to develop residential homesites on the top of a small mesa located on the easterly portion of the property as a part of the final filing (Filing IV). The purpose of this narrative is to provide City staff and the Planning Commission with a more detailed description of the project objectives and how it complies with the applicable City standards and guidelines. Emphasis is placed on the proposed development of the ridge and the attendant aesthetic and geotechnical concerns. Section V herein contains a sequential response to the enumerated deficiencies identified in

---

[1]For example, the revised plan now calls for 66 lots instead of 69. Also, some of the streets have been realigned and renamed. Other changes have been made to improve the original plan. Exhibit A includes a second sheet plat delineating the four filings.

Katherine M. Portner's September 27, 1995 letter. This narrative refers to and incorporates the required reports, plans and drawings contained in the Exhibits attached hereto.

II. PHYSICAL CHARACTERISTICS OF THE PROPERTY

The boundaries of the property roughly form an imperfect square measuring approximately 1300 ft. x 1300 ft. The Redlands Water and Power Second Lift Canal bisects the property diagonally, running from the northeast section to the southwest corner. The property contains two distinct topographical zones. The western zone consists of relatively flat land. The eastern one-third of the property rises 80-120 ft. to a rock-rimmed mesa area which slopes gently to the east. Nearly every point on the property enjoys stunning views of the Colorado National Monument. Views from the top of the mesa include panoramic sweeps of the bookcliffs, the City of Grand Junction and Grand Mesa. A photo taken from the top of the mesa looking west is attached hereto as Exhibit B. An abandoned canal traversing the slope has been converted into a footpath which accesses the mesa and is linked to an extensive network of hiking and biking trails.

III. PROJECT OBJECTIVES

Petitioner desires to create a high-quality, residential community in the scenic and desirable Redlands area. The natural environment of the subject parcel lends itself to the development of a unique lifestyle community with particular emphasis on integration with the physical surroundings. Specifically, Petitioner wants to utilize the topographical relief of the property to provide an alternative to the standard subdivision layout. The revised preliminary plan (Exhibit A) locates homesites at varying elevations to provide expanded views to homeowners and mixes the lot sizes around curved streets to add character. Nearly 3 acres of open space and trails have been provided. The project features a density of 1.64 units per acre, far less than the 4 units per

acre allowed under existing zoning.

To further integrate with the surrounding topography, Petitioner will use a paved road, a new footpath and the existing trail to provide the community with different points of access to the trail complex on the mesa. The presence of the existing Redlands Water and Power Company canal adds further pedestrian and biking trail possibilities. One of the Redlands Goals and Policies adopted April 3, 1986, is to "[e]ncourage development of a comprehensive trail system with the Redlands Water and Power Canal, the Connected Lakes Trail and the Redlands Parkway Trail as the major segments" (emphasis supplied). In addition, Petitioner will construct a detached pedestrian/bicycle path adjacent to South Camp Road to further the objectives of the City-County adopted Multi-Modal Plan.

In essence, the location of the property and the special landscape features combine to offer residents of the City of Grand Junction a unique residential living experience. As stated in the Redlands Goals and Policies, "[a]reas generally considered to be problems for development such as marshy areas and steep slopes can, if addressed properly, become amenities to a particular project." Presently, no other subdivision within the City can offer the same feel of outdoor/mountain, rural, recreational living in such close proximity to urban amenities.

Trails West Village anticipates a balanced residential mix covering the spectrum from young families to retirees. Petitioner expects that the project will be attractive to current City residents and offer many the opportunity to move-up into the Redlands area. Petitioner will record a comprehensive set of protective covenants to ensure architectural and stylistic conformity and maintenance of the highest possible property values.

IV. PROPOSED RIDGE LINE DEVELOPMENT

The focal point of City staff's concern appears to be the future development of Filing IV which seeks to place 13 homesites (lots 54-66) on the mesa and a paved road along the face of the escarpment to access the homes. Staff's primary concerns are two-fold: 1) the aesthetics or visual appearance of a road scar and dwellings on the escarpment; and 2) geotechnical concerns about the stability of the road and the potential for damaging rockfall.

A. Aesthetic Issues. The City's aesthetic concern may perhaps be best articulated by the September 18, 1995 review agency comments of Linda Dannenberger of the County Planning office who said: "It will be a shame to scar the escarpment with curb, gutter, asphalt and sidewalk and homes. The Redlands policies have not been superseded and recommend blending with hillsides and minimal disturbance of steep slopes subject to rockfall."

To begin, Petitioner wishes to point out the obvious fact that the ridge line in question is not visually pristine and undisturbed. Located immediately south of the property are two large storage tanks, one holding 5,000,000 gallons and the other 2,000,000 gallons, belonging to Ute Water Conservancy District. These pink structures, the largest of which reaches 40 ft. in height, dominate the view of the ridge line from several points along South Camp Road leading to the proposed entrance to Mescalero Drive. Photos showing the view of these tanks from two points along South Camp Road corridor are found at Exhibit C. In addition, the installation of the Ute Water Conservancy District's water mains from the water tanks to South Camp Road disturbed the hillside, leaving a visible scar approximately 70 ft. wide. In a very real sense, these mammoth pink structures and

the water lines connected to them have already impaired the aesthetics of the ridge line.

The addition of 13 Filing IV homesites on the mesa does not mean that 13 homes will be cluttering the ridge line. In the first place, no homes will be constructed near the edge of ridge since that area has been designated a no-build zone (see Sec. IV(B) below). The nearest building envelope on the ridge is over 1,000 linear feet from South Camp Road at the entrance of Azteca Drive. Second, Petitioner proposes limiting the gross height of the homes built on the mesa and the finish colors of the homes through restrictive covenants. Petitioner has used a computer to create illustrations of the visual effect of the ridge line development from various points which roughly correspond to points along South Camp Road. The computer images are attached as Exhibit D. Figure 1 of Exhibit D is a north-facing computer image providing a plan view perspective of the mesa top development and 12 line-of-sight perspectives from 6 points along South Camp Road. The twelve line-of-sight perspectives are identified in Exhibit D as Sections A-J. Sections A-D,I&J, the horizontal perspectives, indicate that only the top portions of eight (8) homes will be visible along the ridge (lots 54-61). The ridge escarpment blocks the view of the lower portion of these homes as well as the five (5) remaining homes on the east side of Trails End Road. Visibility of the upper portions of the eight (8) homes is greatest at the north end of the property and diminishes significantly as you move toward the southern end.

According to Petitioner's modeling, the visual impacts are minimal. Generally speaking, only the roof lines of the affected lots will be seen. As mentioned above, to further

mitigate any adverse visual impacts, the restrictive covenants will limit the color of all roofs and exterior finishes to earthtones. Such a covenant is expressly in conformance with the Redlands Goals and Policies alluded to by Ms. Dannenberger which recommends blending with hillsides.[2]

Petitioner also wishes to point out that presently, there are several areas of ridge line development within the City's boundaries. Exhibit E contains photographs illustrating some of the existing ridge line development of various subdivisions within the City limits. Photographs 2,4 and 5 of Exhibit E provide telling examples of the type of residential structures which Petitioner seeks to avoid through its covenants. Although these subdivisions may not have been approved by the City, they exist nonetheless and with far greater visual disturbance than will be caused by the development of Trails West Village, Filing IV. It should also be pointed out that the construction of homes in Filings I-III will eventually block the view from South Camp Road of much of the ridge anyway.

Similar efforts to mitigate visual impacts will be taken with respect to the road leading to the mesa top. First, the road has been designed to require very little fill and all overburden not necessary for fill purposes will be carried away from the site. Second, if any retaining walls are required by the City for the fill portions of the road, they will be

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[2]The full text of the applicable Redlands Goal and Policy reads:

> "Developments that incorporate hilltops, bluff tops and other visually prominent areas should be designed with colors, textures, and architecture to blend in with surrounding landscape."

Petitioners response to staff recommendations regarding the geotechnical report.

Lincoln DeVore, Inc.
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TEL: (970) 242-8968
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January 9, 1996

Camelot Investments, LLC
Brian Stowell, Paul Stowell P.E. & Dave Wens

Subject: Grand Junction Planning STAFF REVIEW/ANALYSIS
Preliminary Plan-Trails West Village, File #PP-95-157

References: Lincoln DeVore Report of Engineering Geology Investigation (EGI), September 25, 1995

Lincoln DeVore Report of Subsurface Soil Exploration (SSE), November 18, 1995

Lincoln-DeVore, Inc. personnel have reviwed the above referenced STAFF REVIEW/ANALYSIS for the proposed Trails West Village Subdivision, in order to address specific comments regarding the Geological and Geotechnical aspects of the review. As the STAFF comments are placed beneath headings and individual paragraphs, they will be referred to as a paragraph number under a specific heading. It must be noted that many of the comments are interrelated and thus, some of the discussion which follows may seem redundant.

Beneath the Geotechnical heading, the first paragraph with 3 sentences fairly accurately describes the general conclusions of the report of the Engineering Geology Investigation (EGI), completed by this office.

The second paragraph under the Geotechnical Heading again refers to the EGI and makes specific references to Lots 48, 49, 50, 51 & 52, mapped as Potential Rock Slide and Rock Rolling Areas, with additional comments. The lot designation at the time of the EGI was based on a preliminary plan dated September 1, 1995. The proposed lot layout has been somewhat modified between the EGI and the report of Subsurface Soils Exploration (SSE). The lot designations for the area of potential rock slide and rock rolling areas, at the time of this SSE Report, November 18, 1995, would be 49, 50, 51, 25, & 53.

The SSE Report has addressed the Potential Rock Slide and Rock Rolling Areas as Potential Rock Debris Rolling and Sliding Areas.

This issue is addressed specifically on pages 11 & 12 of the SSE. Part of the reason for the change of designation was based on additional field study of the site. This study observed the rock position, frequency of new debris and the condition of the abandoned irrigation ditch.

Careful observations of this ditch indicated that the only rocks present in this abandoned ditch were from minor slope sloughing on the uphill (cut face) side of the ditch which appears to have occurred since the ditch was abandoned. No evidence of rocks rolling or sliding from more than 15' uphill from the abandoned ditch line could be positively determined. It appears that the recent debris acculmulation (since the 1940's) has been associated with soil and rock sloughing of the uphill, cut face of the ditch.

The third paragraph under the Geotechnical Heading indicates the remainder of the comments will be in reference to the SSE report, dated November 18, 1995.

The fourth paragraph under the Geotechnical Heading refers to Page 6 of the SSE Report. The specific quote is "special care should be taken to maintain vegetation on the steeper slopes." This is normally considered an issue which is addressed in the final design stage, with types of vegetation being determined by existing vegetation in the area and proposed vegetation changes which are a natural result of development/human activity. The only recommendation that would probably be appropriate from Lincoln DeVore, at this stage of the design process, would be that revegetation be accomplished with appropriate Xerascaping Techniques for this area and climate. It should be noted that this particular landscaping concern has been repeatedly expressed by Lincoln DeVore in virtually any area containing slopes with gradient over 15% and is considered very important for slopes over 25% gradient.

Paragraph Number 5 under the Geotechnical Heading refers to page 11 of the SSE. The first portion of the paragraph quotes "that great care is required to design subsurface drainage and cuts and fills in order to minimize the possibility of large scale movement", with additional comments. The paragraph then proceeds to a conversation between Edward Morris, the undersigned, and Jodie Kliska, the City Development Engineer. This conversation regarded possible methods of dealing with anticipated movement or displacement of concrete features normally associated with road construction. Actually, two issues are being addressed here and, while related, must be separated as they are in the SSE report.

The concerns regarding site drainage and appropriate cuts and fill to be controlled is an issue on any slopes, regardless of whether concrete is to be placed or not. Some control of potential slope instability has been addressed by the limits of the NO BUILD ZONE, shown on the plat maps. This NO BUILD ZONE effectively restricts the construction activities in this geotechnically/geology sensitive area to the construction of the road and associated utilities. This zone effectively allows greater ease of home construction across the rest of the tract.

The anticipated movement of concrete structures, (curb, gutter and sidewalk) is related to the expansive soils in the site. Please note that this concern regarding the expansive soil's effecting concrete structures is addressed in the Concrete Slabs on Grade section of the SSE report, page 30. The actual concern is that concrete slabs and curb and gutter are quite rigid and do not tolerate subgrade movement. It should also be noted that this problem is present throughout the Grand Junction area, whether the soils have expansive or settlement characteristics. The extent of the problem is well documented by the on-going and extensive curb, gutter and sidewalk replacement program in the new and old portions of the City of Grand Junction. The problem of concrete structures moving is not necessarily the result of anticipated mass slope failure, as the general context of the paragraph may inadvertently imply.

Paragraph #6 under the Geotechnical Heading refers to Page 11, "The site drainage and appropriate cuts and fills must be carefully controlled to avoid inadvertent triggering of hillside creep or mass movement." It should be noted that this sentence is essentially a rephrasing of the reference sentence in paragraph 5. It is not known whether the preliminary and final drainage plans should have a statement stating that recommendations of the geotechnical report have been considered during the preparation of the drainage plans or whether other verbiage or considerations are necessary.

Careful reading of the SSE report, particularly in the Ground Water section, pages 12 & 13, and the Drainage and Grading section, pages 18-20, would indicate the primary consideration is that the designs and final construction must provide for rapid removal of water and that water must not be allowed to stand or pond around cuts, fills or structures. In addition the water should not be allowed to saturate the natural soils, any fills or the underlying rock formations which is not presently occurring under the pre-development conditions. It is admitted that the majority of the report drainage considerations are directed toward individual buildings. This concern for individual build-

ings is due to a continual problem whether in hillside areas or to include the downtown, older portion of the City of Grand Junction.

The reference to a troublesome perched water conditions in the 6th paragraph applies principally to building construction but would apply to the construction of cuts and fills. Again, the desire result is that water must not be allowed to pond or stand around structures. It is probable that some subsurface drainage may be required, in some areas.

The perched water condition, which is normally isolated to individual building sites, but may be quite general in extant, has been addressed by Lincoln DeVore in other Subsurface Explorations for several Subdivisions within the City of Grand Junction, as well as Mesa County. This is not an uncommon condition.

Paragraph 7 under the Geotechnical Heading actually contains 2 items. The first item deals with the potential for slope instability pertaining to construction of the road and single family residences and the presence of expansive clays which may effect the foundations. The paragraph then notes that on pages 32-33 are specific recommendations for roadways cuts and fills to alleviate the anticipated slope instability. In addition, the expansive clays and drainage concerns which are associated with both expansive clays and slope stability are addressed in the Ground Water section, pages 12 & 13 and the Drainage and Gradient section on pages 18-20.

The second half of paragraph 7 deals with a concern expressed by Jodie Kliska, the City Development Engineer, regarding the possibility of any effect of rockblasting for foundation and utility excavations on the site slope stability. The possibility of rock blasting has been considered as a last resort after attempts to rip the shales, mudstones, siltstones and sandstone beds of the Burro Canyon & Morrison Formations have proven innappropriate. Precise recommendations have not been made but, can be provided at a later date, if required. In general, certain licenses are required of contractors who participate in blasting and the Client should certainly impose additional requirements, to include insurance, experience/qualification documentation. In addition, limiting the type and energy of the explosives so as to minimize nearby ground accelerations would be prudent. The type and energy of the explosive charges should be limited to that which would be allowable within a developed residential or commercial area. It must be noted that under no circumstances would rock fragmenting be allowed which would involve flying rock.

Paragraph 8 under the Geotechnical Heading refers to page 35 (which should read page 34), which are the results of laboratory testing for pavement design. The actual references are made to a number resulting from the Hveem-Carmany Test procedure. This Displacement Value is utilized in determining the "R Value" for a soils type, utilized to compute pavement sections. The statement is made that this indicates a more comprehensive pavement design may be required with the final plan.

As a matter of fact, more than 80% of the Hveem-Carmany testing performed on soils in the Grand Junction and Mesa County area involve a Displacement greater than 4, generally indicating the soils are unstable and may require confinement for proper performance. Inspection of Lincoln DeVore records indicates that the majority of information provided to the City of Grand Junction Public Works Department, for both in-house projects and for Subdivision construction (within the past 5 years particularly and for the past 18 years generally) indicate these unstable soils requiring confinement are common in the valley. Lincoln-DeVore, Inc. has to assume that road design and construction has incorporated this fact of the Grand Valley soils into all previous decisions by The Public Works Department regarding Subdivision approval and acceptance of road construction.

It should also be noted that I do indeed have alternate road sections which may or may not be incorporated into the final road section presented for this project. The alternate road sections involve ease of construction, cost of construction and actual performance. As many of these proposed sections are somewhat different than those commonly utilized by the Division of Public Works, resistance to using these has been experienced in the past, due to several factors, some of which may be valid or not.

It is strongly recommended that the City Engineering and Planning Departments reference the requirements of the Uniform Building Code 1994 edition, chapter 33 and make further reference, mostly for the sake of clarity to the appendix of chapter 33 of the Uniform Building Code, 1994 edition.

In general, construction on this site regarding cuts and fills, house construction and the slope stability concerns can be rather easily handled. These problems have been addressed on many occasions in the older Subdivisions of Mesa County, which are now currently being annexed by the City of Grand Junction. While existing road sections may be narrower or of somewhat less capacity than those desired by the City of Grand Junction, massive failures are virtually unknown. Maintenance problems abound,

partially due to tight and improper mixes of residential construction on the hillsides, excessive irrigation, by the presence of irrigation ditches often times at the top and side slopes of the hillsides and little or no consideration for acceptable slopes for cuts and fills.

It is believed that all pertinent points have been addressed. If any further questions arise regarding this project or if we can be of any further assistance, please do not hesitate to contact this office at any time.

Respectfully Submitted,

LINCOLN DeVORE, Inc.

by: Edward M. Morris PE
Engineer/Western Slope Manager

LD Job No.: 84770-J

City Engineering's comments regarding drainage and geotechnical concerns.

To: Marcia Rabideaux,Kathy Portner
From: Jody Kliska
Subject: PP-95-157 Trails West Village
Date: 12/29/95 Time: 2:43PM

I have the following comments on the resubmitted materials for this project:

1. The offsite drainage report refers to an appendix with computations but one was not provided. Please submit the appendix.

2. The offsite drainage report indicated part of the scope of work was to include field measurement of the culvert across South Camp Road. I did not see this in the report. Because this development will be required to provide turn lanes on South Camp Road, it is important to know the size and capacity of the culvert and recommendations for extension of the culvert.

3. The geotechnical report contains several statements detailed below which should probably be further explained or detailed. This may be a requirement of final plan approval, although it is possible there may be questions arise at the Planning Commission hearing in January regarding the geotechnical concerns which the applicant should be prepared to answer.

Page 6 - "Special care should be taken to maintain vegetation on the steeper slopes." Specific recommendations for the type of care and which slopes should accompany final plans.

Page 11 - "Great care is required to design subsurface drainage and cuts and fills in order to minimize the possibility of a large scale movement." It appears the roadway design will need to include specific designs for subsurface drainage. Although the report does not specifically address it, I had a conversation with Ed Morris of Lincoln-DeVore in which he indicated he would not recommend any concrete (curb, gutter and sidewalk) be constructed in the proposed through cuts for 7-10 years to give the disturbed area time to make whatever movement it would make after disturbance and he evidently expects some movement. Our street standards require curb, gutter and sidewalk in residential areas of this density, so this may present a problem.

Page 11 - "The site drainage and appropriate cuts and fills must be carefully controlled to avoid inadvertent triggering of hillside creep or mass movement." The on-site preliminary drainage report does not address this at all. The final drainage report will be required to address this concern. The report also warns on page 13 of the possibility of "a troublesome perched water condition may develop which will provide construction difficulties."

Page 14 - "The site condition which would have the greatest effect on the planned development is the potential for slope instability as pertaining to the construction of Trails End Road and the construction of single family residences on top of the Mesa and the presence of expansive clays which would affect the foundations of structures on lots 54-66." Pages 32-33 contain specific recommendations for roadway cuts and fills, which I think is intended to alleviate the anticipated slope instability. In my conversation with Ed Morris, we also discussed the possibility of blasting for foundations on the the top of the mesa and the possible effects this could have on slopes. Another concern I had after this conversation was with

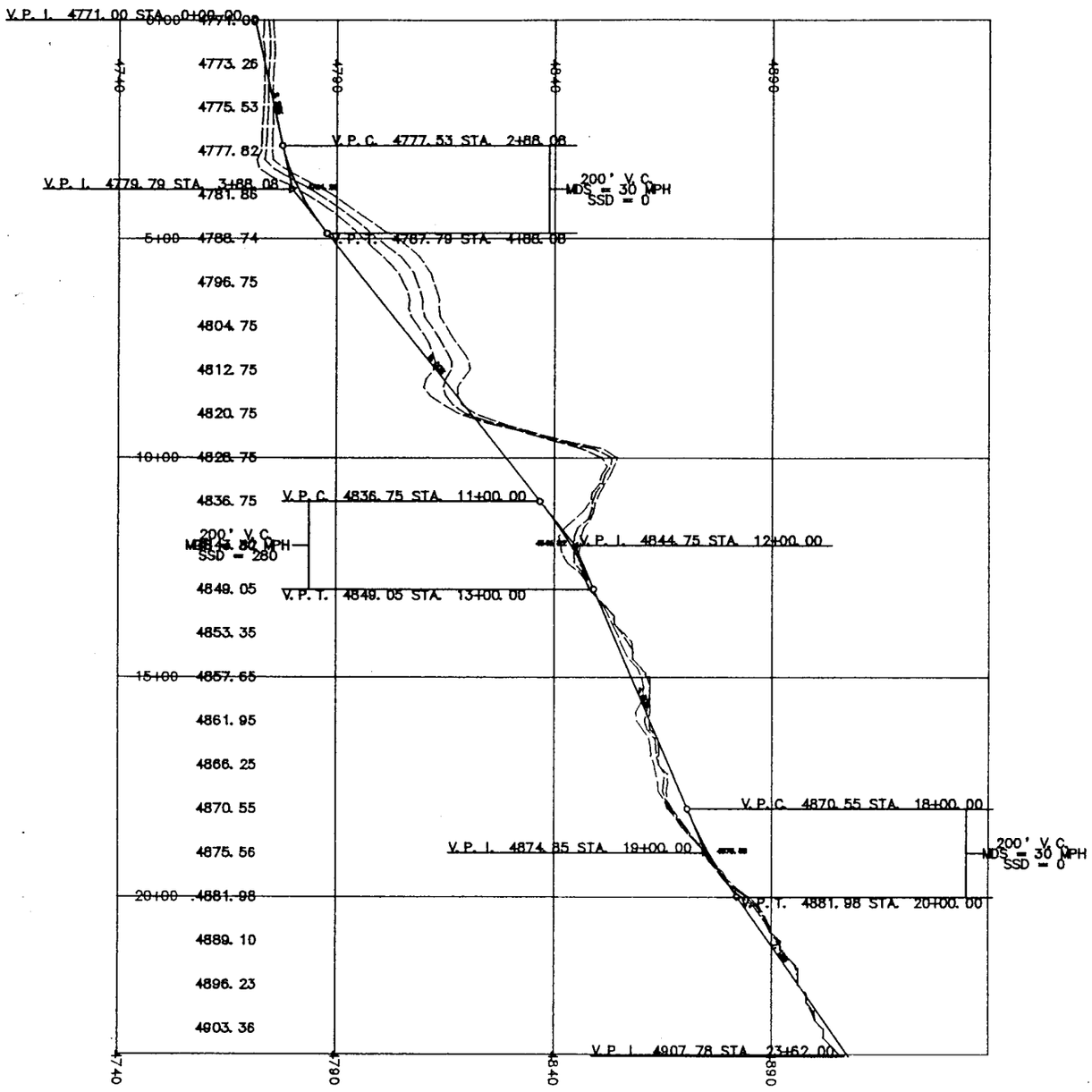
the construction of sewer lines which by City Standards are required to be 6' below the roadway grade. No excavation pit logs were provided with the report and need to be to look at where rock is encountered.

Page 35 - The results of laboratory testing for pavement design are shown and are followed by the statement "Displacement values higher than 4.00 generally indicate the soil is unstable and may require confinement for proper performance." This indicates a more comprehensive pavement design will be required with the final plan. The report goes on to indicate geotextile fabric may be required. In talking to Ed Morris, I believe he has more specific pavement design recommendations than are presented in this report.

I point out these concerns with the construction of roadway cuts and fills because it appears if construction is not done properly, the portion of the roadway which is either in a large fill or cut may turn out to be a maintenance problem for the City. We do not have streets where steep slopes or rockfall is a concern and so this represents a departure from our customary city street.

Roadway plan and profile
with stationing.

Provided by Petitioner



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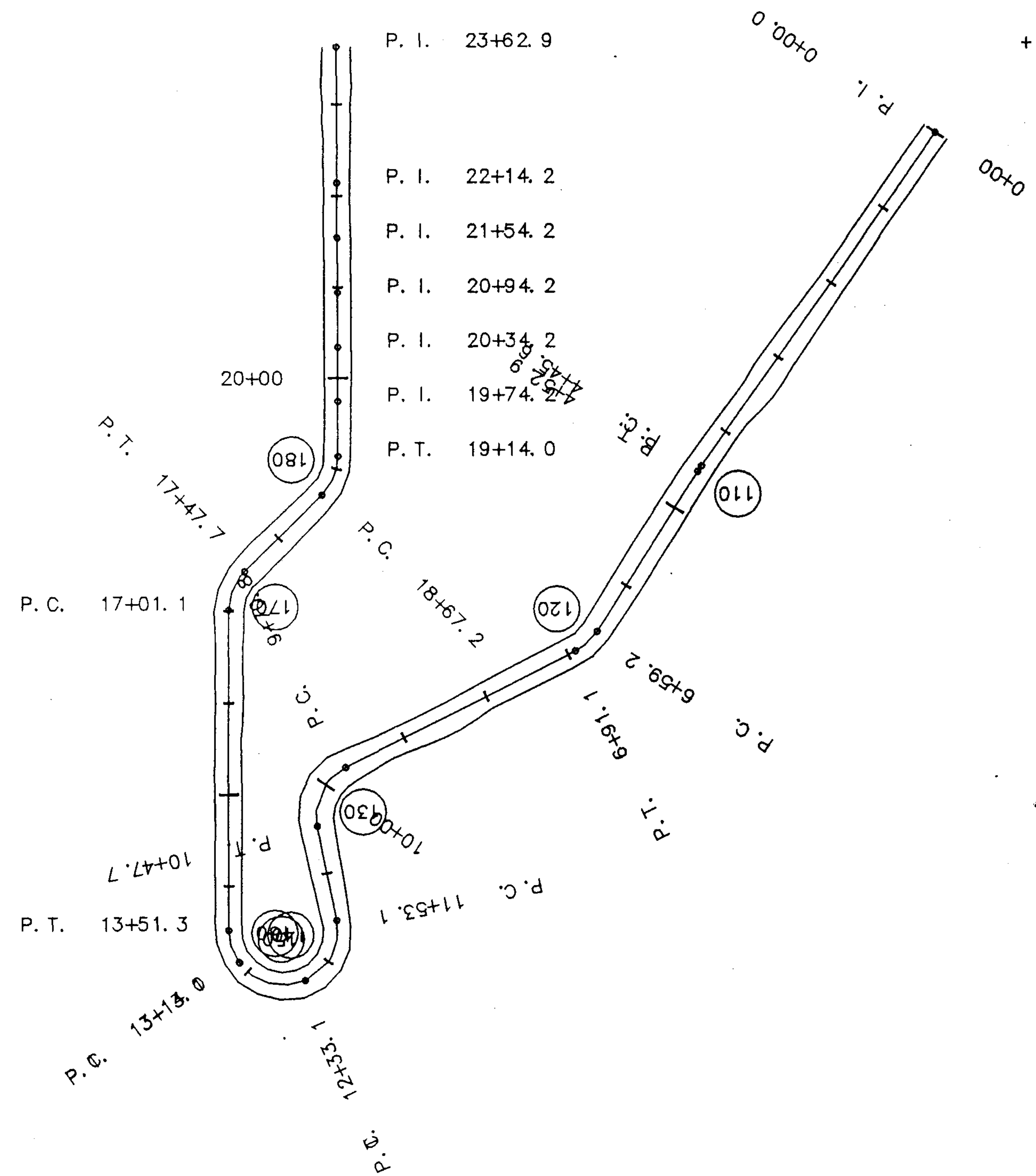
ORIG GRND

RIGHT CATCHPOINT

LEFT CATCHPOINT

Road diagram showing
50 ft. Stations and
cross-sections identifying
cut and fill requirements.

Provided by Petitioner



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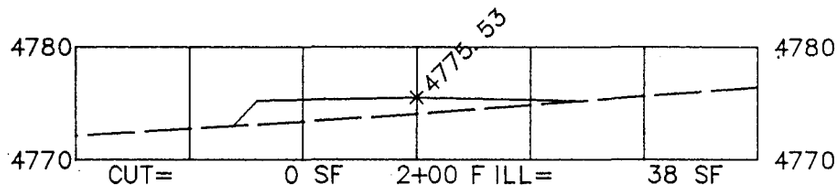
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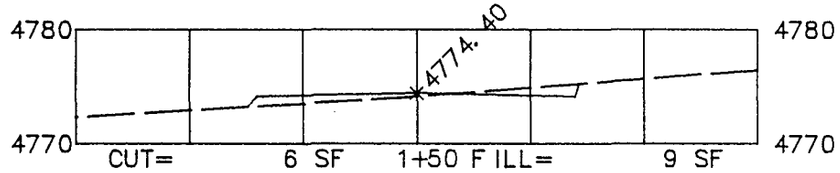
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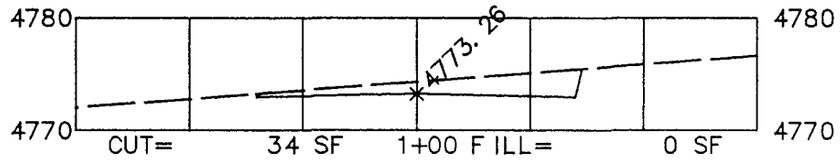
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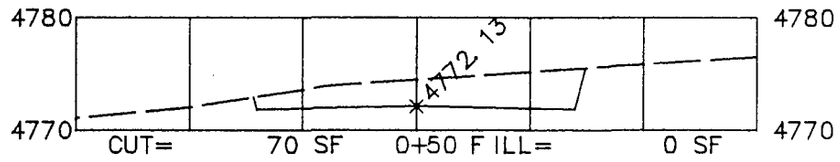
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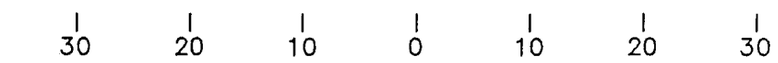
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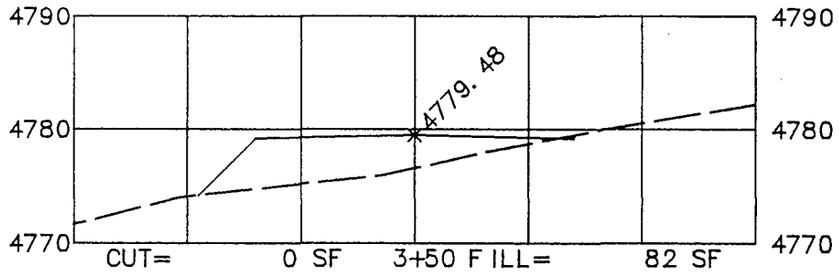
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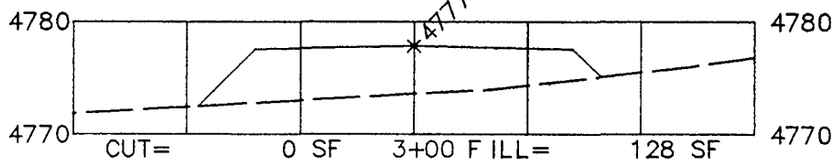
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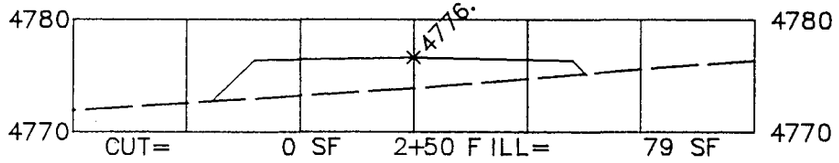
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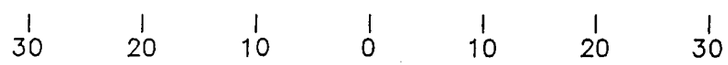
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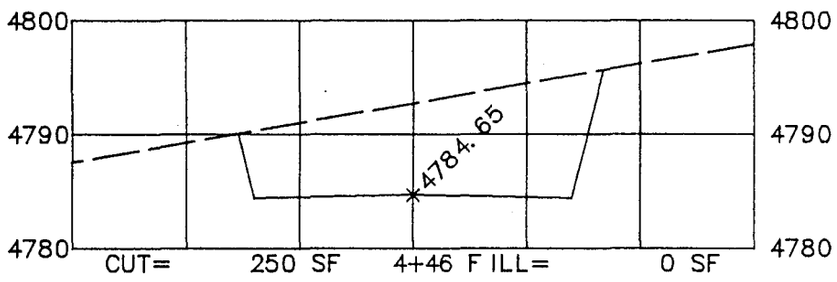
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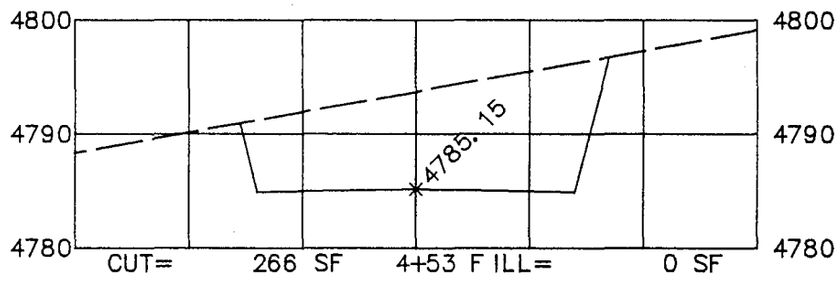
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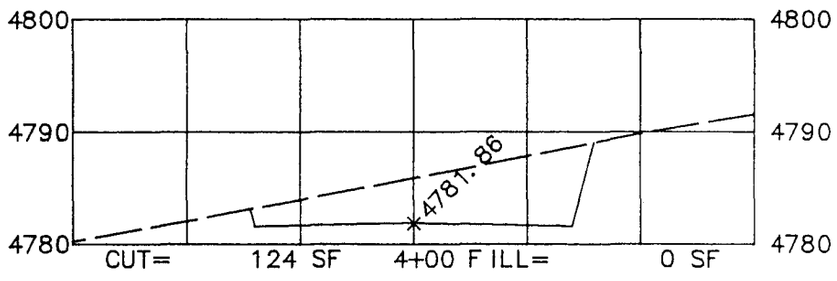
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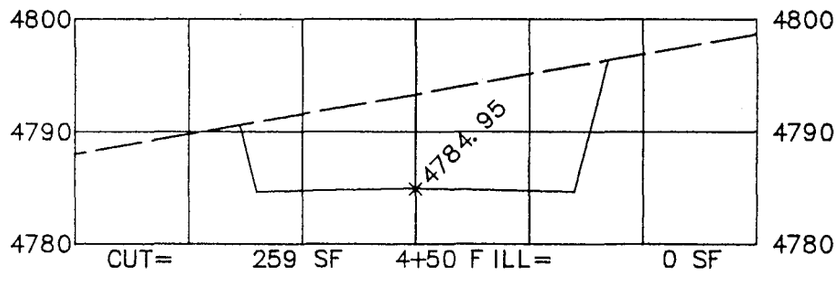
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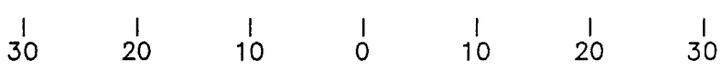
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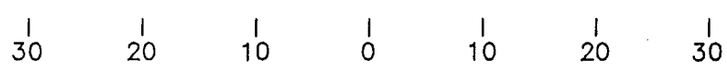
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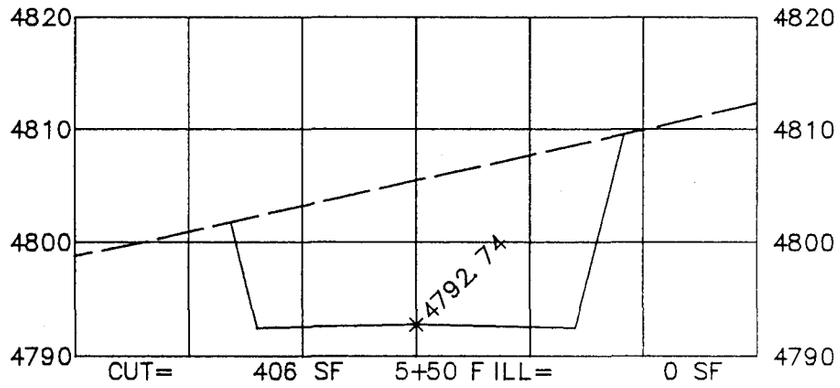
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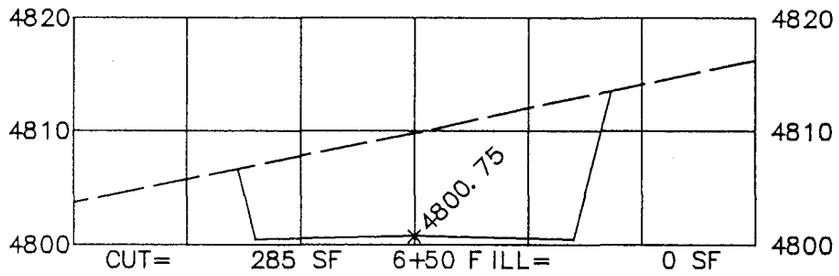
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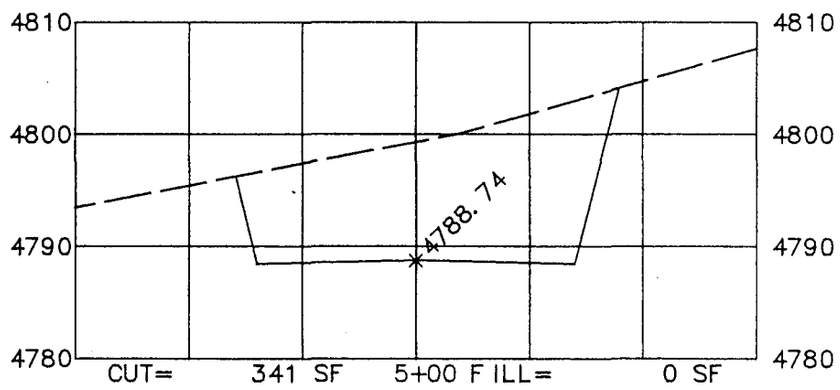
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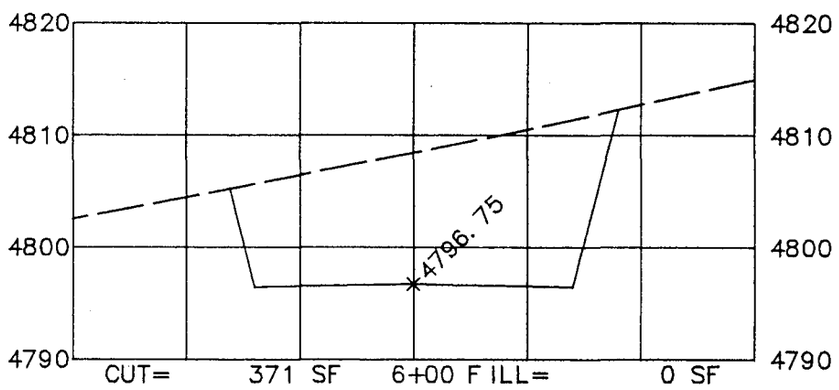
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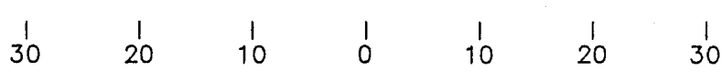
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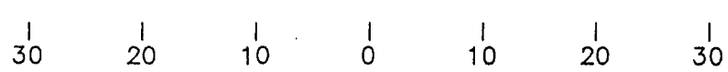
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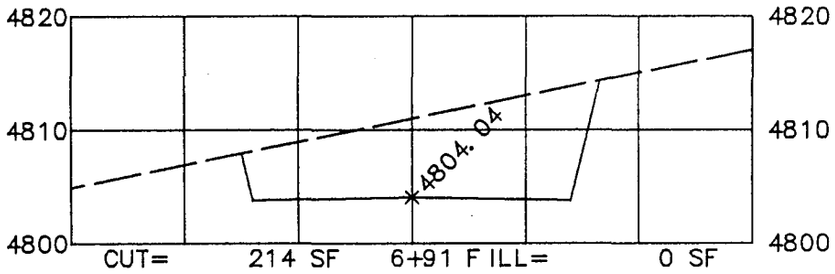

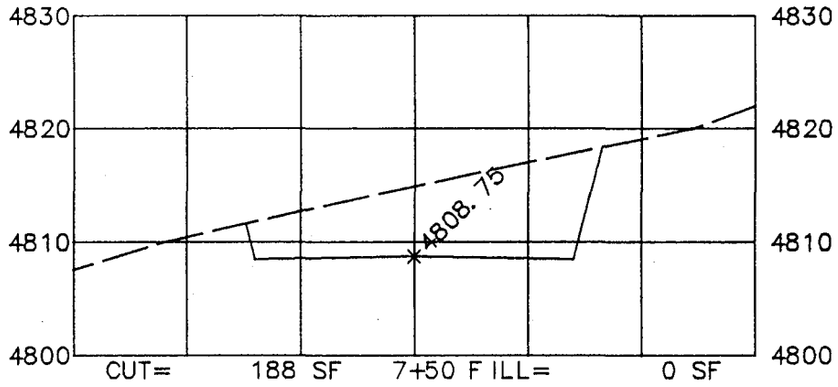

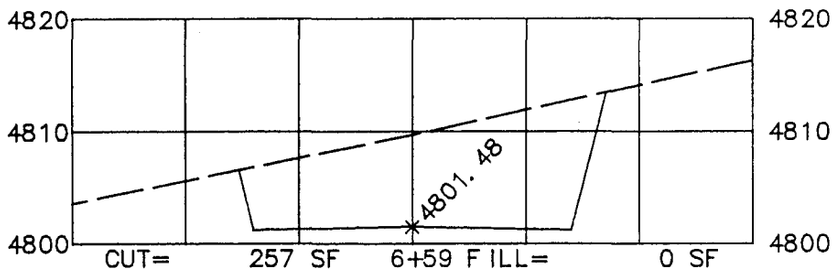

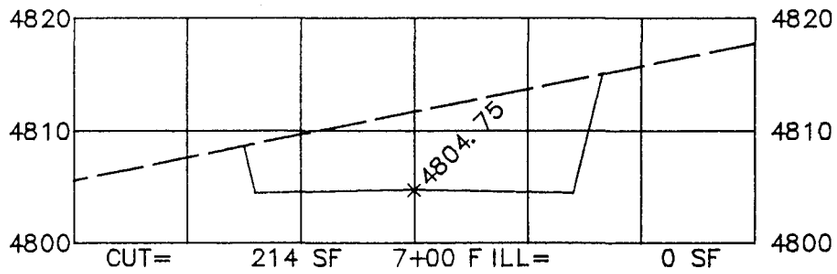

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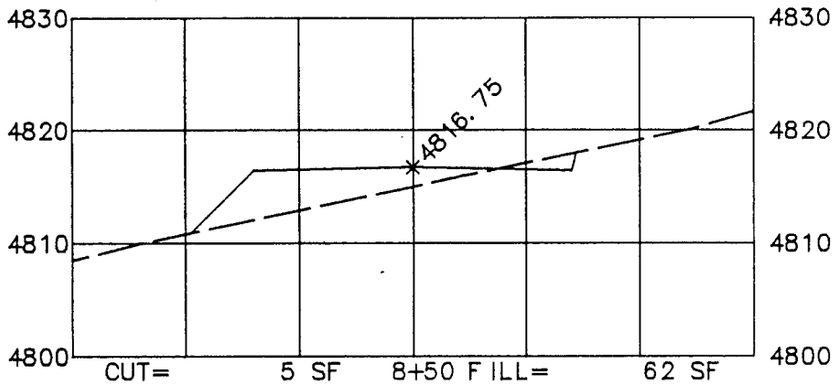
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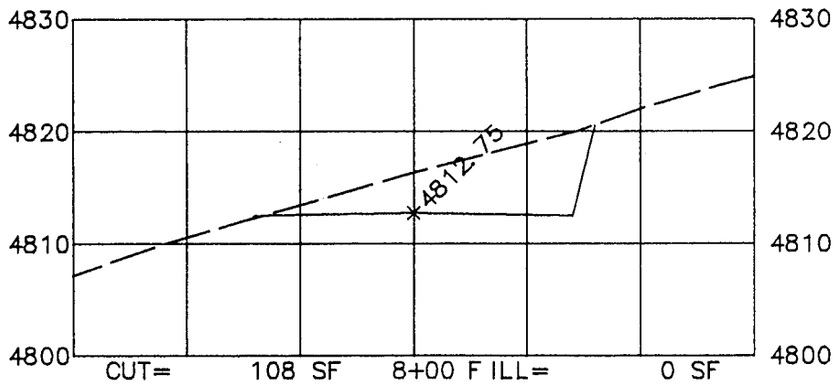
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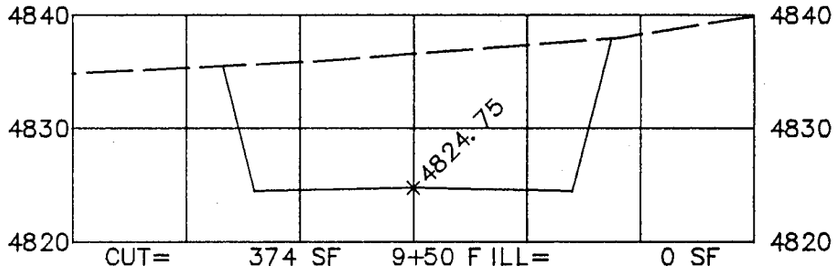
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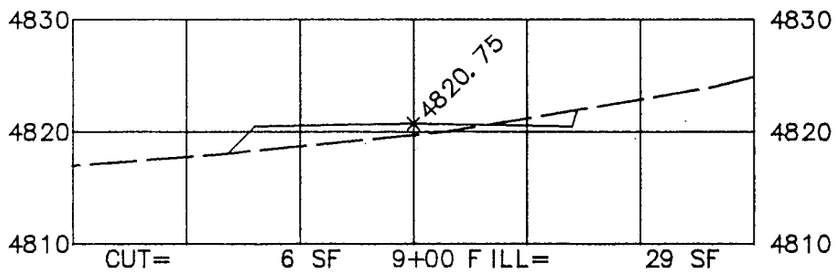
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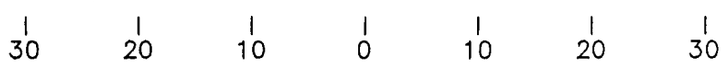
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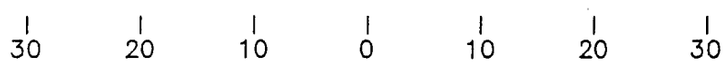
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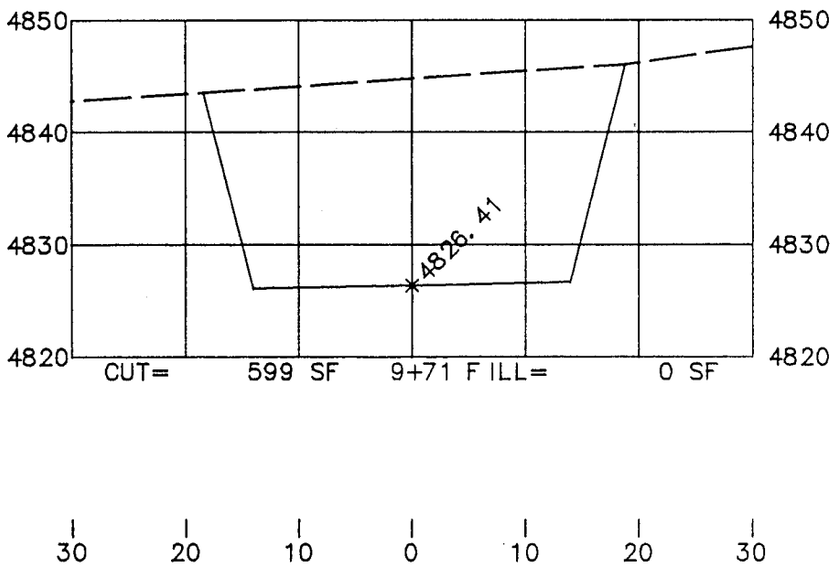
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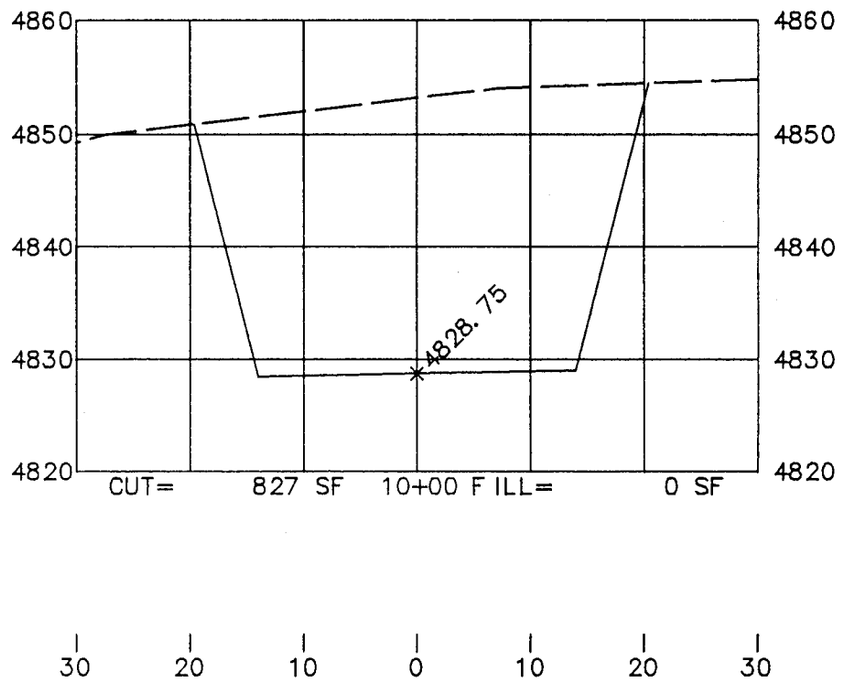
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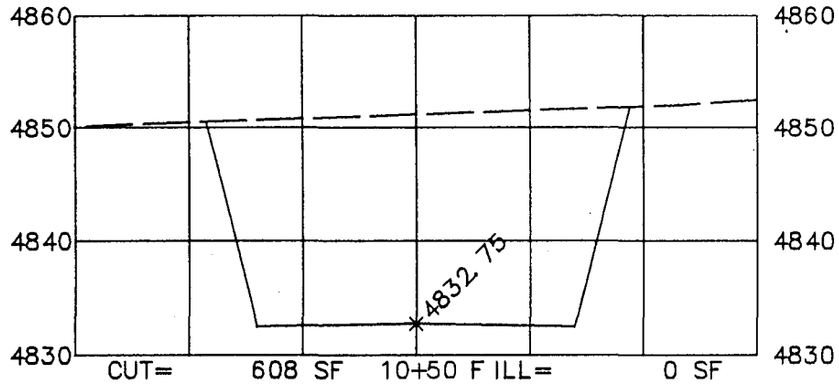
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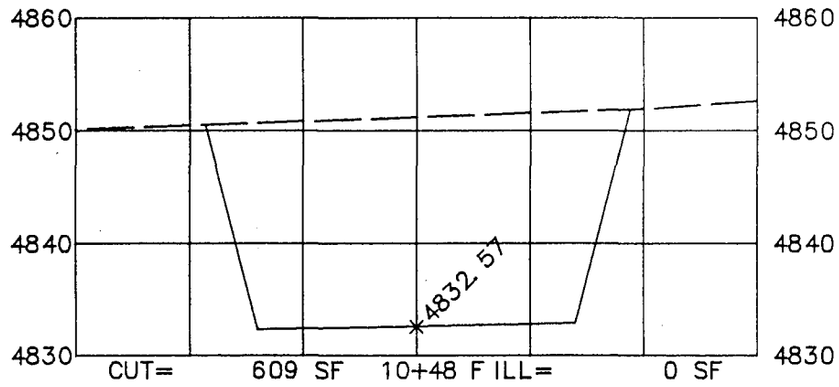
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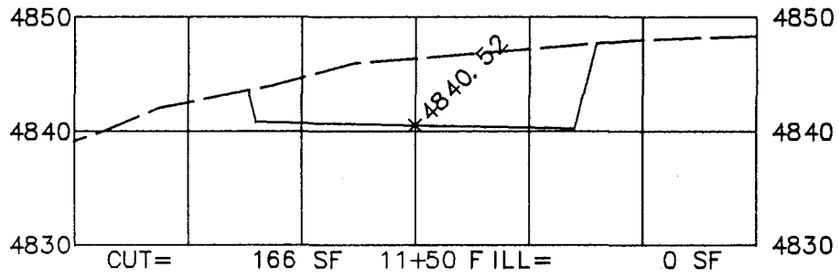
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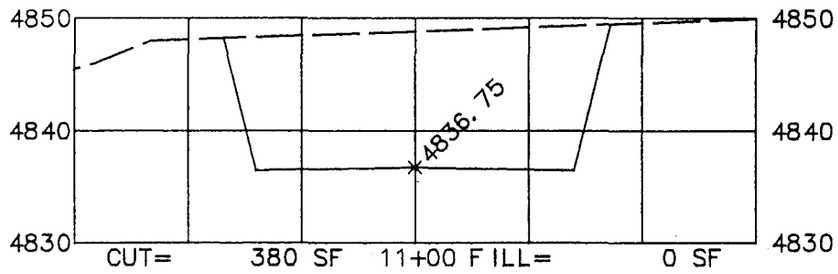
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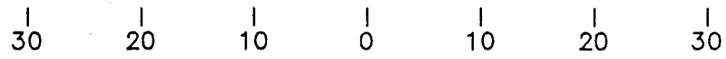
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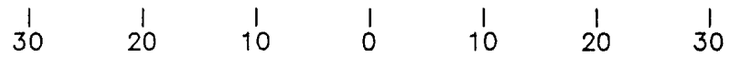
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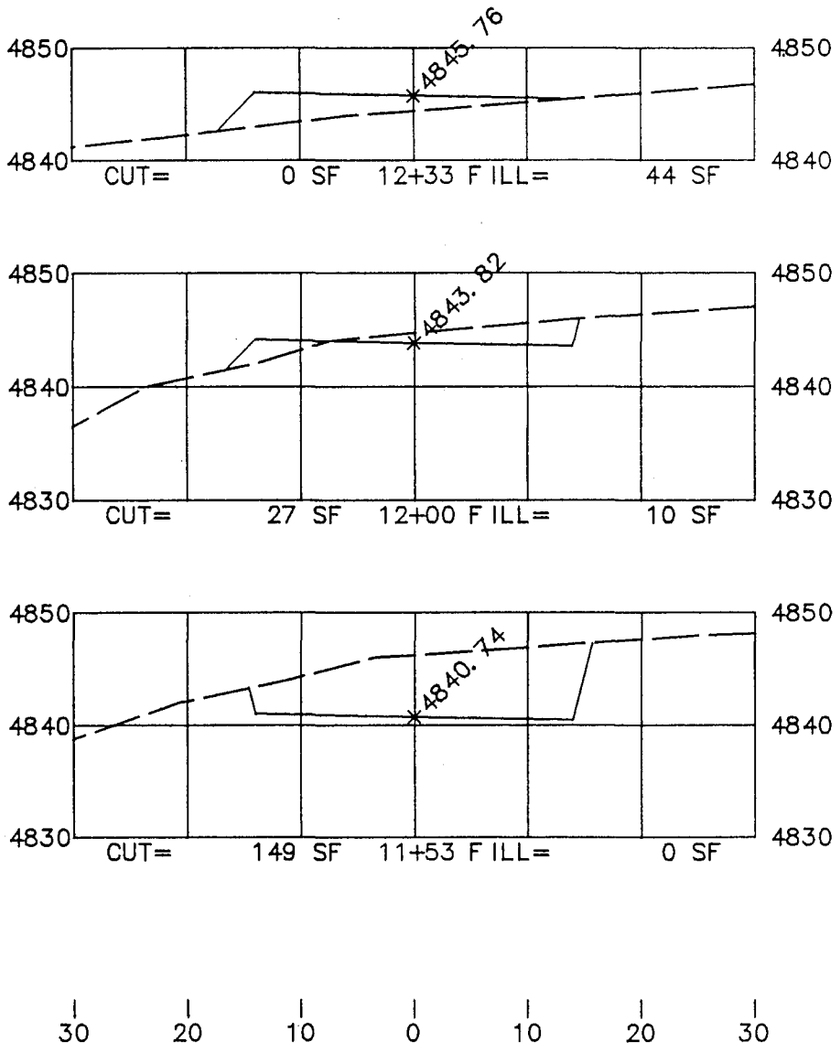
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4850
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CUT= 149 SF 11+53 FILL= 0 SF
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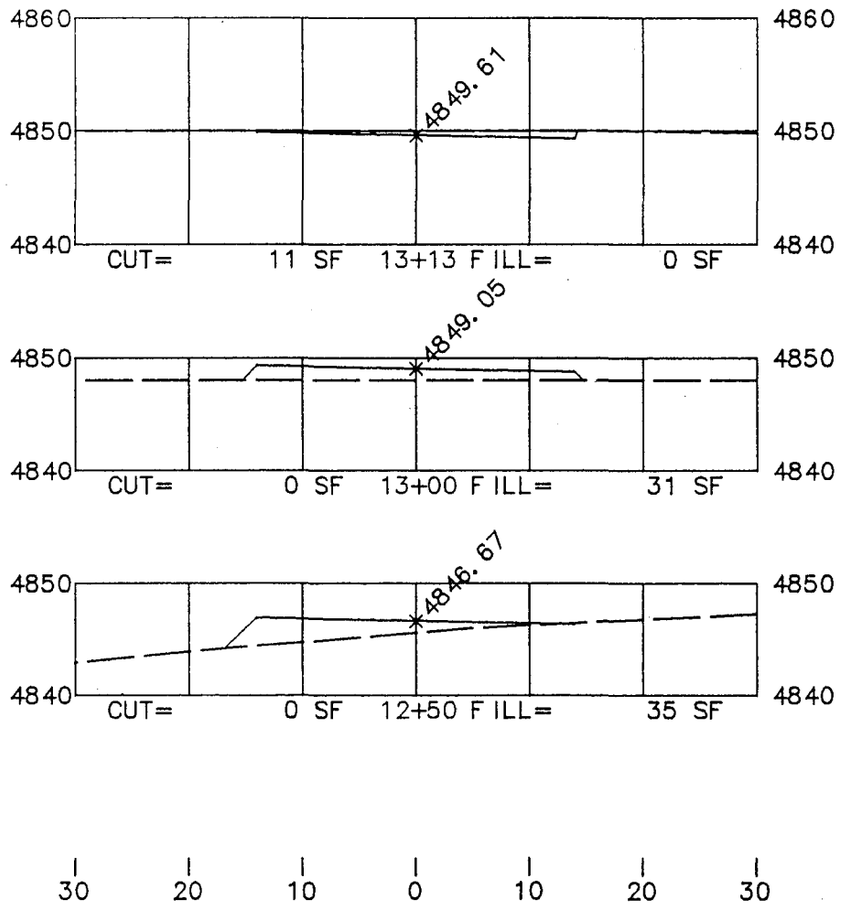
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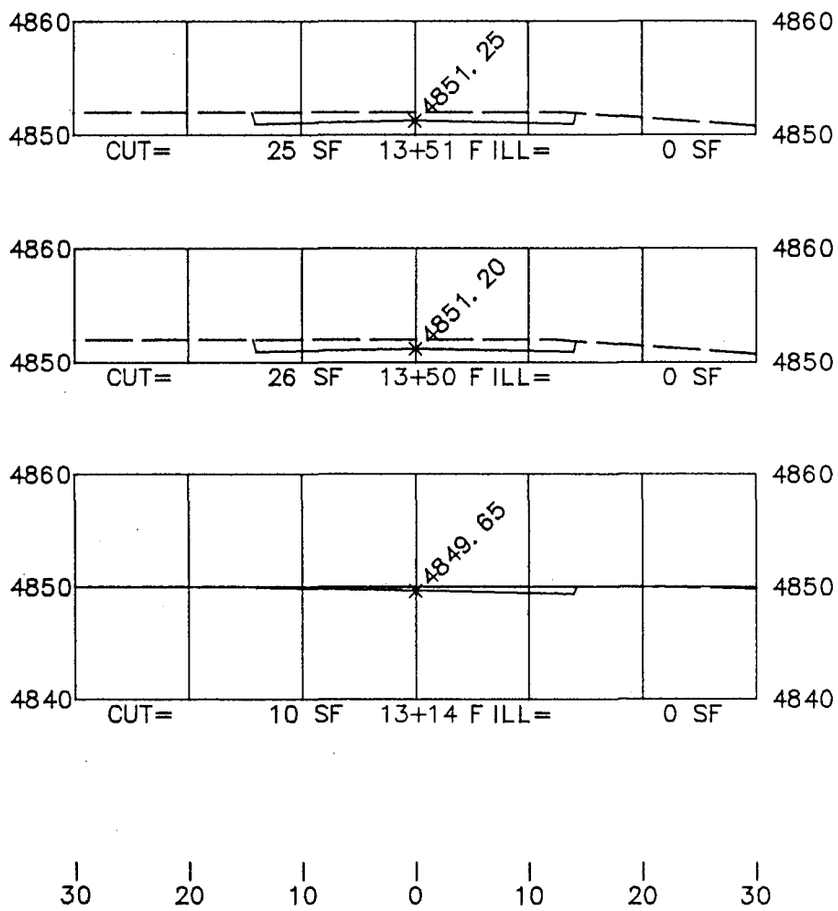
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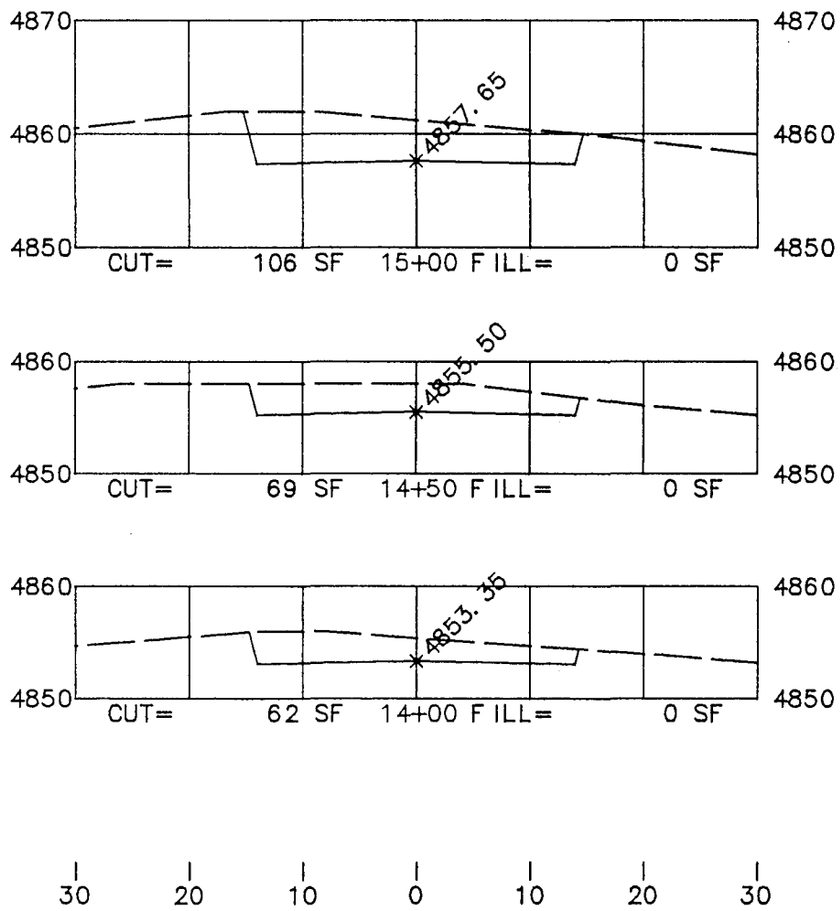
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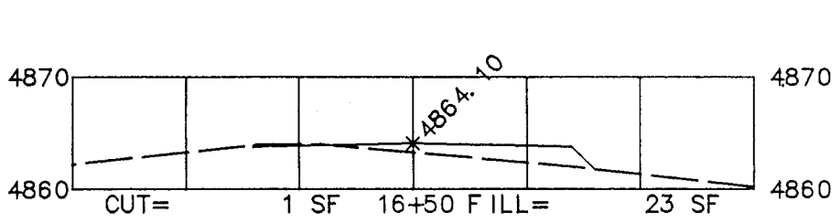
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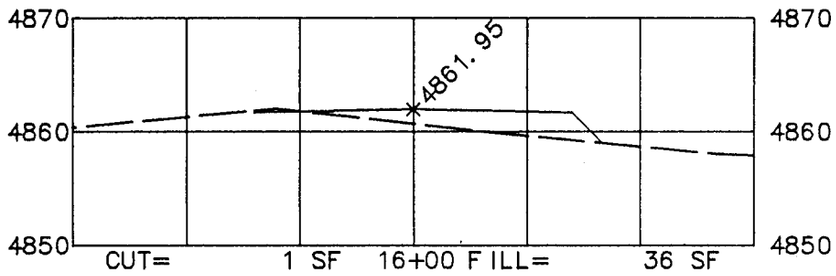
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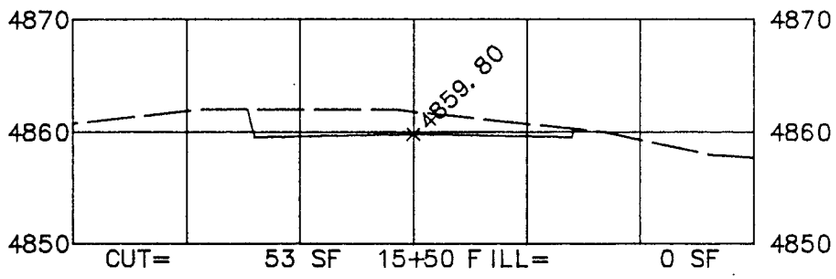
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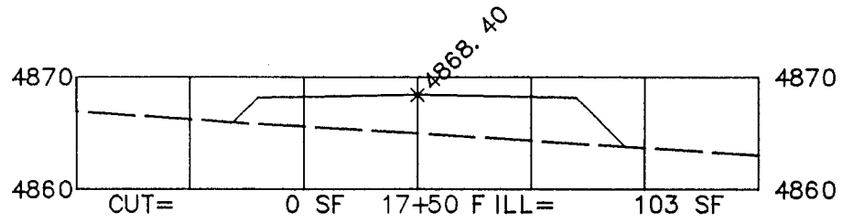
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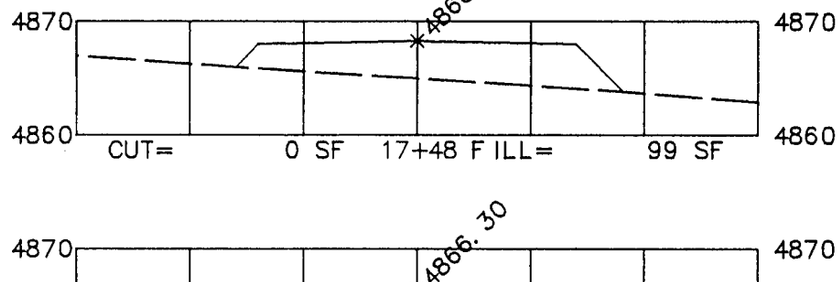
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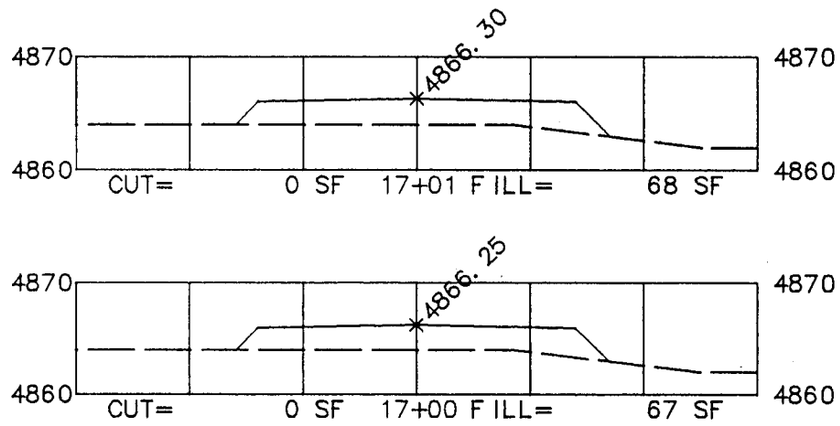
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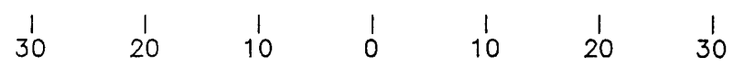
4866.25
CUT= 0 SF 17+00 FILL= 67 SF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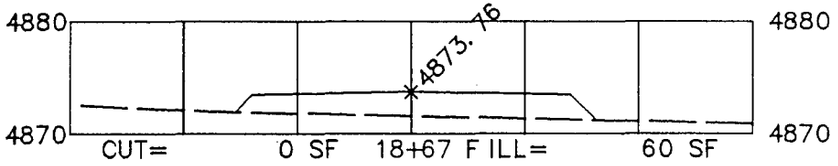
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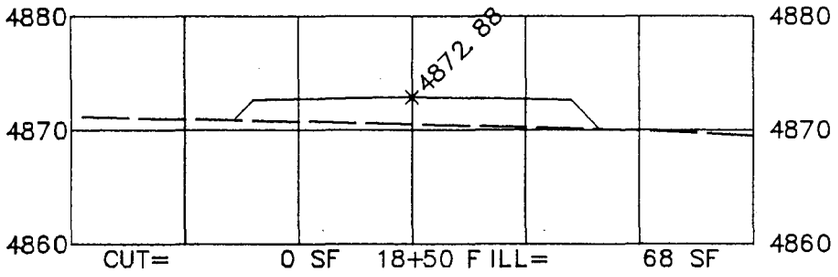
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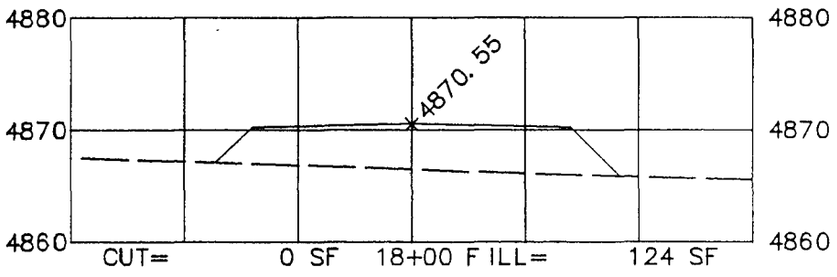
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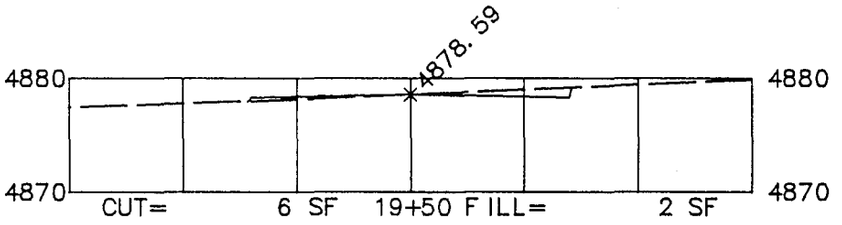
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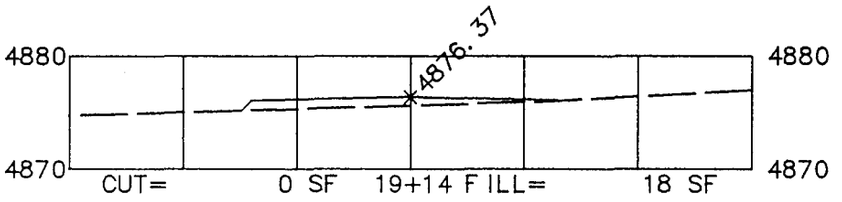
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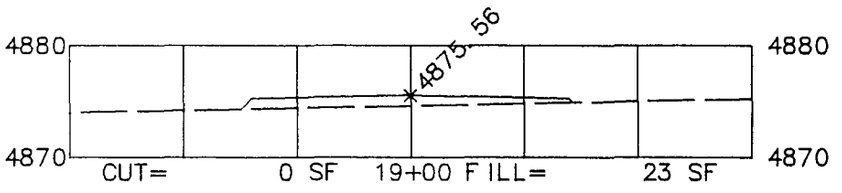
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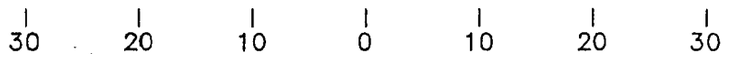
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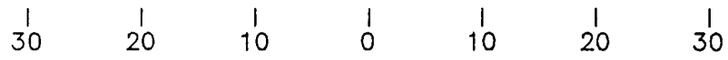
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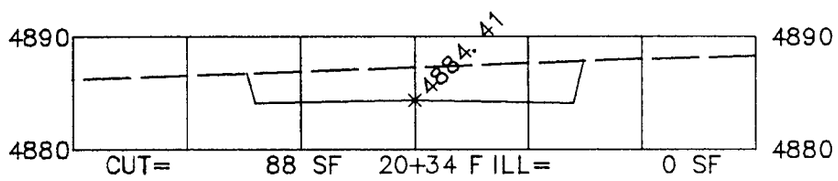
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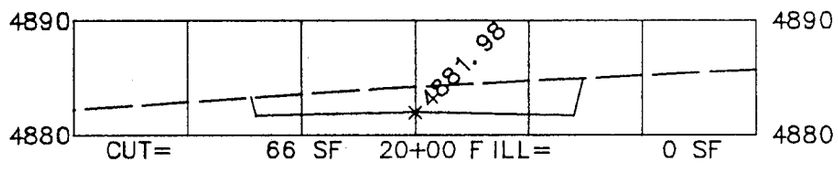
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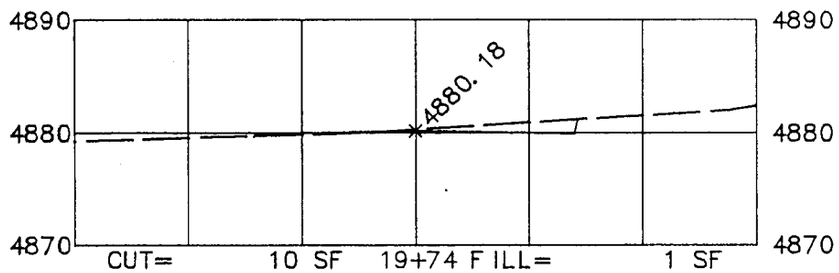
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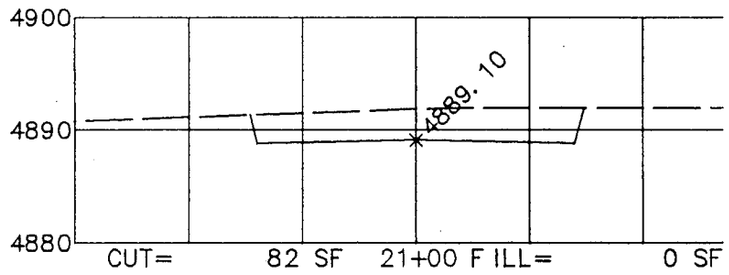
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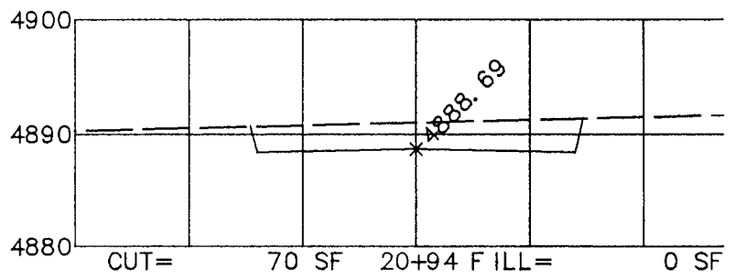
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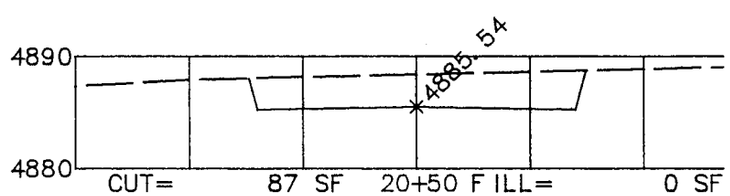
4890
4880
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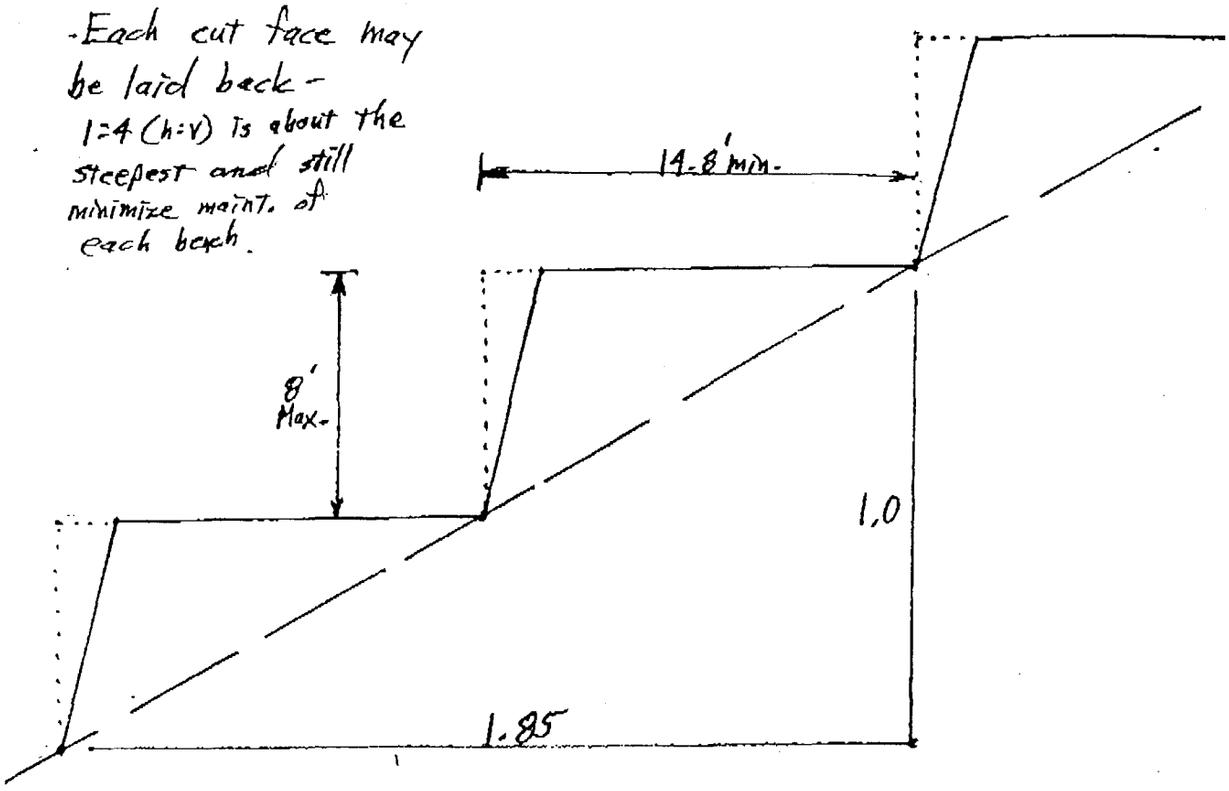
30 20 10 0 10 20

Post-it® Fax Note 7671	Date 12-5-95	# of pages ▶ 1
To Paul Stowell PE	From Ed Morris PE	
Co./Dept.	Co.	
Phone # 973-2040	Phone # 242-8968	
Fax # 303 972-2724	Fax # 970-242-1561	

-Each cut face may be laid back - 1:4 (h:v) is about the steepest and still minimize maint. of each bench.



Rec'd 12-5-95

CUT SLOPE SECTIONS - TRAILS END ROAD

Lincoln DeVore, Inc.
Geotechnical Consultants

TRAILS WEST VILLAGE SUBDIVISION		
WENS - STOWELL		DATE 12-5-95
JOB NO. 8457-5	DRAWN EMH	Scale 1"=6'

constructed out of either natural stone removed during construction of the road or, alternatively, a mechanically stabilized earth (MSE) wall designed to blend into the surroundings, or both. An example of an MSE is shown in Exhibit F.

A computer generated image of an aerial view of the road is attached as Exhibit G. This view represents the worst angle for viewing the road cuts. The extent of the cuts depicted in Exhibit G will not be visible from South Camp Road. Additional technical detail showing road cross-sections (revealing the required cut and fill profiles) at 50 foot intervals along the road is attached as Exhibit H. The road has been re-designed to eliminate the 14 ft. cut through lot 54 (formerly lot 53) which was originally required to loop Trails End Road to the south once it reached the mesa top. Special care was taken to avoid several of the unique and attractive rock formations visible from South Camp Road.

In short, Petitioner shares the City's desire to protect the aesthetics of the ridge. The combination of a no-build set-back from the edge of the escarpment and limitations on the height and color of the few homes built on the mesa will serve to create a visual impact in accordance with current policies and far less distracting than existing ridge development within City limits. Petitioner believes this plan achieves an important balance between the preservation of aesthetic integrity and the interest of future homeowners whose commanding view from the mesa top will create an unparalleled residential experience within Grand Junction.

B. Geotechnical Issues. The geotechnical concerns of the City have been addressed in detail in the November 20, 1995 report prepared by Lincoln DeVore, Inc. and attached hereto as Exhibit I. Lincoln-DeVore concludes that there are no geotechnical impediments to constructing Trails End Road in the present alignment to the top of the mesa. According to Lincoln DeVore, there are no locations along the road which will require an artificial rockfall barrier.

With respect to home construction, a no-build zone has been identified on the plat and staked in the field. A copy of the legal description of this no-build zone is attached hereto as Exhibit J. This no-build zone represents the area which Lincoln DeVore thinks should be avoided for home construction purposes due to geologic concerns. By locating building envelopes outside the no-build zone, Petitioner has taken the appropriate steps to allow properly engineered homes to be built on stable soils on the mesa top.

V. RESPONSE TO THE SEPTEMBER 27, 1995 LETTER

In her September 27, 1995 letter addressed to Mr. Dave Wens, Kathy Portner identified 15 inadequacies found in Petitioner's prior submittals. The enumerated items are reproduced below in italics followed by Petitioner's response.

1. The revised utility composite is not showing the looped water line as required and hydrants between lots 58 and 54 appear to be exceeding the 500' spacing and exceeding the 250' minimum from any lot frontage.

Response: The revised utility composite, attached hereto as Exhibit K, now shows a 12" looped water line running the length of Trails End Road and Azteca Drive to South Camp Road. In

addition, Petitioner has re-measured the spacing of the hydrants between former lots 58 and 54 and found them to be less than 500 feet from each other and less than 250 feet from any lot frontage.

2. Limits of the no-build zone were not adequately described.

Response: The limits of the no-build zone are now identified on the revised preliminary plat (Exhibit A) and described by metes and bounds (Exhibit J).

3. The drainage plan does not address the concerns of Redlands Water and Power that no additional run-off be allowed into the Redlands Canal.

Response: The drainage plan for the subdivision has been revised and is attached as Exhibit L. Under the revised plan, the Redlands canal will actually carry less sheet flow run-off than it has historically due to the construction of the roads, curbs and gutters which will transport the bulk of the run-off away from the canal and into appropriate detention ponds. It should also be pointed out that the existence of the canal is a unique asset to the property from a drainage standpoint in that it serves to intercept natural run-off and transport it away. In this sense, the canal should be viewed as mitigating the run-off.[3]

4. The extent of the floodplain, as identified by the Mesa County Planning Staff comments must be shown and detailed as to the plan for that area.

Response: A comprehensive off-site drainage study has been prepared by Lincoln DeVore and is attached as Exhibit M.

5. A revised roadway plan and profile with stationing was not submitted.

Response: A revised roadway plan and profile with stationing is submitted as Exhibit N.

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[3] The concern about the canal creating sheet flow conditions during a storm does not take into account the fact that the canal has additional carrying capacity to handle a certain amount of run-off.

6. Detail was not submitted on the proposed cut areas to determine if the design is feasible. It also was not shown how the cuts could be lessened.

Response: The road design has been changed to eliminate the 14 ft. cut on lot 54 (formerly 53). Other proposed cut areas of the road are modeled in Exhibit H.

7. Inadequate geotechnical information to determine if slope stability can be attained.

Response: The detailed Lincoln DeVore report (Exhibit I) concludes that slope stability can be attained.

8. Did not address how lots along steep cuts could be accessed, specifically lot 53.

Response: See response to number 6, above.

9. Detail not provided on intersection.

Response: The city has indicated that it wants Petitioner to expand South Camp Road to a 36 ft. width for approximately 1200 ft. in length incorporating a left-hand turn lane for the entire distance. According to the City, Petitioner has the option of widening the road on either side of the existing pavement or on both sides. The City has also indicated that a determination of the exact location and design of a left-hand turn lane is a final design issue and need not be addressed at this juncture.

10. Did not adequately address how the required cuts would impact the depth of water lines.

Response: The depth of the water lines where cuts are required is at least six (6) feet below grade according to Ute Water. The cuts in these areas can be kept to 18" or less, thereby preserving the 52" cover required by the pipe. A major rupture will erode sandy or clay soil near the breach but would only transport such soil particles from the shallow overburden until it reaches bedrock. Any rupture discharge will be intercepted by Azteca Drive and Trails End Road and conveyed to

the storm detention basin which will suffice for containment until emergency response procedures can be implemented by Ute Water.

11. Did not address the off-site contribution of drainage. Drainage report and plan not in accordance with SSID requirements.

Response: See response to number 4, above. Petitioner's studies reveal that approximately 150 360? cfs could pass through the culvert under South Camp Road in a worst case scenario. The channel design for this situation is reflected in Exhibit N.

12. Detention areas not shown.

Response: The two (2) detention ponds included as part of the drainage plan are identified in Exhibit L.

13. Copies of prior drainage reports not included in response.

Response: All prior drainage reports in Petitioner's possession are included and grouped together collectively as Exhibit O.

14. Geotechnical report not complete. Did not make specific recommendations for road cuts, pavement design or rockfall structures that may be required.

Response: The geotechnical report prepared by Lincoln DeVore (Exhibit I) contains specific recommendations for road cuts and pavement design. No specific rockfall structures are required.

15. Have not adequately justified having a cul-de-sac far exceeding the recommended maximum length of 1,000 feet.

Response: To satisfy the City's desire to avoid isolating subdivisions, Petitioner has added an unimproved easement as a future outlet/access at the end of Trails End Road on the mesa top. The addition of a looped water line running the length of Trails End Road eliminates the concern of Hank Masterson of the City Fire Department of a dead end 8" line.

LANDesign

ENGINEERING • SURVEYING • PLANNING

January 2, 1995

Ms. Kathy Portner
City of Grand Junction
Community Development Department
250 North 5th
Grand Junction, CO 81501

Re: Trails West Subdivision

Dear Kathy,

Our firm is currently in the process of completing of the plans for the above mentioned project. We were notified of a comment from Ute Water District of the concern regarding a 24" water transmission line and the possibility of a break in that line affecting this project. We have only know of this concern since the end of last week and with the holiday weekend etc, were unable to get a response from Ute Water regarding their concern. We will respond with specific details of how this concern will be handled as soon as we can ascertain the size of the possible impact and what measures can be taken to mitigate the problem.

Please be assured that the final plans will reflect mitigation of this concern. I will talk to you regarding this issue tomorrow, however I was unable to contact you by phone and you had required a response to this issue today.

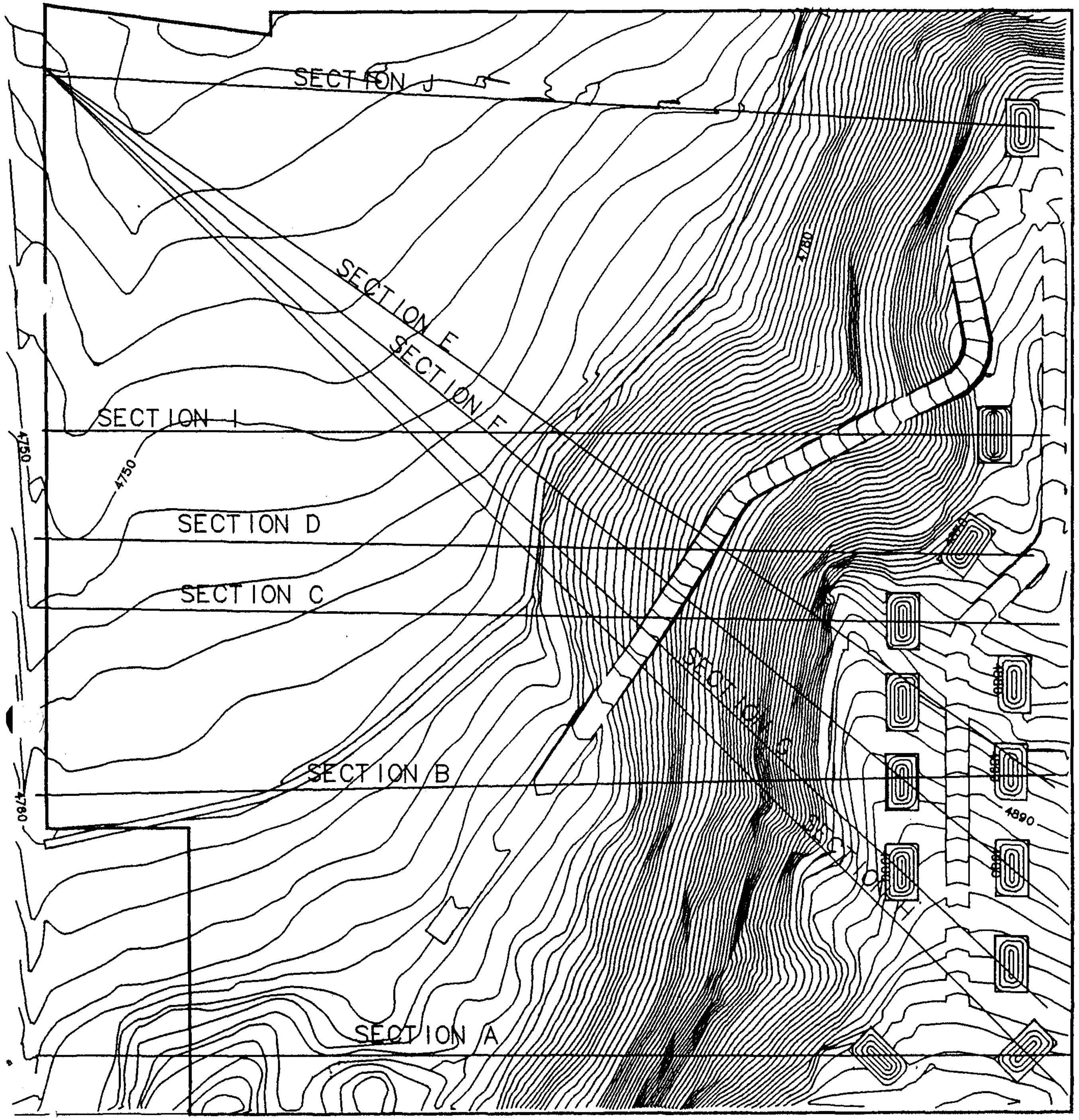
Sincerely,

Philip M. Hart, PE
President

259 Grand Ave. • GRAND JUNCTION, CO 81501 • (970) 245-4099 • FAX (970) 245-3076

Computer developed
line-of-sight profiles.

Provided by Petitioner



SECTION J
SECTION E
SECTION F
SECTION I
SECTION D
SECTION C
SECTION G
SECTION H
SECTION B
SECTION A
4750
4780
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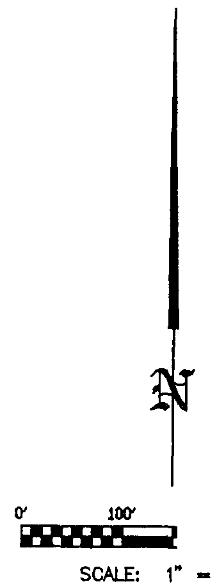
Figure 1



N
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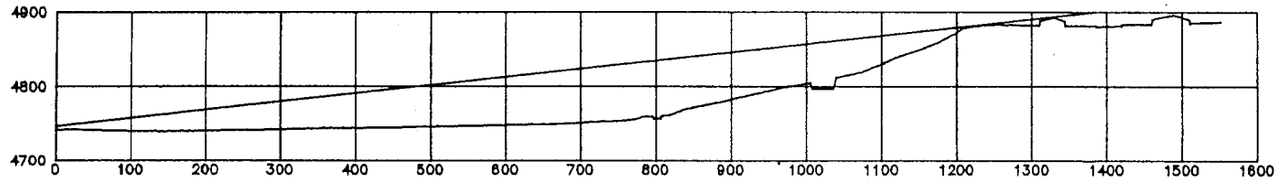
SCALE: 1" = 1



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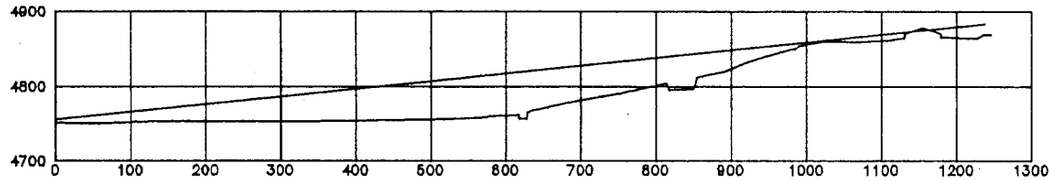

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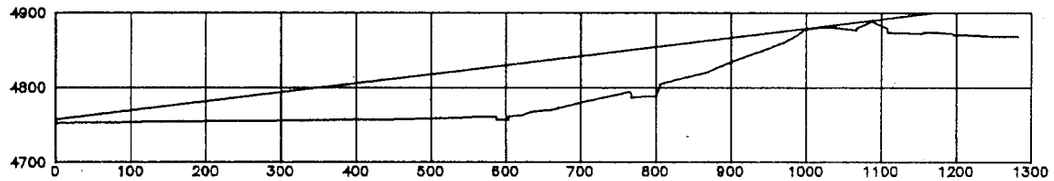

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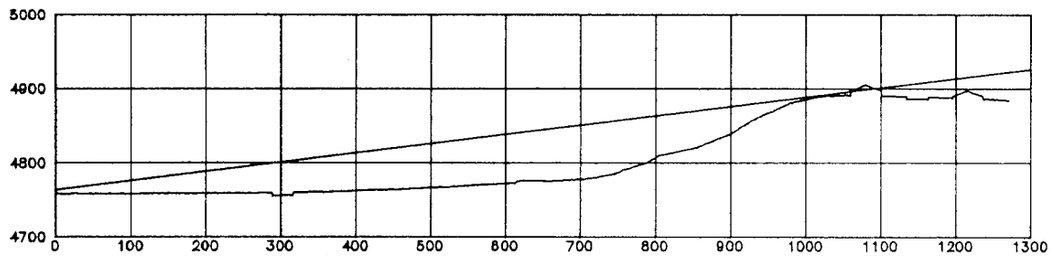

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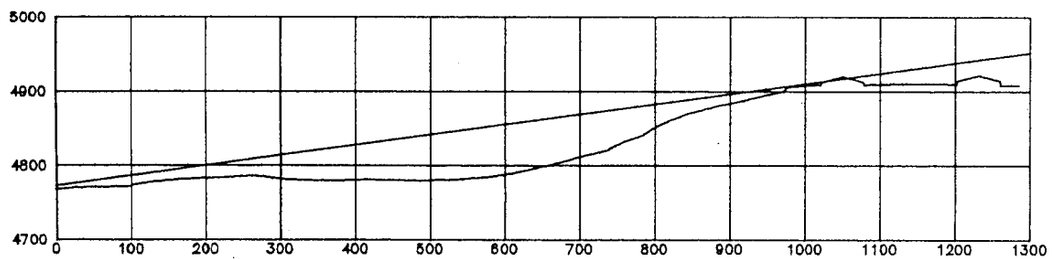

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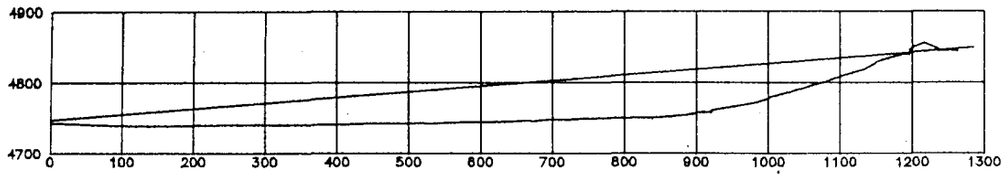

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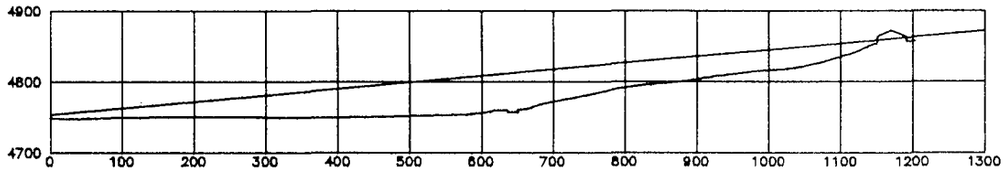

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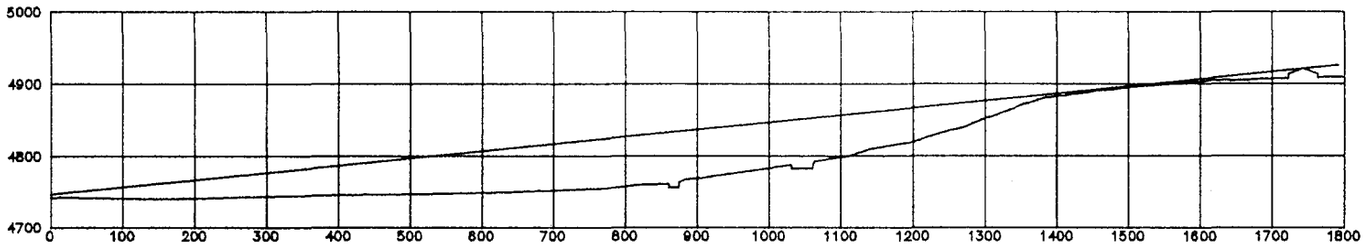

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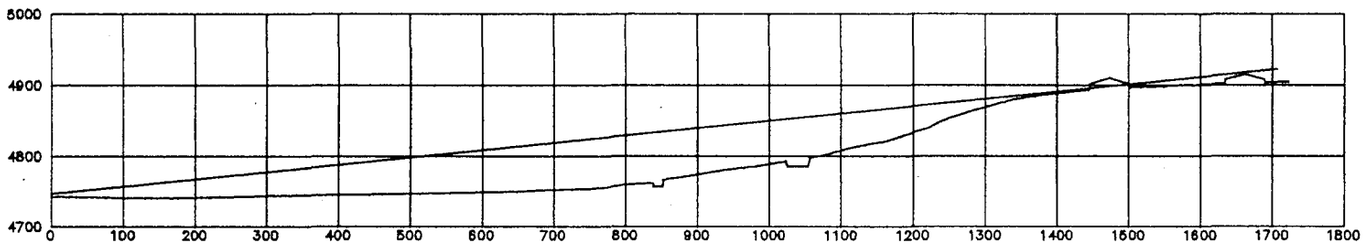

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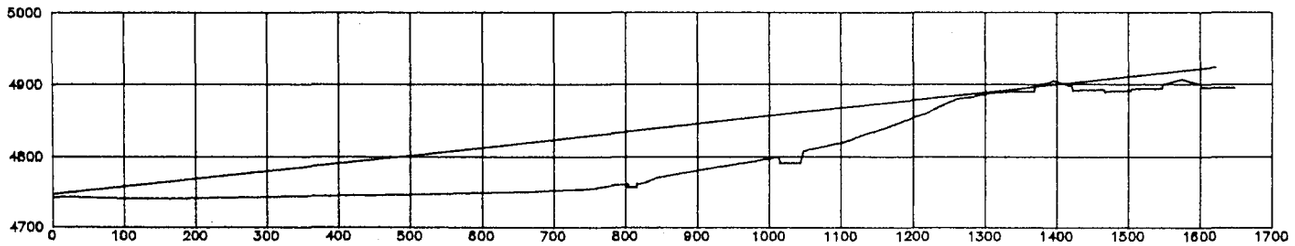


SECTION F

STAFF REVIEW

FILE: #PP-95-157

DATE: January 3, 1996

STAFF: Kathy Portner

REQUEST: Preliminary Plan--Trails West Village

LOCATION: E of S. Camp Road, S of S. Broadway

APPLICANT: Camelot Investments, LLC

EXISTING LAND USE: Undeveloped

PROPOSED LAND USE: Single Family Residential, approximately 1.7 units per acre

SURROUNDING LAND USE:

NORTH:	Single Family Home, Church and Undeveloped
SOUTH:	Undeveloped
EAST:	Undeveloped
WEST:	Agriculture, Undeveloped

EXISTING ZONING: RSF-4

PROPOSED ZONING: RSF-4

SURROUNDING ZONING:

NORTH:	RSF-4 (Residential Single Family, 4 units per acre)
SOUTH:	PR-4 (Planned Residential, 4 units per acre)
EAST:	RSF-4
WEST:	R1B (County zone, 2 units per acre)

RELATIONSHIP TO COMPREHENSIVE PLAN:

No Comprehensive Plan exists for this area.

STAFF ANALYSIS:

The proposal is to develop 66 single family lots on approximately 40 acres for a density of 1.7 units per acre. The property is zoned RSF-4 (Residential Single Family, 4 units per acre).

Lots 1 through 39, between South Camp Road and the Redlands Canal Second Lift, consists of gently sloping topography. Lots 40 through 53, located between the Redlands Canal Second Lift and the abandoned Redlands Canal are more steeply sloping and the buildable areas of lots 54 through 66 are at the top of a steep escarpment.

The City has required more detail than is normally required with a preliminary plan review for this site because of the steep topography and drainage concerns. Following is a summary of those issues.

Drainage

The Trails West Village Subdivision is within the 715 acre watershed of an unnamed ephemeral stream that drains an area between the much larger Ute Canyon and Red Canyon watersheds. The main channel of the watershed enters the Trails West Village Subdivision via a culvert under South Camp Road where it joins a smaller tributary which drains an area mostly north and east of South Camp Road. The stream then flows through the site of a proposed detention pond in the northwest corner of the subdivision.

Comments received by Mesa County Planning indicate the existence of a floodplain as mapped on the Redlands Geologic Hazards maps. It is assumed that this would be a flash flood area. The applicant's Hydrologic Study for the site indicates that "no 100-year floodplains have been officially designated, although preventing encroachment within the 100-year flooding level is a valid planning issue". Clarification of the existence of this hazard area should be required with the final drainage study.

The Hydrologic Report also indicates a peak runoff discharge of 364 cfs in the 100-year storm event. The drainage report noted that part of the scope of work was to include field measurement of the culvert across South Camp Road which would be carrying this runoff. That report did not include those measurements; however, the Preliminary Drainage Analysis, submitted by Wayne Lizer stated that the culvert would carry approximately 150 cfs. Final design would have to include the enlargement of the culvert, if necessary, in conjunction with the required road widening. Final design would also need to show how the drainage will be carried along the east side of South Camp Road, along the subdivision boundary. With the required road widening will the drainage be accommodated within the ROW or will additional easement width be necessary?

The drainage detention areas must be designated as common tracts to be owned and maintained by the homeowners. The off-site drainage report refers to an appendix with computations which was not provided.

Geotechnical

The Engineering Geology Investigation report, completed by Lincoln DeVore, Inc., describes the general geology of the site. The report states that several geologic hazards are present on the site and that the development plan is not in extreme conflict with these hazards. The geologic study identified three areas of ancient landslides, soil creep areas and rockslide and

rock rolling areas.

The report indicates that the landslide areas should be treated as potentially unstable, similar to the areas of soil creep. The report recommends the upper slopes of lots 48, 49, 50, 50 and 52 be mapped as Potential Rockslide and Rockrolling Areas and addressed in the covenants as requiring evaluation and possible mitigation for rockslide and rockrolling. The proposed no build areas should mitigate the remaining rock fall potential. The report also indicates that the proposed road construction through the unstable slopes could create some problems.

The geotechnical report contains several statements which need further explanation or detail. Some might be appropriately left to be included with the final submittal, but others raise concerns with the design at the preliminary stage. The concerns are as follows:

Page 6--"Special care should be taken to maintain vegetation on the steeper slopes." Specific recommendations for the type of care and which slopes should be included in the final plans.

Page 11--"Great care is required to design subsurface drainage and cuts and fills in order to minimize the possibility of a large scale movement." It appears the roadway design will need to include specific designs for subsurface drainage. Although the report does not specifically address it, conversations between Ed Morris of Lincoln-DeVore and Jody Kliska, the City Development Engineer, indicated that Mr. Morris would not recommend any concrete (curb, gutter and sidewalk) be constructed in the proposed through cuts for 7 to 10 years to give the disturbed area time to make whatever movement it would make after disturbance. The assumption is that he expects some movement. This is not acceptable to the City.

Page 11--"The site drainage and appropriate cuts and fills must be carefully controlled to avoid inadvertent triggering of hillside creep or mass movement." The on-site preliminary drainage report does not address this at all. The final drainage report will be required to address this concern. The report also warns on page 13 of the possibility of "a troublesome perched water condition may develop which will provide construction difficulties."

Page 14--"The site condition which would have the greatest effect on the planned development is the potential for slope instability as pertaining to the construction of Trails End Road and the construction of single family residences on top of the Mesa and the presence of expansive clays which would affect the foundations of structures on lots 54-66." Pages 32-33 contain specific recommendations for roadway cuts and fills, which appear to be intended to alleviate the anticipated slope instability. Conversations with Ed Morris included the possibility of blasting for foundations on the top of the mesa and the possible effects this could have on slope stability. The other concern that arose from this conversation was how sewer line construction would be accommodated since the lines would be required to be 6' below the roadway grade. No excavation pit logs were provided with the report but will be required to evaluate areas where rock is encountered.

Page 35--The results of laboratory testing for pavement design are shown and are followed by the statement "Displacement values higher than 4.00 generally indicate the soil is unstable and may require confinement for proper performance." This indicates a more comprehensive

pavement design will be required with the final plan. The report goes on to indicate geotextile fabric may be required. Discussions with Ed Morris indicate he has more specific pavement design recommendations than are presented in the report.

All of the above issues with the construction of roadway cuts and fills are a concern for the City because it appears if construction is not done properly, the portion of the roadway which is either in a large fill or cut may be a maintenance problem for the City. The City is not equipped to deal with streets with steep slopes or rockfall potential.

Other Comments

The petitioner has not satisfactorily addressed the impact a break in the 24" Ute Water line would have on downstream lots and how it could be mitigated.

The City is requesting land or easement dedication along both the active and inactive Redlands canal for public trails use. The applicant has indicated agreement with that request. Details of the dedications would be included with a final submittal.

Proposed street stubs to adjoining properties must be constructed with this subdivision. Final design would need to show how Trails End Road could access the adjoining land-locked parcels on top of the mesa.

The final submittal should show the buildable area for some of the smaller and more constrained lots, such as lots 31, 36, 39 and 54. The existing zoning of RSF-4 requires setbacks of 25' along South Camp Road and 23' from all internal streets, 30' rear yard setback and 7' sideyard setback. The proposal for single story structures on the upper lots will greatly restrict the square footage of the homes along the ridgeline.

The required improvements along South Camp Road will include widening for a left turn lane and a detached bicycle/pedestrian path.

Ute Water noted that adequate water pressure might not be available for the upper lots. Confirmation of necessary water pressure would be required with the final submittal.

The intersection of Mescalero and Montero should be as close to 90° as possible.

General Policies

Section 6-1-1 of the Zoning and Development Code includes the following stated goals of the subdivision regulation:

I. To preserve natural vegetation and cover, and to promote the natural beauty of the City;
J. To prevent and control erosion, sedimentation, and other pollution of surface and subsurface water;
L. To restrict building in areas poorly suited for building or construction;
M. To prevent loss and injury from landslides, mudflows, and other geologic hazards.

RECOMMENDED PLANNING COMMISSION MOTION:

Mr. Chairman, on item #PP-95-157, Preliminary Plan for Trails West Village, I move we approve the request with the following conditions:

Sept. 1990
RPR

CIMARRON SUBDIVISION
DRAINAGE REPORT

HISTORIC ON-SITE RUNOFF:

Currently, on-site runoff is produced from two basins. (See attached Preliminary Grading & Drainage Plan.) Basin 1 consists of sheet flow from steep rocky slopes which is intercepted by the Redlands Canal. Point of discharge for this basin is at the west end of the canal on the project site.

Runoff from Basin 2 is sheet flow which collects in a shallow swale along the west side of the property and is discharged near the northwest property corner. Soil in this basin is sandy with sparse vegetation. Slope is to the northwest at a rate of 2.5%.

BASIN 1: (ON-SITE RUNOFF)

A = 31.4 Acres

C = 0.40 steep, sandy soil with large rock outcrops and sparse vegetation.

Time of Concentration:

Runoff is sheet flow at S = 9.0% for 1,250 L.F.
and sheet flow at S = 23% for 350 L.F.
and channel flow at V=4 ft./sec. (assumed) for 1,200 L.F.

$Tc = 1.8\ (1.1-C)\ (D)^{1/2}/(S)^{1/3}$
$= 21.4 + 8.3 + 5 = 35$ minutes

From Intensity/Duration Curves:

$I_{10} = 1.3$ in./hr. $\quad I_{100} = 2.1$ in./hr.

$Q_{10} = CIA \quad Q_{100} = 1.25\ CIA$

$Q_{10} = 0.4\ (1.3)\ (31.4) = 16.3$ CFS

$Q_{100} = 1.25\ (0.4)\ (2.1)\ (31.4) = 33.0$ CFS

BASIN 2: (ON-SITE RUNOFF)

A = 15.5 Acres

C = 0.35 Sandy soil with light scattered vegetation and a 2.5% slope to the north.

Time of Concentration:

Runoff is by sheet flow accumulating at the swale exiting near the northwest corner of the parcel. L = 950'.

Tc = 31 minutes

I_{10} = 1.4 in./hr., I_{100} = 2.2 in./hr. .

Q_{10} = 0.35 (1.4) (15.5) = 7.6 CFS

Q_{100} = 1.25 (0.35) (2.2) (15.5) = 14.9 CFS

OFF-SITE RUNOFF:

Off-site runoff originates from a small canyon west of Red Canyon in the Colorado National Monument. (See attached Drainage Basins Map.) This flow parallels Buffalo Drive to Wingate School where it then runs north along South Camp Road. The natural channel becomes more constricted and culverts get smaller as flow progresses downstream. When runoff reaches the Redlands Canal, at the south end of the subdivision, it has been detained naturally by the congested channel and restricted culverts along South Camp Road. The canal intercepts some of the off-site flow which is carried west. Some flow passes through an existing 12" culvert which has been partially flattened by traffic loading. Remaining flow crosses the canal by overtopping the banks of the channel. At this point it is carried to the north by a drain channel along the west side of South Camp Road and the adjacent field to it. The flow is again split approximately 300 feet north of the canal at an existing box culvert crossing under South Camp Road to the east. A portion of this runoff will pass through the box culvert and the remainder flows north across an existing alfalfa field to the housing development located along the north side of the field (Monument Meadows). Observers in the area reported approximately 50% of the flow crossed through the box culvert and 50% continued north across the hayfield on the west side of South Camp Road during runoff from the heavy thunderstorm of September 2, 1990.

Any runoff flowing through the box culvert under South Camp Road becomes sheet flow across the relatively flat Cimarron site. This sheet flow continues across the adjacent property to the north. It then accumulates in the existing drain ditch which begins to be defined as a channel. Runoff continues north within this drainage way, which is very wide and congested with cattails and brush, until it is detained by a dam created by a driveway and 12" culvert. This driveway provides access to the church east of South Camp and

south of South Broadway. The driveway crossing will back water to a height of several feet and slowly release it through the 12" culvert, thereby acting as a natural detention basin.

For this development, a quick release of all on-site runoff is recommended. This is a sub-basin draining to a large natural detention area in the church vicinity. The site is in the lower reaches of this major sub-basin and is therefore appropriately located for a fast release of development stormwater before peak flows from upper regions can arrive.

Off-site Runoff: (S.C.S. Method)

A = 580 Acres

100 yr. - 24 hr. Isopluvial = 2.2" Rainfall for Grand Junction area

Hydrologic Soil Group = "B"
CN = (Weighted Avg. - See Below)

25% @ CN = 90 (Steep slopes and slickrock)
75% @ CN = 65 (Open areas, flat, sandy, some cover)
Therefore: CN = 71 (avg.)

Runoff tables give: q = 0.35" for 2.2" Rain @ CN = 71
Runoff charts give: Q = 170 CFS/inch @ S = 4% (Moderate)
Q = 275 CFS/inch @ S = 16% (Steep)

Avg. Slope of Watershed: $S = 0.25Z\ (LC_{25} + LC_{50} + LC_{75})/A$

Therefore, By interpolation: Q = 240 CFS/inch @ S=12% (Actual)

Qp = Qq = 240 (0.35) = 84 CFS

Q_{100}= 84 CFS (off-site)

Manning's Equation shows an earth channel (triangular) 15 feet wide at the top and 2.5 feet deep (3:1 sides) will be required to contain developed runoff and off-site runoff combined. The capacity of such a channel is 125 CFS assuming (conservatively) a roughness coefficient of N = 0.025 and a minimum slope of 1.0%.

DEVELOPED RUNOFF:

Developed runoff will closely follow historic patterns as areas above the Redlands Second Lift Canal will continue to

drain into the canal either by sheet flow or by channelized input from roadside ditches crossing it. Basin 2, which currently drains off-site near the northwest corner of the site, will have runoff directed by roadways to approximately the same discharge location. Runoff will flow in a swale proposed between lots and across the back (east) end of an adjacent property into the existing drain ditch. It is proposed to improve the swale across the off-site parcel to provide control and direction of the flow so it can be accommodated by the existing drainage ditch which becomes more defined and has improved capacity near the north side of the adjacent off-site parcel. Preliminary discussions with the owner of the property indicate a willingness to allow these improvements.

BASIN 1: (ON-SITE RUNOFF)

A = 31.4 Acres

C = Composite: 10 Lots @ C = 0.95 (3,000 S.F. Ea. - Roof/Drive)
and C = 0.15 (1,500 S.F. Ea. - Lawn)
and C = 0.95 (500' x 26' - Road)

$$= \frac{10\ (3000)\ (0.95)+10(1500)\ (0.15)+500\ (26)\ (0.95)+30.1\ (43,560)\ (0.40)}{31.4\ (43560)}$$

= 0.41 (developed)

Time of Concentration: (Unchanged from Historic) = 35 minutes
Rainfall Intensity: (Unchanged), I_{10} = 1.3, I_{100} = 2.1

Q_{10} = 0.41 (1.3) (31.4) = 16.7 CFS

Q_{100} = 1.25 (0.41) (2.1) (31.4) = 33.8 CFS

BASIN 2: (ON-SITE RUNOFF)

A = 15.5 Acres
C = Composite = 32 Lots w/C = 0.95 (3000 S.F. - Roof/Drive)
and C = 0.15 (1500 S.F. - Lawn)
and C = 0.95 (2200' x 26' - Road)

$$= \frac{32\ (3000)\ (0.95)+32\ (1500)\ (0.15)+2200\ (26)\ (0.95)+10.9\ (43560)(0.40)}{15.5\ (43560)}$$

= 0.51 (developed)

Time of Concentration:
Runoff is sheet flow at S = 2.0% for 600'
and channel flow at V = 4 ft./sec. for 500'

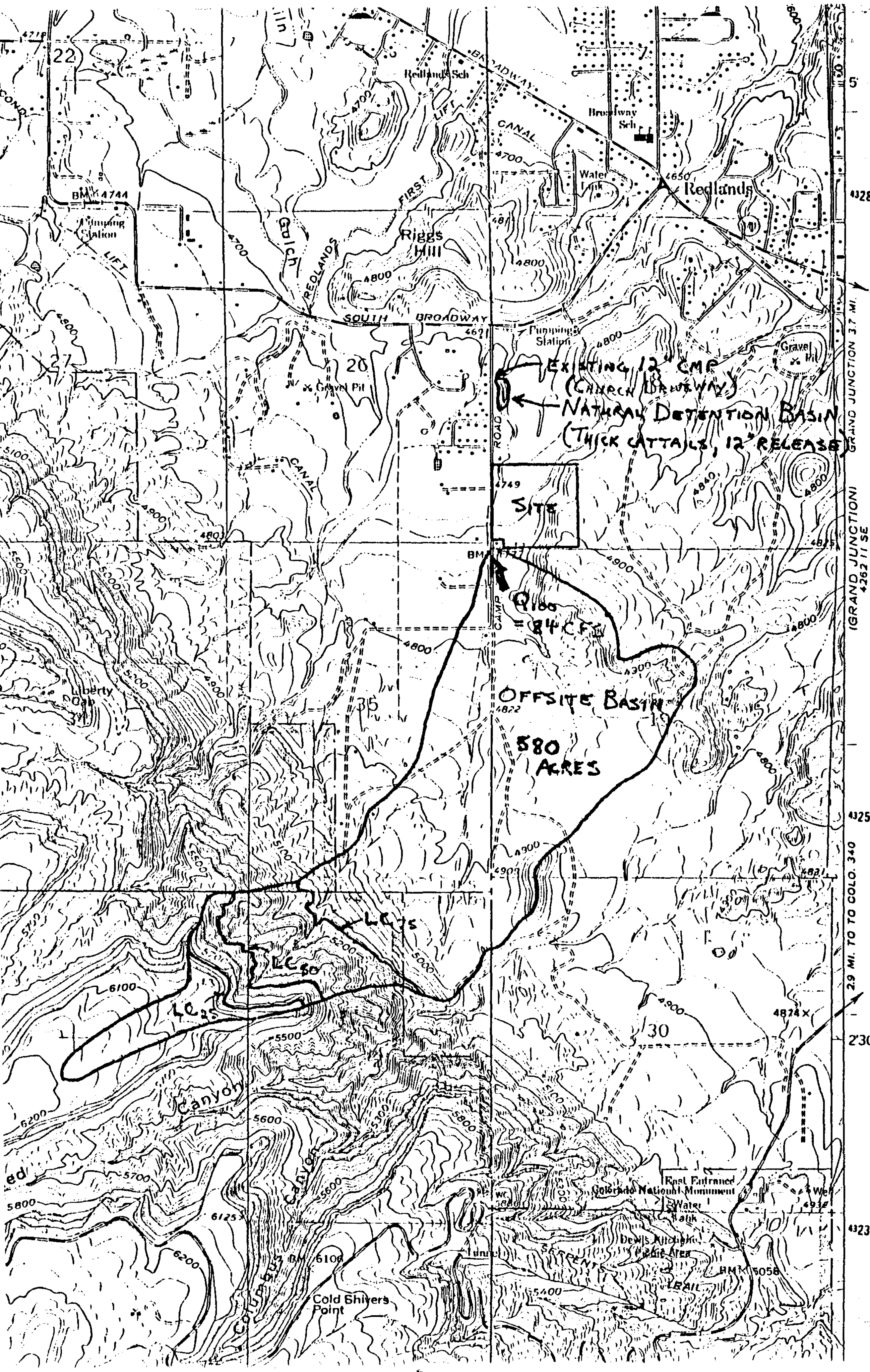
Tc = 24.5 + 2.1 = 27 minutes

Rainfall Intensity:
I_{10} = 1.6 in./hr.
I_{100} = 2.4 in./hr.

Q_{10} = 0.51 (1.6) (15.5) = 12.6 CFS
Q_{100} = 1.25 (0.51) (2.4) (15.5) = 23.7 CFS

RUNOFF COMPARISON

	Historic	Developed
Basin 1_{10}	16.3	16.7
Basin 1_{100}	33.0	33.8
Basin 2_{10}	7.6	12.6
Basin 2_{100}	14.9	23.7



EXISTING 12" CMP
(CHURCH DRIVEWAY)
NATURAL DETENTION BASIN
(THICK CATTAILS, 12" RELEASE)
SITE
Q100
= 84 CFS
OFFSITE BASIN
580
ACRES
LC75
LC50
LC25
Redlands Sch
Broadway Sch
Redlands
Water Tank
Riggs Hill
SOUTH BROADWAY
REDLANDS
FIRST
LIFT
CANAL
Pumping Station
Gravel Pit
CAMP
ROAD
Liberty Cap
Canyon
Cold Shivers Point
East Entrance
Colorado National Monument
Devils Kitchen Picnic Area
GRAND JUNCTION 3.7 MI.
(GRAND JUNCTION)
4262 II SE
2.9 MI. TO TO COLO. 340
4323000m. N.
2'30"

W.H. LIZER & ASSOCIATES
Engineering Consulting and Land Surveying
576 25 Road, Unit #8
Grand Junction, Colorado 81505
241-1129

PRELIMINARY DRAINAGE ANALYSIS
FOR
TRAILS WEST VILLAGE
Part of the SW 1/4 SW 1/4 Section 18, T1S, R1W, U.M.
City of Grand Junction, Colorado
November 20, 1995

GENERAL:

Trails West Village is located for the most part in Section 18, T1S, R1W, of the Ute Meridian in the City of Grand Junction, Colorado.

The site generally drains from the Southeast to Northwest of varying degrees of slope, ranging from approximately 30% to 2.3% slopes and consists of approximately 38.9 acres, excluding South Camp Right-of Way.

OFFSITE CONTRIBUTION:

There are approximately two acres that will contribute stormwater to the site at the Southeast corner of the site, and approximately 0.7 acres at the Southwest corner of the site, of which areas are accounted for in the following analysis.

OTHER CONTRIBUTION: (Stormwater conveyed past the proposed subdivision)

A separate off-site drainage study is being prepared by Lincoln DeVore, Inc. of 1441 Motor Street, Grand Junction, Colorado.

Preliminary information given to the writer of this report by Lincoln DeVore personnel indicates that there are 600 acres plus to the South of the proposed subdivision that will generate approximately 400 CFS of stormwater for a 100 year event.

A portion of this stormwater is expected to effect the proposed site as follows:

There is a 3 foot deep by 6 foot wide box culvert under South Camp Road as located on the attached map, which will carry approximately 150 CFS of stormwater.

Other stormwater may cross South Camp Road and flow across the Northwest corner of the site.

These quantities have not been determined yet by Lincoln DeVore, Inc. but are upcoming in their report.

METHOD OF ANALYSIS

The Rational Method was used to determine the amount of storm runoff, using the formula Q = CIA.

where Q = runoff in cfs
C = runoff coefficient
I = rainfall intensity (in./hrs.)
A = area in acres

The site consists of several drainage basins with sub-basins.

The upper terrace and generally the area above the Redlands Second Lift Canal is Soil Class D. Areas below the canal is Soil Class A.

A detention basin is planned at the North side of Lot 44 and at the Northwest corner of the site.

The detention basin at the North side of Lot 44 will help reduce the amount of flow for street carrying capacity. Flow routing is shown on the attached map.

A preliminary channel is designed at the Northwest corner of the site to transport water through the site from the location of the box culvert. Road crossings will be designed accordingly.

Respectfully submitted,

Wayne H. Lizer, P.E., P.L.S.

WHL:dp

TRAILS WEST VILLAGE

BASIN 1

HISTORICAL

$A = 2.4$ Ac

$S = 5.3\%$

SOIL CLASS D

$C_2 = 0.50$

$C_{100} = 0.58$

$$T_{c_2} = \frac{1.87(1.1-0.50)(300)^{1/2}}{(5.3)^{1/3}} = 11 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(300)^{1/2}}{(5.3)^{1/3}} = 10 \text{ min}$$

$I_2 = 1.46$

$I_{100} = 3.80$

$Q = CIA =$

$Q_2 = (0.50)(1.46)(2.4) = 1.7$ CFS

$Q_{100} = (0.58)(3.80)(2.4) = 5.3$ CFS

AFTER DEVELOPMENT

C FROM COMPOSITE METHOD

PAVEMENT, CONC., 2nd ROOFS =

$C_2 = 0.94$, $C_{100} = 0.96$

LAWNS $C_2 = 0.40$, $C_{100} = 0.48$

POSTURE $= C_2 = 0.50$, $C_{100} = 0.58$

$$C_2 = \sum \frac{(0.74)(0.94) + 1.66(0.50)}{2.4} = 0.63$$

$$C_{100} = \sum \frac{(0.74)(0.96) + 1.66(0.58)}{2.4} = 0.70$$

$$T_{c_2} = \frac{1.87(1.1-0.63)(300)^{1/2}}{(5.3_{AVE})^{1/3}} = 9 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.70)(300)^{1/2}}{(5.3)^{1/3}} = 7 \text{ min}$$

$I_2 = 1.59$, $I_{100} = 2.4$

$Q_2 = CIA = (0.63)(1.59)(2.4) = 2.4$ CFS

$Q_{100} = CIA = (0.70)(4.4)(2.4) = 7.4$ CFS

BASIN 2A

Conditions are essentially the same as Basin 1

$A = 3.6$ Ac, $S = 5.3\%$

$Q_{h_2} = CIA = (0.50)(1.46)3.6 = 2.6$ CFS

$Q_{h_{100}} = CIA = (0.58)(3.80)(3.6) = 7.9$ CFS

$Q_{d_2} = CIA = (0.63)(1.59)(3.6) = 3.6$ CFS

$Q_{d_{100}}$ $CIA = (0.70)(4.4)(3.6) = 11.1$ CFS

BASIN 2B

A = 0.70 Ac, S = 2970 +, No Development Except Road
$C_2 = 0.50$, $C_{100} = 0.58$
Historical T_c

$$T_{c_2} = \frac{1.87(1.1-0.50)(130)^{1/2}}{(29)^{1/3}} = 4.1 \text{ min} \sim \text{use } 5 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(130)^{1/2}}{29^{1/3}} \quad 4 \text{ min} \sim \text{use } 5 \text{ min}$$

$I_2 = 1.95$
$I_{100} = 4.95$

$Q_2 = CIA = (0.50)(1.95)(0.70) = 0.7 \text{ CFS}$
$Q_{100} = CIA = (0.58)(4.95)(0.70) = 2.0 \text{ CFS}$

AFTER DEVELOPMENT

C_2 From Composite Method
i.e. Roadway and undeveloped area above roadway

$$C_2 = \sum \frac{(0.12)(0.95)+(0.58)(0.50)}{0.70} = 0.56$$

$$C_{100} = \sum \frac{(0.12)(0.97)+(0.58)(0.58)}{0.70} = 0.65$$

$$T_{c_2} = \frac{1.87(1.1-0.55)(130)^{1/2}}{(29)^{1/3}} = 3.6, \text{ use } 5 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.65)(130)^{1/2}}{(29)^{1/3}} = 3 \text{ min, use } 5 \text{ min}$$

Trails P-F 4/

$I_2 = 1.95$, $I_{100} = 4.95$

$Q_2 = CIA = (0.58)(1.95)(0.70) =$ 0.8 CFS

$Q_{100} = CIA = (0.65)(4.95)(0.70) =$ 2.2 CFS

Summary For Design Point 1

BASIN/SUBBASIN	Area (Ac)	Q_{2H}	Q_{100H}	Q_{2D}	Q_{100D}
1	2.4	1.7	5.3	2.4	7.4
2A	3.6	2.6	7.9	3.6	11.1
2B	0.7	0.7	2.0	0.8	2.2
Totals	6.7	5.0	15.2	6.8	20.7

Trails P-F 5/1

Exterior Contribution

From Southeast Corner

Area = 2 Ac., Soil Class D
S = 5.3%

$$T_{c_2} = \frac{1.87(1.1-0.50)(300)^{1/2}}{(5.3)^{1/3}} = 11 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(300)^{1/2}}{5.3^{1/3}} = 10 \text{ min}$$

$I_2 = 1.46$, $I_{100} = 3.80$

$Q_2 = CIA = (0.50)(1.46)(2) = 1.5$ CFS
$Q_{100} = CIA = (0.58)(3.80)(2) = 4.4$ CFS

From Southwest Corner

Area = 0.70 Ac, Soil Class D, S = 9.4%

$$T_{c_2} = \frac{1.87(1.1-0.50)(300)^{1/2}}{(9.4)^{1/3}} = 9 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(300)^{1/2}}{(9.4)^{1/3}} = 8 \text{ min}$$

$I_2 = 1.59$, $I_{100} = 3.99$

$Q_2 = CIA = (0.50)(1.59)(0.7) = 0.6$ CFS

$Q_{100} = CIA = (0.58)(3.99)(0.7) = 1.6$ CFS

BASIN 2C
HISTORICAL & DEVELOPED
Area = 3.8 Ac, S = 33% ±, D = 300'
Soil Class D
$C_2 = 0.50$, $C_{100} = 0.58$

$$T_{c_2} = \frac{1.87(1.1-0.50)(200)^{1/2}}{(33)^{1/3}} = 4.9 \approx \text{use } 5 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(200)^{1/2}}{(33)^{1/3}} = 4.2, \text{ use } 5 \text{ min}$$

$I_2 = 1.95$, $I_{100} = 4.95$

$Q_2 = CIA = (0.50)(1.95)(3.8) = 3.7$ CFS
$Q_{100} = CIA = (0.50)(4.95)(3.8) = 9.4$ CFS

BASIN 2D
A = 3 Ac, S = 11.8% - Soil Class D

Historical

$$T_{c_2} = \frac{1.87(1.1-0.50)(220)^{1/2}}{(11.8)^{1/3}} = 7.3 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.58)(220)^{1/2}}{(11.8)^{1/3}} = 6.3 \text{ min}$$

$I_2 = 1.74$, $I_{100} = 4.65$

$Q_2 = CIA = (0.50)(1.74)(3) = 2.6$ CFS

$Q_{100} = CIA = (0.58)(4.65)(3) = 8.1$ CFS

BASIN 2D Cont.

AFTER DEVELOPMENT

$$C_2 = \sum \frac{(0.8)(0.95) + (2.2)(0.5)}{3} = 0.62$$

$$C_{100} = \sum \frac{(0.8)(0.97) + (2.2)(0.58)}{3} = 0.68$$

$$T_{c_2} = \frac{1.87(1.1 - 0.62)(220)^{1/2}}{(11.8)^{1/3}} = 5.8 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1 - 0.68)(220)^{1/2}}{(11.8)^{1/3}} = 5.1 \text{ min}$$

$I_2 = 1.83$, $I_{100} = 4.95$

$Q_2 = CIA = (0.62)(1.83)(3) = 3.4$ CFS

$Q_{100} = CIA = (0.68)(4.95)(3) = 10$ CFS

BASIN 3

Area = 2.9 Ac, Soil Class D, S = 6.7%

Historical

$$T_{c_2} = \frac{1.87(1.1 - 0.50)(300)^{1/2}}{(6.7)^{1/3}} = 10 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1 - 0.58)(300)^{1/2}}{(6.7)^{1/3}} = 19 \text{ min}$$

$I_2 = 1.52$, $I_{100} = 3.99$

BASIN 3 Cont.

$Q_2 = CIA = (0.50)(1.52)(2.9) = 2.2$ CFS

$Q_{100} = CIA = (0.58)(3.99)(2.9) = 6.7$ CFS

AFTER DEVELOPMENT

$$C_2 = \frac{\sum (0.35)(0.95) + (2.55)(0.50)}{2.9} = 0.55$$

$$C_{100} = \frac{\sum (0.35)(0.97) + (2.55)(0.58)}{2.9} = 0.63$$

$$T_{c_2} = \frac{1.87(1.1-0.55)(300)^{1/2}}{(6.7)^{1/3}} = 9 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.63)(300)^{1/2}}{(6.7)^{1/3}} = 8 \text{ min}$$

$I_2 = 1.59$, $I_{100} = 4.19$

$Q_2 = CIA = (0.55)(1.59)(2.9) = 2.4$ CFS

$Q_{100} = CIA = (0.62)(4.19)(2.9) = 7.5$ CFS

TRAILS AREA 4-1

Historical

Area = 7.3 Ac, S_{AVE} = 20%, Soil Class D

$$T_{c_2} = \frac{1.87(1.1-0.50)(200)^{1/2}}{(20)^{1/3}} = 5.8 \text{ min}$$

$$T_{c,100} = \frac{1.87(1.1-0.58)(200)^{1/2}}{(20)^{1/3}} = 5 \text{ min}$$

$I_2 = 1.83$, $I_{100} = 4.95$

$Q_2 = CIA = (0.50)(1.83)(7.3) = 6.7$ CFS

$Q_{100} = CIA = (0.58)(4.95)(7.3) = 21.0$ CFS

AFTER DEVELOPMENT

C from Composite method

$$C_2 = \sum \frac{(0.34)(0.95) + 0.50(6.96)}{7.3} = 0.52$$

$$C_{100} = \sum \frac{(0.34)(0.97) + (0.58)(6.96)}{7.3} = 0.60$$

$$T_{c_2} = \frac{1.87(1.1-0.52)(200)^{1/2}}{(20)^{1/3}} = 5.6 \text{ min}$$

$$T_{c,100} = \frac{1.87(1.1-0.60)(200)^{1/2}}{(20)^{1/3}} = 4.9 \text{ min} \Rightarrow \text{use } 5 \text{ min}$$

$I_2 = 1.87$, $I_{100} = 4.95$

$Q_2 = CIA = (0.52)(1.87)(7.3) = 7$ CFS

Q_{100} $CIA = (0.60)(4.95)(7.3) = 21.7$ CFS

Trails Area 4-2 19/

HISTORICAL

Area = 3.5 Ac, Soil Class A,
S = 3.3% $C_2 = 0.16$, $C_{100} = 0.26$

$$T_{c_2} = \frac{1.87(1.1-0.16)(180)^{1/2}}{(3.3)^{1/3}} = 16 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.26)(180)^{1/2}}{(3.3)^{1/3}} = 14 \text{ min}$$

$I_2 = 1.24$, $I_{100} = 3.33$

$Q_2 = CIA = (0.16)(1.24)(3.5) = 0.7$ CFS
$Q_{100} = CIA = (0.26)(3.33)(3.5) = 3.0$ CFS

AFTER DEVELOPMENT
Lowis ote $C_2 = 0.22$, $C_{100} = 0.32$

$$C_2 = \frac{\sum (1.2)(0.94) + (0.22)(2.3)}{3.5} = 0.47$$

$$C_{100} = \frac{\sum (1.2)(0.96) + (0.32)(2.3)}{3.5} = 0.53$$

$$T_{c_2} = \frac{1.87(1.1-0.47)(180)^{1/2}}{(3.3)^{1/3}} = 11 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.53)(180)^{1/2}}{(3.3)^{1/3}} = 10 \text{ min}$$

$I_2 = 1.46$, $I_{100} = 3.80$

$Q_2 = CIA = (0.47)(1.46)(3.5) = 2.4$ CFS

$Q_{100} = CIA = (0.53)(3.80)(3.5) = 7$ CFS

TRAILS P-F 111
BASIN 5

Area = 7.9 Ac, S = 2.6%
SOIL CLASS A

$$T_{c_2} = \frac{1.87(1.1-0.16)(300)^{1/2}}{(2.6)^{1/3}} = 22 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.26)(300)^{1/2}}{(2.6)^{1/3}} = 12 \text{ min}$$

$I_2 = 1.05$, $I_{100} = 3.5$

$Q_2 = CIA = (0.16)(1.05)(7.9) = 1.3$ CFS

$Q_{100} = CIA = (0.26)(3.5)7.9 = 7.3$ CFS

AFTER DEVELOPMENT

Pvmt, Roofs etc = 2.6 Ac
Lawn etc = 5.3 Ac

$$C_2 = \sum \frac{2.6(0.96) + 5.3(0.22)}{5.3} = 0.69$$

$$C_{100} = \sum \frac{2.6(0.97) + (5.3)(0.32)}{5.3} = 0.80$$

$$T_{c_2} = \frac{1.87(1.1-0.69)(300)^{1/2}}{(2.6)^{1/3}} = 10 \text{ min}$$

$$T_{c_{100}} = \frac{1.87(1.1-0.80)(300)^{1/2}}{(2.6)^{1/3}} = 7 \text{ min}$$

$I_2 = 1.52$, $I_{100} = 4.40$

$Q_2 = CIA = (0.69)(1.52)(5.3) = 5.6$ CFS
$Q_{100} = CIA = (0.80)(4.40)(5.3) = 18.6$ CFS

TR 20, 15

BASIN 6

AREA = 2.7 Ac, SOIL CLASS A

S_{AVE} = 2.6 %

HISTORICAL

$$T_{c_2} = \frac{1.87\,(1.1 - 0.16)(300)^{1/2}}{(2.6)^{1/3}} = 22 \text{ min}$$

$$T_{c_{100}} = \frac{1.87\,(1.1 - 0.26)(300)^{1/2}}{(2.6)^{1/3}} = 20 \text{ min}$$

$I_2 = 1.05$, $I_{100} = 2.84$

$Q_2 = CIA = (0.16)(1.05)(2.7) = 0.45$ CFS

$Q_{100} = CIA = (0.26)(2.84)(2.7) = 2$ CFS

AFTER DEVELOPMENT

Pavement, Roofs = 0.90 Ac

Lawns, etc = 1.8 Ac

$$C_2 = \frac{\Sigma\,(0.90)(0.94) + (0.22)(1.8)}{2.7} = 0.46$$

$$C_{100} = \frac{\Sigma\,(0.90)(0.96) + (0.32)(1.8)}{2.7} = 0.53$$

$$T_{c_2} = \frac{1.87\,(1.1 - 0.46)(300)^{1/2}}{(2.6)^{1/3}} = 15 \text{ min}$$

$$T_{c_{100}} = \frac{1.87\,(1.1 - 0.53)(300)^{1/2}}{(2.6)^{1/3}} = 13 \text{ min}$$

$I_2 = 1.28$, $I_{100} = 3.43$

$Q_2 = CIA = (0.46)(1.28)(2.7) = 1.5$ CFS

$Q_{100} = CIA = (0.53)(3.43)(2.7) = 4.9$ CFS

BASIN I TRAILS 131

AREA = 1.1 AC, SOIL Class A,
S = 2.6 %
HISTORICAL & DEVELOPED

$$T_{c_2} = \frac{1.87(1.1-0.16)(300)^{1/2}}{(2.6)^{1/3}} = 22 \text{ min}$$

$$T_{c_1} = \frac{1.87(1.1-0.26)(300)^{1/2}}{(2.6)^{1/3}} = 20 \text{ min}$$

$I_2 = 1.05$, $I_{100} = 2.84$

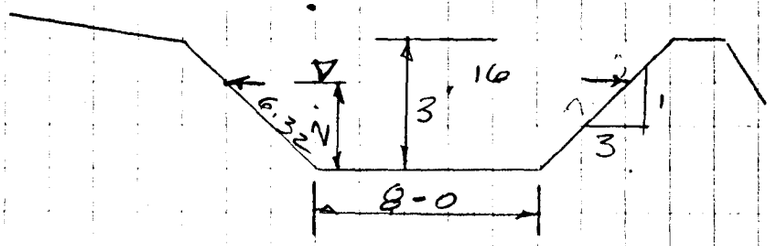
$Q_2 = CIA = (0.16)(1.05)(1.1) = 0.2$ CFS
$Q_{100} = CIA = (0.26)(2.84)(1.1) = 0.8$ CFS

TRAILS P-F 14/

SUMMARY

BASIN/ SUB-BASIN	AREA (AC.)	Q_{2H}	Q_{100H}	Q_{2D}	Q_{100D}
2-C	3.8	3.7	9.4	3.7	9.4
2-D	3.0	2.6	8.1	3.4	10.0
3	2.9	2.2	6.7	2.4	7.5
4-1	7.3	6.7	21.0	7	21.7
4-2	3.5	0.7	3.0	2.4	7.0
5	7.9	1.3	7.3	5.6	18.6
6	2.7	0.4	2.0	1.5	4.9
7	1.1	0.2	0.8	0.2	0.8
SUB-TOTALS	32.2	17.8	58.3	26.20	79.9
SUB-TOTAL From Page 4	6.7	5.0	15.2	6.8	20.7
Exterior Contribution (Page 5	2.7	2.1	6.0		
TOTALS	41.6	24.9	79.50	33.0	100.6

PROPOSED CHANNEL - NW Cor of Site



$P = 2(6.32) + 8 = 20.64$

$A = \frac{20+8}{2} \times 2 = 28$, $S = 1.5\%$

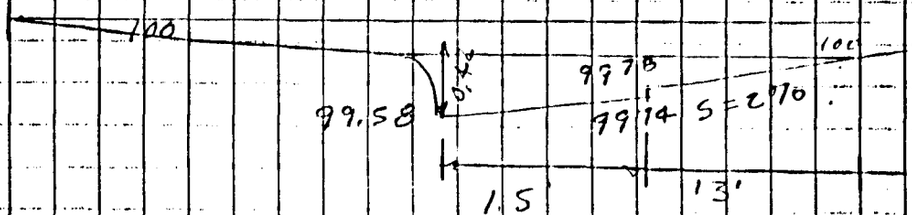
$R = \frac{A}{P} = \frac{28}{20.64} =$

$Q = \frac{1.49}{0.030} (1.36)^{2/3} (0.015)^{1/2} (28) = 209$ CFS

WITH 1 FOOT OF FREE BOARD

Street Section

Reference Elevation
Back of Walk.



½ STREET SECTION, min slope = 0.40%

Area = 0.42 × 0.42 × 0.5 = 3.50 FT.

$P \approx 14.42$, $R = A/P = \frac{3}{14.42} = 0.20$

$Q = \frac{1.49}{0.016} (0.20)^{2/3} (0.004)^{1/2} (3) = 6$ CFS

Total Street = 6 × 2 = 12 CFS

For 10' into yard at 2%

Total P = 2(14.42) + 8(2) + 20 = 64.84'

A = 0.20 × 64 = 12.8 + 6 = 18.8 ft²

$R = \frac{A}{P} = \frac{18.8}{64.4} = 0.29$

$Q = \frac{1.49}{0.030} (0.29)^{2/3} (0.004)^{1/2} (18.8) = 26$ CFS

TABLE "A-1"
INTENSITY-DURATION-FREQUENCY (IDF) TABLE

Time (min)	2-Year Intensity (in/hr)	100-Year Intensity (in/hr)	Time (min)	2-Year Intensity (in/hr)	100-Year Intensity (in/hr)
5	1.95	4.95	33	0.83	2.15
6	1.83	4.65	34	0.82	2.12
7	1.74	4.40	35	0.81	2.09
8	1.66	4.19	36	0.80	2.06
9	1.59	3.99	37	0.79	2.03
10	1.52	3.80	38	0.78	2.00
11	1.46	3.66	39	0.77	1.97
12	1.41	3.54	40	0.76	1.94
13	1.36	3.43	41	0.75	1.91
14	1.32	3.33	42	0.74	1.88
15	1.28	3.24	43	0.73	1.85
16	1.24	3.15	44	0.72	1.82
17	1.21	3.07	45	0.71	1.79
18	1.17	2.99	46	0.70	1.76
19	1.14	2.91	47	0.69	1.73
20	1.11	2.84	48	0.68	1.70
21	1.08	2.77	49	0.67	1.67
22	1.05	2.70	50	0.66	1.64
23	1.02	2.63	51	0.65	1.61
24	1.00	2.57	52	0.64	1.59
25	0.98	2.51	53	0.63	1.57
26	0.96	2.46	54	0.62	1.55
27	0.94	2.41	55	0.61	1.53
28	0.92	2.36	56	0.60	1.51
29	0.90	2.31	57	0.59	1.49
30	0.88	2.27	58	0.58	1.47
31	0.86	2.23	59	0.57	1.45
32	0.84	2.19	60	0.56	1.43

Source: Mesa County 1991

LAND USE OR SURFACE CHARACTERISTICS	SCS HYDROLOGIC SOIL GROUP (SEE APPENDIX "C" FOR DESCRIPTIONS)											
	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
UNDEVELOPED AREAS												
Bare ground	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .40 - .48	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Cultivated/Agricultural	.08 - .18 .14 - .24	.13 - .23 .18 - .28	.16 - .26 .22 - .32	.11 - .19 .16 - .24	.15 - .23 .21 - .29	.21 - .29 .28 - .36	.14 - .22 .20 - .28	.19 - .27 .25 - .33	.26 - .34 .34 - .42	.18 - .26 .24 - .32	.23 - .31 .29 - .37	.31 - .39 .41 - .49
Pasture	.12 - .22 .15 - .25	.20 - .30 .25 - .35	.30 - .40 .37 - .47	.18 - .26 .23 - .31	.28 - .36 .34 - .42	.37 - .45 .45 - .53	.24 - .32 .30 - .38	.34 - .42 .42 - .50	.44 - .52 .52 - .60	.30 - .38 .37 - .45	.40 - .48 .50 - .58	.50 - .58 .62 - .70
Meadow	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .44 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Forest	.05 - .15 .08 - .18	.08 - .18 .11 - .21	.11 - .21 .14 - .24	.08 - .16 .10 - .18	.11 - .19 .14 - .22	.14 - .22 .18 - .26	.10 - .18 .12 - .20	.13 - .21 .16 - .24	.16 - .24 .20 - .28	.12 - .20 .15 - .23	.16 - .24 .20 - .28	.20 - .28 .25 - .33
RESIDENTIAL AREAS												
1/8 acre per unit	.40 - .50 .48 - .58	.43 - .53 .52 - .62	.46 - .56 .55 - .65	.42 - .50 .50 - .58	.45 - .53 .54 - .62	.50 - .58 .59 - .67	.45 - .53 .53 - .61	.48 - .56 .57 - .65	.53 - .61 .64 - .72	.48 - .56 .56 - .64	.51 - .59 .60 - .68	.57 - .65 .69 - .77
1/4 acre per unit	.27 - .37 .35 - .45	.31 - .41 .39 - .49	.34 - .44 .42 - .52	.29 - .37 .38 - .46	.34 - .42 .42 - .50	.38 - .46 .47 - .55	.32 - .40 .41 - .49	.36 - .44 .45 - .53	.41 - .49 .52 - .60	.35 - .43 .43 - .51	.39 - .47 .47 - .55	.45 - .53 .57 - .65
1/3 acre per unit	.22 - .32 .31 - .41	.26 - .36 .35 - .45	.29 - .39 .38 - .48	.25 - .33 .33 - .41	.29 - .37 .38 - .46	.33 - .41 .42 - .50	.28 - .36 .36 - .44	.32 - .40 .41 - .49	.37 - .45 .48 - .56	.31 - .39 .39 - .47	.35 - .43 .43 - .51	.42 - .50 .53 - .61
1/2 acre per unit	.16 - .26 .25 - .35	.20 - .30 .29 - .39	.24 - .34 .32 - .42	.19 - .27 .28 - .36	.23 - .31 .32 - .40	.28 - .36 .36 - .44	.22 - .30 .31 - .39	.27 - .35 .35 - .43	.32 - .40 .42 - .50	.26 - .34 .34 - .42	.30 - .38 .38 - .46	.37 - .45 .48 - .56
1 acre per unit	.14 - .24 .22 - .32	.19 - .29 .26 - .36	.22 - .32 .29 - .39	.17 - .25 .24 - .32	.21 - .29 .28 - .36	.26 - .34 .34 - .42	.20 - .28 .28 - .36	.25 - .33 .32 - .40	.31 - .39 .40 - .48	.24 - .32 .31 - .39	.29 - .37 .35 - .43	.35 - .43 .46 - .54
MISC. SURFACES												
Pavement and roofs	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97	.93 .95	.94 .96	.95 .97
Traffic areas (soil and gravel)	.55 - .65 .65 - .70	.60 - .70 .70 - .75	.64 - .74 .74 - .79	.60 - .68 .68 - .76	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.64 - .72 .72 - .80	.67 - .75 .75 - .83	.69 - .77 .77 - .85	.72 - .80 .79 - .87	.75 - .83 .82 - .90	.77 - .85 .84 - .92
Green landscaping (lawns, parks)	.10 - .20 .14 - .24	.16 - .26 .22 - .32	.25 - .35 .30 - .40	.14 - .22 .20 - .28	.22 - .30 .28 - .36	.30 - .38 .37 - .45	.20 - .28 .26 - .34	.28 - .36 .35 - .43	.36 - .44 .42 - .52	.24 - .32 .30 - .38	.30 - .38 .40 - .48	.40 - .48 .50 - .58
Non-green and gravel landscaping	.30 - .40 .34 - .44	.36 - .46 .42 - .52	.45 - .55 .50 - .60	.45 - .55 .50 - .60	.42 - .50 .48 - .56	.50 - .58 .57 - .65	.40 - .48 .46 - .54	.48 - .56 .55 - .63	.56 - .64 .64 - .72	.44 - .52 .50 - .58	.50 - .58 .60 - .68	.60 - .68 .70 - .78
Cemeteries, playgrounds	.20 - .30 .24 - .34	.26 - .36 .32 - .42	.35 - .45 .40 - .50	.35 - .45 .40 - .50	.32 - .40 .38 - .46	.40 - .48 .47 - .55	.30 - .38 .36 - .44	.38 - .44 .45 - .53	.46 - .54 .54 - .62	.34 - .42 .40 - .48	.40 - .48 .50 - .58	.50 - .58 .60 - .68

NOTES:

1. **Values above and below pertain to the 2-year and 100-year storms, respectively.**
2. **The range of values provided allows for engineering judgement of site conditions such as basic shape, homogeneity of surface type, surface depression storage, and storm duration. In general, during shorter duration storms (Tc ≤ 10 minutes), infiltration capacity is higher, allowing use of a "C" value in the low range. Conversely, for longer duration storms (Tc) 30 minutes), use a ""C value in the higher range.**
3. **For residential development at less than 1/8 acre per unit or greater than 1 acre per unit, and also for commercial and industrial areas, use values under MISC SURFACES to estimate "C" value ranges for use.**

RATIONAL METHOD RUNOFF COEFFICIENTS

(Modified from Table 4, UC-Davis, which appears to be a modification of work done by Rawls)

TABLE "B-1"

6/15/93

REVISED DRAINAGE CALCULATIONS: BASED ON SOUTH CAMP MEADOW DESIGN USING CIMARRON SUBDIVISION DRAINAGE REPORT

BASIN 1 (ON-SITE RUNOFF)

A = 31.4 Acres
C = Composite: 5 lots @ C = 0.95 (3,000 S.F. Ea. - Roof/Drive)
and C = 0.15 (1,500 S.F. Ea. - Lawn)

$$= \frac{5(3000)\ (0.95) + 5(1500)\ (0.15) + 30.1\ (43{,}560)\ (0.40)}{31.4\ (43560)}$$

= 0.39 (developed)

Time of Concentration: (unchanged from Historic) = 35 minutes
Rainfall Intensity: (unchanged), I_{10} = 1.3, I_{100} = 2.1

Q_{10} = 0.39 (1.3) (31.4) = 15.92 CFS
Q_{100} = 1.25 (0.39) (2.1) (31.4) = 32.145 CFS

BASIN 2: (ON-SITE RUNOFF)

A = 15.5 Acres
C = Composite: 16 lots @ C = 0.95 (3000 S.F. - Roof/ Drive)
and C = 0.15 (1500 S.F. - lawn)
and C = 0.95 (1287 L.F. x 22' - Road)

$$= \frac{16(3000)(0.95) + 16(1500)(0.15) + 1287(22)(0.95) + 10.9(43560)(0.40)}{15.5\ (43560)}$$

= 0.39 (developed)

Rainfall Intensity:
I_{10} = 1.6 in./hr.
I_{100} = 2.4 in./hr.

Q_{10} = 0.39 (1.6) (15.5) = 9.6 CFS
Q_{100} = 1.25 (0.39) (2.4) (15.5) = 18.1 CFS

RUNOFF COMPARISONS:

	Historic CFS	Developed CFS	Impact
Basin 1_{10}	16.3	15.9	- 0.4
Basin 1_{100}	33.0	32.1	- 0.9
Basin 2_{10}	7.6	9.6	+ 2.0
Basin 2_{100}	14.9	18.1	+ 3.2

In Basin 1, the developed flows are actually reduced below historic levels. In Basin 2, developed flows marginally increased above historic levels.

We have designed a menu of detention/conveyance facilities to detain drainage by three different methods (see attached map):

1. 1' deep swales as part of the roadway design (C) with driveways serving as check dams
2. detention basin (B) north of South Camp Court, east of South Camp Road (0.75' deep)
3. detention basin (A) south of South Camp Court, east of South Camp Road (0.75' deep)

The approximate capacity of these basins are:

Basin A = 33,750 C.F.
Basin B = 28,125 C.F.
Basin C = 14,200 C.F

Total on-site capacity for detention = 76,075 C.F.

The detention/conveyance facilities designed provide approximately 16 times that needed for a 100-year storm and 25 times the area needed for a 10-year storm.

100-year storm = 4800 C.F.
10-year storm = 3000 C.F

Therefore, South Camp Meadow detains on-site developed flows in addition to portions of Historic flows. In this way the flows eventually released to the north at the Historic location will be less than Historic levels, and will actually reduce the impact of drainage on downstream neighbors.

DRAINAGE - A detail drainage report has been submitted to the Mesa County Engineering and Planning Departments. The report indicates the subject property is influenced by a 580-acre off-site drainage basin. This basin originates from a small canyon west of Red Canyon in the Colorado National Monument. The drainage flows southerly to Buffalo Drive and South Camp Road, at which point it flows northerly along the west side of South Camp to the Redlands 2nd Lift Canal. The canal intercepts some of the runoff generated within the basin. However, in the event of a major storm the generated storm water breaches the canal and continues to flow northerly several hundred feet to an existing box culvert under South Camp, at which point the storm water splits. About 1/2 of the total flow will enter the subject property. Over the years, a previously existing channel has been filled and creates sheet flow type flooding. The storm water leaves the subject property in a swale at the north property line about 300 feet east of South Camp. The aforementioned Drainage Report estimates that approximately 84 cfs of off-site storm water would affect the property in the event of a 100-year frequency storm. Further, the report estimates that in its current state the site itself generates 33.0 cfs and 14.9 cfs from two distinct basins found on the property during a 100-year frequency storm.

MESA COUNTY LAND USE POLICIES

In 1982, the Board of County Commissioners adopted Land Use Policies as a portion of their Comprehensive Master Plan. These policies have been updated and amended seven times since their initial adoption. Of the 32 total policies, 21 appear to apply to the subject site. These policies generally address issues such as utility service, vehicular access and other site development standards.

Policies which appear to have direct effect on the future development of South Camp Meadow follow:

Policy Section No.	Title
1	Introduction.
2	Availability of drinking water in new subdivisions and other developments.
3	Minimum fire flows.
4	Fire response time.

6/15/93

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$$= \frac{5(3000)\ (0.95) + 5(1500)\ (0.15) + 30.1\ (43{,}560)\ (0.40)}{31.4\ (43560)}$$

= 0.39 (developed)

Time of Concentration: (unchanged from Historic) = 35 minutes
Rainfall Intensity: (unchanged), I_{I} = 1.3, I_{II} = 2.1

Q_{I} = 0.39 (1.3) (31.4) = 15.92 CFS
Q_{II} = 1.25 (0.39) (2.1) (31.4) = 32.145 CFS

BASIN 2: (ON-SITE RUNOFF)

A = 15.5 Acres
C = Composite: 16 lots @ C = 0.95 (3000 S.F. - Roof/ Drive)
and C = 0.15 (1500 S.F. - lawn)
and C = 0.95 (1287 L.F. x 22' - Road)

$$= \frac{16(3000)(0.95) + 16(1500)(0.15) + 1287(22)(0.95) + 10.9(43560)(0.40)}{15.5\ (43560)}$$

= 0.39 (developed)

Rainfall Intensity:
$I_{1\text{I}}$ = 1.6 in./hr.
$I_{1\text{II}}$ = 2.4 in./hr.

Q_{I} = 0.39 (1.6) (15.5) = 9.6 CFS
Q_{II} = 1.25 (0.39) (2.4) (15.5) = 18.1 CFS

RUNOFF COMPARISONS:

	Historic CFS	Developed CFS	Impact
Basin 1_{I}	16.3	15.9	- 0.4
Basin 1_{II}	33.0	32.1	- 0.9
Basin 2_{I}	7.6	9.6	+ 2.0
Basin 2_{II}	14.9	18.1	+ 3.2

In Basin 1, the developed flows are actually reduced below historic levels. In Basin 2, developed flows marginally increased above historic levels.

We have designed a menu of detention/conveyance facilities to detain drainage by three different methods (see attached map):

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100-year storm = 4800 C.F.
10-year storm = 3000 C.F

Therefore, South Camp Meadow detains on-site developed flows in addition to portions of Historic flows. In this way the flows eventually released to the north at the Historic location will be less than Historic levels, and will actually reduce the impact of drainage on downstream neighbors.

WESTERN
COLORADO
TESTING,
INC.

PRELIMINARY GEOTECHNICAL INVESTIGATION FOR SOUTH CAMP MEADOW SUBDIVISION A PORTION OF SW 1/4, SW 1/4, SECTION 18, T1S, R1W, UTE MERIDIAN MESA COUNTY, COLORADO

Prepared For:

Dave Wens
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(970) 241-7700

August 2, 1995
Job No. 202795

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of the preliminary geotechnical investigation performed at the site of a proposed approximate 40 acre subdivision to be located in a portion of the southwest quarter of the southwest quarter and a small strip along the southern edge of the northwest quarter of the southwest quarter, Section 18, Township 1 south, Range 1 west of the Ute Meridian, Mesa County, Colorado. This investigation was authorized by Mr. Dave Wens on July 6, 1995.

Included in this investigation were test borings and a report of our conclusions and recommendations. The scope of our report was limited to the following:

- Evaluating the engineering properties of the subsoils encountered.
- Recommending types and depths of foundation elements.
- Evaluating soil bearing capacity and estimated settlement.
- Presenting recommendations for earthwork and soils related construction with respect to the subsoils encountered.

This report was prepared by the firm of Western Colorado Testing, Inc. (WCT) under the supervision of a professional engineer registered in the state of Colorado. Recommendations are based on the applicable standards of the profession at the time of this report within this geographic area. This report has been prepared for the exclusive use of Mr. Dave Wens and the owners, for the specific application to the proposed project in accordance with generally accepted geotechnical engineering practices.

The scope of this investigation did not include any environmental assessment for the presence of hazardous or toxic materials in the soil or groundwater on or near this site. If contamination is a concern, it is recommended an environmental assessment be performed.

SITE CONDITIONS

The site is bounded on the west by South Camp Road followed by farm ground. To the northwest is residential housing. To the north east and south sides is vacant ground except at the north west and south west corners of the property. At these corners there is a residential structure adjacent the subject property. The Redlands Second Lift Canal meanders diagonally across the property from near the southwest to near the northeast corners. The lower approximately two thirds of the canal is concrete lined. To the east is a mesa with exposed rock. The east side of the property has been designated a no build zone due to geologic rock hazard. Just off the property to the southeast is some water storage tanks. These tanks are up on the mesa with water lines crossing the south end of the property. Along the south end of the property, near the southwest corner is an embankment of a pond. At the time of our field investigation the pond was dry.

The site presently consists of vacant ground with native grasses and brush. The site is generally sloped to the north in the proposed development area, with grades on the order of 3 to 6 percent. The site will need to be graded to provide good surface drainage around and away from the proposed structures.

PROPOSED CONSTRUCTION

The proposed construction will consist of single family dwellings. The proposed residences will be of conventional wood framing with siding or brick veneer. The structures are planned

to be built over reinforced concrete foundations, without basements. Light foundation loads are anticipated.

FIELD EXPLORATION

The field investigation was conducted on July 17, 1995. The exploratory program consisted of three (3) soil borings as shown on the Boring Location Plan (Appendix, Figure 1). Borings were located in the field by pacing distances from features shown on the boring location plan. The location of the borings should be considered accurate only to the degree implied by the method used.

Test borings were advanced to depths of approximately 13 3/4 to 18 1/2 feet with a truck-mounted CME-75 soil sampling rig using four inch continuous flight augers. Borings remained open during drilling, and stabilization drilling methods were not required within the depths investigated.

Soil samples were obtained at the sampling intervals shown on the Boring Logs (Appendix, Figures 2 through 4). Recovered samples were extracted in the field, sealed in plastic or brass containers, labeled and protected for transportation to the laboratory for testing. Split barrel samples were obtained while performing standard Penetration Tests (SPT) driven in general accordance with ASTM D-1586, "Penetration Test and Split Barrel Sampling of Soils". The N-Value, reported in blows per foot, equals the number of blows required to drive the sampler over the last 12 inches of the sample interval.

Stratification lines represent the approximate boundary between soil types, and the transition may be gradual.

LABORATORY TESTING

The field boring logs were reviewed to outline the depths, thicknesses, and extent of the soil strata, and a testing program was established to evaluate the engineering properties of the recovered samples. Specific tests that were performed include moisture contents, particle size analysis, Atterberg limits, and soluble sulfate tests. These tests were performed in general accordance with current ASTM or state-of-the-art test procedures. The test results are presented on Figures 5 through 9.

Based on the results of this testing program the field logs were reviewed and supplemented as presented in the Appendix, Figures 2 through 4. These final logs represent our interpretation of the field logs, and reflect the additional information gained in the laboratory testing program.

SUBSURFACE CONDITIONS

As shown on the boring logs, Appendix, Figures 2 through 4, the subsurface conditions encountered at the site are fairly uniform. Generally, the soils encountered in the borings consisted of silty fine grained sand material followed by gravelly sand to sand and gravel with cobbles. Water was encountered in boring TH-2 at the time of drilling at a depth of 13 feet and was measured in all the borings, seven days following drilling at depths of 14′-4", 12′-0", and 10′-0" in boring TH-1, TH-2 and TH-3, respectively.

The surface material was a silty, fine grained sand which was dry to slightly moist and brown to reddish brown in color. The upper 1 to 3 feet was loose, while below these depths penetration tests indicate the silty sand is medium dense. Below the silty sand in test boring TH-2 was interbedded layers of sandy clay and clayey sand to a depth of 12 feet. These

overburden soils were slightly moist becoming more moist with depth to moist to very moist and was reddish brown in color. Penetration tests indicate the sandy clays to clayey sands are very stiff to medium dense. Underlaying the interbedded materials was a gravelly, medium grained sand which was wet and reddish brown in color. A penetration test indicates the gravelly sand is dense. The gravelly sand material extended to a maximum depth explored, in boring TH-2, 18½ feet. In borings TH-1 and TH-3, the upper silty sand was overlying, at a depth of 5 to 6 1/2 feet, a silty, sand, gravel and cobble material which was moist to wet and reddish brown to brown in color. Penetration tests indicated the sand, gravel and cobble material is medium dense to dense. The sand, gravel and cobble material extended to the maximum depth explored, 18 1/2 feet.

CONCLUSIONS AND RECOMMENDATIONS

In general, this site is considered suitable for the proposed construction. The subsoils encountered at the anticipated depth of foundations are generally capable of supporting the anticipated loads, within the design parameters discussed as follows.

FOUNDATIONS

The borings indicate some loose silty sand exists, varying in depth and location. Depending on construction some sites may need to be over excavated and replaced with new structural fill. The depth of structural fill needed will depend on site conditions and bearing depths. In addition, some sandy clays were encountered. The clayey soils at the site are low plastic soils with little or no expansive potential. Generally, based on the site and subsurface conditions encountered, in the borings, we recommend the proposed residences be founded on

conventional spread footings bearing on the natural soils, exclusive of topsoil, or new structural fill.

The following design and construction details should be observed for spread footing foundation systems.

- Footings placed on the natural soils or new structural fill should be designed for allowable soil bearing pressures as follows:

    - silty sands (below 1 1/2') 1500 psf
    - sand and gravel with cobbles 3500 psf
    - structural fill 3000 psf

  The top 12 inches of silty sand should be moisture conditioned to (±)2% of optimum moisture and compacted to a minimum of 95% of ASTM D-698 prior to placing footings. All footings should be proportioned as much as practicable to minimize differential settlement.

- Structural fill placed for support of footings should consist of a granular, non-expansive, non-free draining, material compacted to a minimum 95% of the maximum Standard Proctor density (ASTM D-698) at a moisture content (±) 2% of optimum. Structural fill should extend down from the bottom of the footings at a one horizontal to one vertical projection.

- We estimate total settlement for footings designed and constructed as discussed in this section will be one inch or less, which is generally considered acceptable and was used in our analysis.

- Exterior footings and footings in unheated areas should extend to below the frost depth. The local building codes

should be consulted, however we would recommend a minimum depth of 24 inches.

- Continuous foundation walls should be reinforced top and bottom to span an unsupported length of at least ten (10) feet.

- All loose or disturbed material encountered at the foundation bearing level should be removed or compacted to a minimum 95% of ASTM D-698.

- A representative of the geotechnical engineer should observe all foundation excavations prior to the placement of fill and concrete.

LATERAL EARTH PRESSURES

Foundation walls are normally designed to be fairly rigid (unyielding), and should therefor be designed for "at rest" lateral soil pressures. Backfill consisting of the existing soils should be designed to resist an "at rest" (k_0) lateral earth pressure corresponding to an equivalent fluid pressure (EFP) of at least 50 pounds per cubic foot. Walls which are separate from structures and can rotate sufficiently to develop active conditions can be designed to resist a lateral earth pressure corresponding to an equivalent fluid pressure of 40 pcf. These lateral earth pressures do not include sloped backfill, surcharge loads or hydrostatic pressures.

FLOOR SLABS

The natural soils, exclusive of topsoil, are suitable for support of slab-on-grade construction. The following construction details will help mitigate slab movement and should be observed for slab-on-grade construction.

- Floor slabs should be separated from all bearing walls, columns and utility lines with an expansion joint which allows unrestrained vertical movement.

- Floor slabs should be provided with control joints to reduce damage due to shrinkage cracking.

- The top 12 inches of dry silty sands should be moisture conditioned to (±)2% of optimum and recompacted to minimum 95% of ASTM D-698.

- The risk of slab movement could be reduced by removing all clay encountered within 3 feet below the slabs and replacing it with structural fill.

- All fill placed below the slabs should consist of non-expansive, granular material compacted to at least 95 percent of the maximum standard Proctor density at a moisture content (±)2% of optimum.

WATER SOLUBLE SULFATES

A sample of the on site soils from test boring TH-1 at a depth 8½ to 9½ feet was tested to determine the concentration of water soluble sulfates. The test results indicate a sulfate content of less than 50 ppm. This concentration of water soluble sulfates represents a negligible degree of sulfate attack on concrete exposed to these materials. Based on the test results, sulfate resistant cement is not indicated. However, if imported fill is anticipated or used we would recommend a sulfate, resistant cement, Type I-II or Type II be used in all concrete exposed to the soils.

PERIMETER DRAIN SYSTEM

Water was encountered at a depth that should not affect the proposed construction. Another source of water is from

excessive irrigation and poor surface drainage. In the event good surface drainage cannot be provided away from foundation members, a drain system should be provided around exterior foundation walls. The perimeter drain system should be placed at or below the footing level and typically consist of a perforated 4 inch diameter drain pipe surrounded by at least one pipe diameter of free draining gravel. The gravel should extend to the top of the footing or above and should be completely wrapped in a filter fabric. The drain lines should be graded to daylight or to a sump where the water can be removed by pumping. A minimum slope of 1 percent should be used for all drain pipe. The gravel used in the drain system should be minus 2 inch material having less than 20 percent passing the No. 4 sieve and less than 5 percent passing the No. 200 sieve.

SURFACE DRAINAGE AND LANDSCAPING

The success of shallow foundation and slab-on-grade systems is contingent upon keeping the subgrade soils at a more or less constant moisture content, and by not allowing surface drainage a path to the subsurface. Positive surface drainage away from structures must be maintained at all times. Landscaped areas should be designed and built such that irrigation and other surface water will be collected and carried away from foundation elements.

The final grade of the foundations backfill and any overlying concrete slabs or sidewalks should have a positive slope away from foundation walls on all sides. We recommend a minimum slope of 8 inches in the first 10 feet; however, the slope can be decreased if the ground surface adjacent to foundations is covered with concrete slabs or sidewalks.

Backfill material should be placed near optimum moisture content and compacted to at least 90% of maximum standard Proctor density in landscaped areas and to at least 95% maximum standard

Proctor density beneath structural areas (sidewalks, patios, driveways, etc.). All roof downspouts and faucets should discharge well beyond the limits of all backfill. Irrigation within ten (10) feet of foundations should be carefully controlled and minimized.

GENERAL

In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analysis and recommendations submitted in this report are based in part upon the data obtained from the three (3) soil borings. The nature and extent of variation between the borings may not become evident until construction. If variations then appear, it will be necessary to reevaluate the recommendations in this report.

It is recommended that the geotechnical engineer be provided the opportunity for general review of the final designs and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the designs and specifications. It is also recommended that the geotechnical engineer be retained to provide continuous engineering services during construction of the foundations, excavations, and earthwork phases of the work. This is to observe compliance with the design concepts, specifications, or recommendations and to modify these recommendations in the event that subsurface conditions differ from those anticipated.

Respectfully Submitted,
WESTERN COLORADO TESTING, INC.

Gary L. Hamacher, P.E.
Senior Geotechnical Engineer

APPENDIX

WESTERN COLORADO TESTING, INC.

Job No. 2795
Date 8-2-95
Project South Camp Meadow Subdivision
Location Mesa County, Colorado

BORING LOCATION PLAN

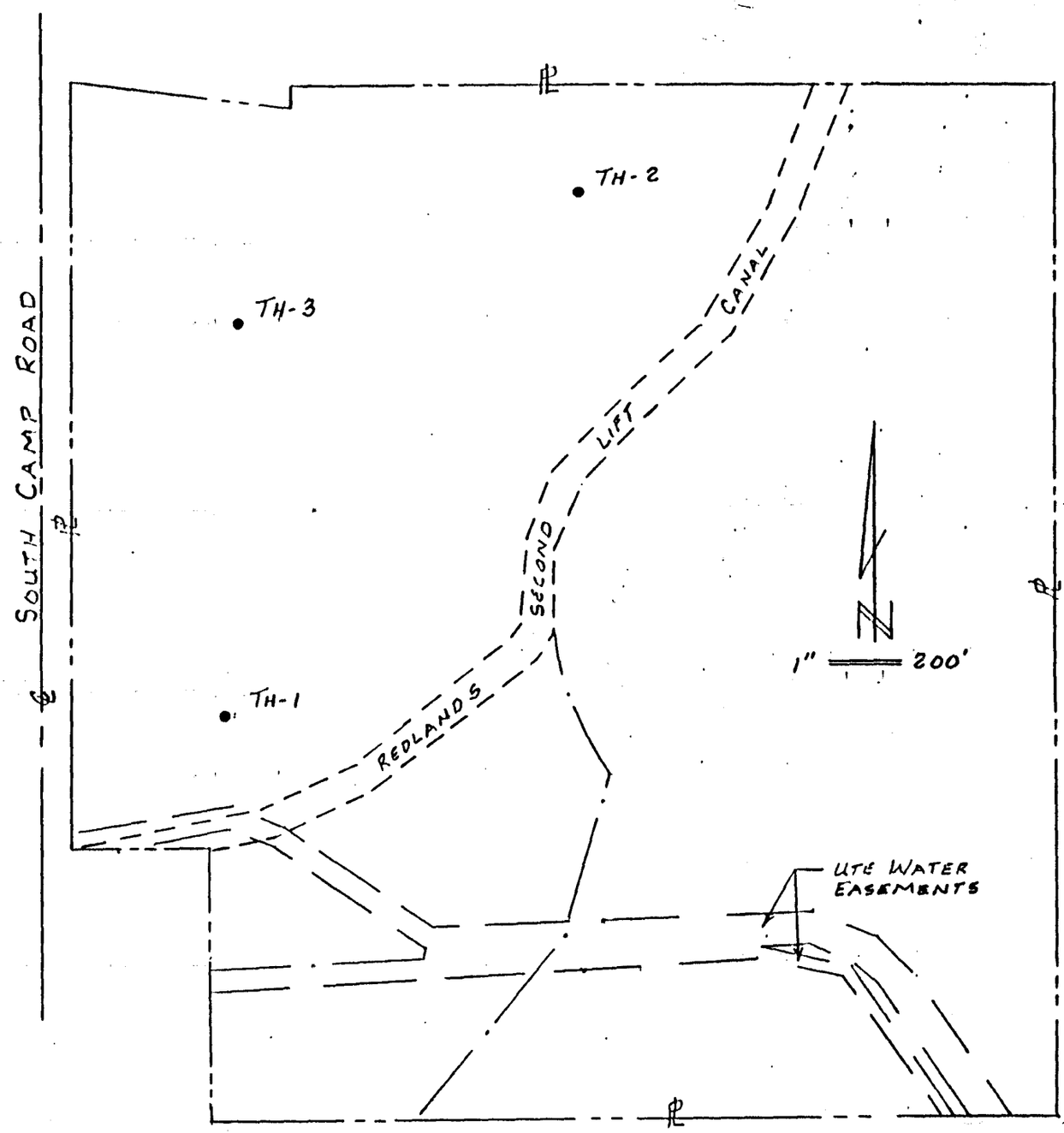


Figure 1

WESTERN COLORADO TESTING, INC.

Project Sou Camp Meadow Subdivision
Location Mesa County, Colorado
Job No 202795 Date 7-17-95

BORING LOG

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	DRILLER	LOGGER
TH-1	See Boring Location Plan	---	---	D. Smith	G. Hamacher

WATER LEVEL OBSERVATIONS				TYPE OF SURFACE	DRILL RIG
				Native Grasses & Brush	CME-75
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	7 DAYS	DRILLING METHOD	TOTAL DEPTH
None			14'-4"	4" Cont. Flight Auger	18 1/2'

DEP. FT	SAMPLE DATA: SAMPLE NO. & TYPE	"N" BLOWS /FT	% REC.	SOIL DESCRIPTION: COLOR	MOIST	CONS.	GEOLOGIC DESCRIPTION & OTHER REMARKS	LABORATORY DATA: % MC	DRY DENS pcf	qu tsf	CLASS	DEP. FT
0				reddish brown	slightly moist	loose	SAND, fine grained, silty					0
						medium dense		4.6				
5	SP-1	22	100									5
				reddish brown to brown	slightly moist	dense	Sand & gravel with cobbles					
10	SP-2	55	100		moist		hard rock at 9' - 10'	11.0				10
15	SP-3	50	100									15
							B.O.H. AT 18 1/2'					
20												20
25												25

Figure 2

WESTERN COLORADO TESTING, INC.

Project Sou Camp Meadow Subdivision
Location Mesa County, Colorado
Job No 202795 Date 7-17-95

BORING LOG

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	DRILLER	LOGGER
TH-2	See Boring Location Plan	---	---	D. Smith	G. Hamacher

WATER LEVEL OBSERVATIONS				TYPE OF SURFACE	DRILL RIG
				Native Grasses & Brush	CME-75
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	7 DAYS	DRILLING METHOD	TOTAL DEPTH
13'			12'-0"	4" Cont. Flight Auger	18 1/2'

DEP. FT	SAMPLE DATA: SAMPLE NO. & TYPE	"N" BLOWS /FT	% REC.	SOIL DESCRIPTION: COLOR	MOIST	CONS.	GEOLOGIC DESCRIPTION & OTHER REMARKS	LABORATORY DATA: % MC	DRY DENS pcf	qu tsf	CLASS	DEP. FT
				brown / reddish brown	dry / slightly moist	loose / stiff to very stiff	TOP SOIL, sand, silty CLAY, sandy to SAND clayey					
	SP-1	29	100						5.5		LL=26 PI=13 CL	
5				reddish brown	moist	medium dense	SAND, fine grained, clayey					5
				reddish brown	moist to very moist	very stiff	CLAY, sandy					
	SP-2	29	100						12.0			
10							Some Cobbles at 11' - 12'					10
				reddish brown	very moist / wet	medium dense to dense	SAND, medium grained, gravelly					
	SP-3	36	100									
15												15
							B.O.H. at 18 1/2'					
20												20
25												25

Figure 3

WESTERN COLORADO TESTING, INC.

Project Sou Camp Meadow Subdivision
Location Mesa County, Colorado
Job No 202795 Date 7-17-95

BORING LOG

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	DRILLER	LOGGER
TH-3	See Boring Location Plan	---	---	D. Smith	G. Hamacher

WATER LEVEL OBSERVATIONS				TYPE OF SURFACE	DRILL RIG
				Native Grasses & Brush	CME-75
WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	7 DAYS	DRILLING METHOD	TOTAL DEPTH
None			10'-0"	4" Cont. Flight Auger	13'-9"

DEP. FT	SAMPLE DATA			SOIL DESCRIPTION				LABORATORY DATA				DEP. FT
	SAMPLE NO. & TYPE	"N" BLOWS /FT	% REC.	COLOR	MOIST	CONS.	GEOLOGIC DESCRIPTION & OTHER REMARKS	% MC	DRY DENS pcf	qu tsf	CLASS	
0				reddish brown	dry	loose	SAND, fine grained, silty					0
						medium dense	some gravel at 2'	4.1				
	SP-1	23	100						moisture content of sample			
5				brown	moist	medium dense to dense	Sand & Gravel, some cobbles					5
							with lenses of fine grained, silty sand					
	SP-2	22	100		moist to very moist							
10							Boulder at 13 1/2'					10
15							Auger Refusal at 13'-9"					15
20												20
25												25

Figure 4

WESTERN COLORADO TESTING, INC.
529 25½ Road, Suite B-101
Grand Junction, CO 81505
(303) 241-7700

LABORATORY REPORT

PHYSICAL PROPERTIES OF SOILS

Client Dave Wens

Job No. 202795
Lab/Invoice No. ____
Date 8-2-95
Reviewed By ____

Project South Camp Meadow Subdivision
Location Mesa County, Colorado — Sampled By G. Hamacher — Date 7-17-95
Type of Material Sand, silty — Submitted By G. Hamacher — Date 7-18-95
Source of Material TH-1 @ 3½ - 5' — Authorized By Client — Date 7-6-95

Sieve Analysis, ASTM D422-

Sieve Size	% Passing Accumulative	Specification
3"		
2½"		
2"		
1½"		
1"		
¾"		
½"		
⅜"	100	
¼"	-	
No. 4	100	
8	99	
10	99	
16	99	
30	97	
40	96	
50	92	
100	47	
Finer than 200 ASTM D1140-	24.0	

Soil Classification

Liquid Limit and Plasticity of Soils ASTM D424- LL = ____ PI = ____

Moisture - Density Relations ☐ ASTM D698- ; ☐ ASTM D1557- ; Method ____ Maximum Dry Density, pcf ____ Optimum Moisture, % ____

Specific Gravity of Soils (minus No. 4 material) ASTM D854- Specific Gravity ____

Resistance 'R' Value of Compacted Soils ASTM D2844- 'R' Value ____

Other:

Natural Moisture Content 4.6%

Copies to:

Figure 5

WESTERN COLORADO TESTING, INC.
529 25½ Road, Suite B-101
Grand Junction, CO 81505
(303) 241-7700

LABORATORY REPORT

PHYSICAL PROPERTIES OF SOILS

Client Dave Wens

Job No. 202795
Lab/Invoice No.
Date 8-2-95
Reviewed By

Project South Camp Meadow Subdivision

Location Mesa County, Colorado — Sampled By G. Hamacher — Date 7-17-95
Type of Material Clay, sandy — Submitted By G. Hamacher — Date 7-18-95
Source of Material TH-2 @ 2½' - 3½' — Authorized By Client — Date 7-6-95

Sieve Analysis, ASTM D422-

Sieve Size	% Passing Accumulative	Specification
3"		
2½"		
2"		
1½"		
1"		
¾"		
½"		
⅜"		
¼"		
No. 4		
8		
10		
16		
30	100	
40	99	
50	98	
100	88	
Finer than 200 ASTM D1140-	61.2	

Soil Classification Unified CL AASHTO A-6(6)

Liquid Limit and Plasticity of Soils ASTM D424- LL = 26, PI = 13

Moisture - Density Relations ☐ ASTM D698- ; ☐ ASTM D1557- ; Method ____ Maximum Dry Density, pcf ____ Optimum Moisture, % ____

Specific Gravity of Soils (minus No. 4 material) ASTM D854- Specific Gravity ____

Resistance 'R' Value of Compacted Soils ASTM D2844- 'R' Value ____

Other:

Natural Moisture Content 5.5%

Copies to:

Figure 6

WESTERN COLORADO TESTING, INC.
529 25½ Road, Suite B-101
Grand Junction, CO 81505
(303) 241-7700

LABORATORY REPORT

PHYSICAL PROPERTIES OF SOILS

Client Dave Wens

Job No. 202795
Lab/Invoice No.
Date 8-2-95
Reviewed By 2TH

Project South Camp Meadow Subdivision
Location Mesa County, Colorado Sampled By G. Hamacher Date 7-17-95
Type of Material Sand, silty & gravelly Submitted By G. Hamacher Date 7-18-95
Source of Material TH-2 @ 8½' 0 10' Authorized By Client Date 7-6-95

Sieve Analysis, ASTM D422-

Sieve Size	% Passing Accumulative	Specification
3"		
2½"		
2"		
1½"		
1"		
¾"	100	
½"	95	
⅜"	93	
¼"	-	
No. 4	88	
8	84	
10	84	
16	81	
30	78	
40	75	
50	70	
100	54	
Finer than 200 ASTM D1140-	34.7	

Soil Classification

Liquid Limit and Plasticity of Soils ASTM D424- LL= PI=

Moisture - Density Relations ☐ ASTM D698- ; ☐ ASTM D1557- ; Method Maximum Dry Density, pcf Optimum Moisture, %

Specific Gravity of Soils (minus No. 4 material) ASTM D854- Specific Gravity

Resistance 'R' Value of Compacted Soils ASTM D2844- 'R' Value

Other:

Natural Moisture Content 12.0%

Copies to:

Figure 7

WESTERN COLORADO TESTING, INC.
529 25½ Road, Suite B-101
Grand Junction, CO 81505
(303) 241-7700

LABORATORY REPORT

PHYSICAL PROPERTIES OF SOILS

Client Dave Wens

Job No. 202795
Lab/Invoice No.
Date 8-2-95
Reviewed By

Project South Camp Meadow Subdivision
Location Mesa County, Colorado — Sampled By G. Hamacher — Date 7-17-95
Type of Material Sand, silty — Submitted By G. Hamacher — Date 7-18-95
Source of Material TH-3 @ 2½' - 4' — Authorized By Client — Date 7-6-95

Sieve Analysis, ASTM D422-

Sieve Size	% Passing Accumulative	Specification
3''		
2½''		
2''		
1½''		
1''		
¾''	100	
½''	98	
⅜''	93	
¼''	-	
No. 4	82	
8	74	
10	72	
16	68	
30	63	
40	61	
50	57	
100	39	
Finer than 200 ASTM D1140-	24.1	

Soil Classification Unified SM

Liquid Limit and Plasticity of Soils ASTM D424- LL= PI=

Moisture - Density Relations ☐ ASTM D698- ; ☐ ASTM D1557- ; Method Maximum Dry Density, pcf Optimum Moisture, %

Specific Gravity of Soils (minus No. 4 material) ASTM D854- Specific Gravity

Resistance 'R' Value of Compacted Soils ASTM D2844- 'R' Value

Other:

Natural Moisture Content 4.1%

Copies to:

Figure 8

WESTERN COLORADO TESTING, INC.

Project South Camp Meadow Subdivision
Location Mesa County, Colorado
Job No 202795 Date 8-2-95

SUMMARY OF SOIL TESTS

Test Hole No.	Sample No.	Sample Depth (ft)	Sample Dia. (in)	Sample Hgt. (in)	Water Content (%)	Density		Void Ratio (e)	Unconfined Compression		Atterberg Limits			Cons Test	% Pass #200 Sieve	Classification or Remarks
						Wet (pcf)	Dry (pcf)		QU (tsf)	Strain (%)	LL	PL	PI			
TH-1	SP-1	3.5 - 5.0	1.5		4.6										24.0	SM
TH-1	SP-2	8.5 - 10.0	1.5		11.0											Soluble Sulfates <50 ppm
TH-2	SP-1	2.5 - 3.5	1.5		5.5						26	13	13		61.2	CL
TH-2	SP-2	8.5 - 10.0	1.5		12.0										34.7	SC
TH-3	SP-1	2.5 - 4.0	1.5		4.1										24.1	SM

Figure 9

STATE OF COLORADO

ROY R. ROMER
GOVERNOR

JOHN W. ROLD
DIRECTOR

COLORADO GEOLOGICAL SURVEY
DEPARTMENT OF NATURAL RESOURCES
715 STATE CENTENNIAL BUILDING — 1313 SHERMAN STREET
DENVER, COLORADO 80203 PHONE (303) 866-2611

November 20, 1990

Mesa County Planning Department
P.O. Box 20,000-5022
Grand Junction, CO 81502-5022

RE: CIMARRON SUBDIVISION

Gentlemen:

We have reviewed the plat and attendant geologic report for this subdivision. Geologic hazards on site include: rockfall, landslide-slope instability potential, swelling soils, shallow water table and the potential for radon gas.

Local bedrock consists of Cretaceous Burro Canyon Formation conformably over the Jurassic Brushy Basin member of the Morrison Formation. These rocks outcrop in the steep hillside of the Mesa and are covered by Redlands alluvium on the gently sloping bottom area. A bentonitic clay derived from the Brushy Basin mudstones may affect construction on the lower level. Swelling soils will disrupt foundations and flatwork if not properly designed in areas of high water tables. Excavation soils testing in site specific areas is recommended for all structures in this subdivision.

The escarpment area presents the most severe geologic barrier to development. As outlined in the geologic report by Armstrong Consultants, this area should be avoided. We further recommend that all rockfall runout zones downslope be avoided for building locations. Specifically, Lots 2-11 in Block 4, should have site specific rockfall retaining barriers incorporated into the building design. The Redlands Second Lift Canal acts as a fairly good barrier to rockfall hazard. None the less, building locations should be located as far downslope as possible. Any hillside grading for roads should help mitigate rockfall if deep cuts are made into the natural material.

Minor landsliding in the area is evident from aerial photography. Slope stability should not be a problem except during periods of flooding. If the drainage and grading plan are followed

as stated, we anticipate no slope failure from design. The lack of shallow water tables in the hillside does not warrant mitigation. Close attention to stability should be conducted when excavating on the escarpment. Buildings should also be avoided in low spots remaining in the proposed swale of Block 1.

No radiologic assessment was conducted for the proposed subdivision. We recommend that such an assessment be done as well as site-specific testing in excavations for uranium mill tailings. Houses should be constructed using radon gas reduction techniques. Sulfate resistant cement in the foundation is required for cement structures in contact with the ground surfaceas well.

If all recommendations outlined in the geologic report and above are followed, we have no objection to the approval of this application.

Sincerely,

Christopher J. Carroll

Christopher J. Carroll
Engineering Geologist

Figure I, a reproduction from the *Mesa County Zoning Map*, can be found on the following page. Five separate zone districts surround the subject property, all of which are residential in nature.

ACCESS - Access to the property is from South Camp Road which is classified as a minor arterial by Mesa County. South Camp serves as a connecting link between South Broadway and Monument Road. both of which are also classified as minor arterials. Colorado State Highway 340 (Broadway) is located approximately 1 mile northeast of the property. Average Daily Traffic Counts, provided by Mesa County for each of the above mentioned roads, are shown on Figure II which is on the following page.

Table I represents a summary of each access road in the vicinity of the subject property, all of which are paved.

TABLE I

ROAD CAPACITY SUMMARY

ROAD NAME	FUNCTIONAL DESIGN CLASSIFICATION	EXISTING LANES	ULTIMATE LANES	RURAL DESIGN CAP. ADT	URBAN CAP. ADT
South Camp	Minor Arterial 13,000	2	2	5,000-10,000	11,000-
South Broadway	Minor Arterial 13,000	2	2	5,000-10,000	11,000-
Colorado 340	Principal Arterial 28,000	2	4	9,000-20,000	21,000-
Monument Road	Minor Arterial 13,000	2	2	5,000-10,000	11,000-

Source: Mesa County Specifications for Road and Bridge Design & Construction.

UTILITY SERVICE - Electric, gas, and communication lines are all located within the South Camp right-of-way.

Two domestic water mains are located within the boundaries of the property. Both of these mains, which are 10 inches, and 24 inches in diameter, originate at a storage tank near the southeast property corner and cross the property generally from the southeast to the northwest.

The nearest sanitary sewer main,at this time, is an 8-inch diameter line located in Avenal Lane approximately 850 feet west of South Camp Road. This main flows northerly to the Goat Draw Interceptor Sewer Main located in South Broadway.

SOILS AND GEOLOGY - The Soil Conservation Service identified 4 soil types within the boundary of the property which include:

Redlands & Thoroughfare: 5 to 10% slopes
Rough Broken Land, Mesa, Chipeta, & Persigo Soils
Thoroughfare Fine Sandy Loam: 0% to 2% slopes
Thoroughfare Fine Sandy Loam: 2% to 5% slopes

Figure III, which follows this page, indicates the location of each soil type found on the property and a chart identifying the soil characteristics found within each type. A Geological Hazards Report has been prepared and submitted to the State Geologist for their review and copy is on file at the Mesa County Planning Department. The purpose of the report is to identify geologic hazards that may have an adverse effect on construction within the subject property. Reference used to supplement the surface observations included among others *"Geology for Planning in the Redlands Area, Mesa County, Colorado"*, Colorado Geological Survey, 1976. The conclusions and recommendations from the aforementioned report follow:

1. The area identified as the mesa top has no particular hazards to construction. Large structures should be located back from the mesa edge probably at least 50 feet in case of downslope failure.

2. The escarpment area presents high level geologic hazards of potential slope failure and/or structural damage due to the underlying bentonitic mudstone. Two landslides occurred on this escarpment south of the property by natural causes even without disturbance by construction activity. Lesser hazards of rockfalls and debris flows also are potential problems. Avoidance of the escarpment for building lots is recommended.

3. Geologic hazards in the gently sloping bottom area include potential settlement of any low density alluvium, the likelihood of swelling clays in the mudstone bedrock and bentonitic soils, and the possibility of a high water table. These potential

problems can be solved by performing subsurface exploration to identify the characteristics of the underlying materials and by employment of engineered foundations. A current supplemental geology letter has been obtained.

4. The depth to water table should be considered in the design of large structures. (Sewage from the subdivision will be conveyed to the Persigo Wastewater Treatment Facility.)

5. The flood potential from thunderstorms will be mitigated by design.

6. Commercial mineral resources are unlikely under this property. The thin sequence of sedimentaries in the subsurface presents little likelihood of commercial oil or gas. The Morrison Formation is present but no uranium has been produced from this area. Two pits in the Redlands are have produced clay for canal and reservoir lining from the Brushy Basin Member of the Morrison Formation.

7. The soils in the area contain varying amounts of sulfate salts. Sulfate resistant cement should be used where concrete would contact the soil or bedrock.

8. The area has a low probability of destructive seismic events.

DRAINAGE - A detail drainage report has been submitted to the Mesa County Engineering and Planning Departments. The report indicates the subject property is influenced by a 580-acre off-site drainage basin. This basin originates from a small canyon west of Red Canyon in the Colorado National Monument. The drainage flows southerly to Buffalo Drive and South Camp Road, at which point it flows northerly along the west side of South Camp to the Redlands 2nd Lift Canal. The canal intercepts some of the runoff generated within the basin. However, in the event of a major storm the generated storm water breaches the canal and continues to flow northerly several hundred feet to an existing box culvert under South Camp, at which point the storm water splits. About 1/2 of the total flow will enter the subject property. Over the years, a previously existing channel has been filled and creates sheet flow type flooding. The storm water leaves the subject property in a swale at the north property line about 300 feet east of South Camp. The aforementioned Drainage Report estimates that approximately 84 cfs of off-site storm water would affect the property in the event of a 100-year frequency storm. Further, the report estimates that in its current state the site itself generates 33.0 cfs and 14.9 cfs from two distinct basins found on the property during a 100-year frequency storm.

MESA COUNTY LAND USE POLICIES

In 1982, the Board of County Commissioners adopted Land Use Policies as a portion of their Comprehensive Master Plan. These policies have been updated and amended seven times since their initial adoption. Of the 32 total policies, 21 appear to apply to the subject site. These policies generally address issues such as utility service, vehicular access and other site development standards.

Policies which appear to have direct effect on the future development of South Camp Meadow follow:

Policy Section No.	Title
1	Introduction.
2	Availability of drinking water in new subdivisions and other developments.
3	Minimum fire flows.
4	Fire response time.

Lincoln DeVore, Inc.
Geotechnical Consultants
1441 Motor St.
Grand Junction, CO 81505

TEL: (303) 242-8968
FAX: (303) 242-1561

September 25, 1995

Mr. Dave Wens
3024 F-3/4 Road
Grand Junction, Colorado 81504

Re: Engineering Geology Investigation
TRAILS WEST VILLAGE Subdivision
Grand Junction, Colorado

Dear Mr. Wens;

At your request, personnel from this office have completed a ground reconnaissance of the above referenced site in order to determine the general geologic conditions and constraints relating to construction of residential structures on the site.

The site has been proposed for a residential subdivision since at least 1990 and has been partially studied several times. This present study utilized a Report of the Preliminary Geotechnical Investigation for the Northwest portion of this tract, Prepared by WESTERN COLORADO TESTING, Inc., Job No. 202795, August 2, 1995. Other documentation included a report from the COLORADO GEOLOGICAL SURVEY, Nov. 20, 1990. The previous Geologic Report(s) prepared by a private consultant for this project, was not available to Lincoln-DeVore.

The purpose of our study is to review the site geology, prepare a report of the Geologic Constraints and make specific recommendations for site planning and define parameters for a Geotechnical Investigation to address the site conditions. A site plan, prepared by W.H. LIZER and ASSOCIATES, has been utilized as a basis for our recommendations for development. Following are our findings.

TRACT LOCATION & DESCRIPTION

The tract lies in the SW Quarter of the SW Quarter of Section 18, Township 1S, Range 1W of the UTE Principal Meridian, Mesa County, Colorado. The tract is bounded on the West by South Camp Road, by Agriculture Land on the North and undeveloped land on the East and South.

The topography of the tract is variable, with relatively flat land in the Northwest Half, with an increasing slope to the East, up to a mesa landform. The site has an elevation range of approximately 4740 feet to 4920 feet above sea level.

The Northwest portion of the tract has been used for Agriculture Purposes. The Northwest portion of the tract has been subject to irrigation and is drained toward the North and eventually to the Colorado River via Goats Draw. Surface drainage is Northwest and North and the subsurface drainage is to the North, Northwest.

GENERAL GEOLOGY

The general geology of this area consists of a thick series of North-northeast dipping sedimentary beds, covered with thin deposits of Alluvial Debris Fan Soils along the existing and ancient drainages.

The Redlands area is on the downthrow side of the Redlands Fault, with The Colorado National Monument on the upthrow side. The high relief of the Colorado National Monument, combined with environmental conditions has produced several well defined drainages, which have more recently been partially filled with alluvium from relatively recent Debris Flow events.

The northwest half of the tract is within the depositional area of the ancient debris fans originating in Red and Ute Canyons, within the Colorado National Monument. At the present time, the surface runoff from these canyons passes west of this site, with the majority draining on the west side of Riggs Hill. These debris soils, sandy silts and silty sands, are locally known as the Redlands Alluvium.

Seismic events have occurred near, and possibly, in the Grand Junction and Redlands Areas. These events were evaluated as having Richter Magnitudes up to and including 4.4, with no reported damage

SITE GEOLOGY

The site is underlain by the upper members of the Morrison Formation of Cretaceous Age, The Morrison Formation is described as Varicolored, interbedded Siltstones, Mudstones, Claystones and Shales. The upper portions is the Brushy Basin Member, which has occasional sandstone beds, which are generally thin and lentic

ular. Some of the finer grained strata have low to medium expansive properties, are mostly of high density, very fractured and have sulfate salt deposits in the fractures and bedding planes.

The Morrison Formation usually erodes to Badlands type topography in arid climates. Topography is often quite subdued, unless capped with the Lower Sandstones of the Burro Canyon Formation. Usually forms lower portions of small cliffs and covered with talus and colluvial soils. Weathers to silts and clays and does not tend to accumulate material for future debris flows, but produces 'muddy' storm runoff. The formation contains large amounts of clays and Sulfate Alkali, which forms a soil surface coating which inhibits penetration of short-term precipitation. Susceptible to shallow and deep seated slope failures if allowed to become saturated or is severely undercut.

The Northwest portion of the tract is covered with Debris Fan Deposits locally known as the Redlands Alluvium. The Redlands Alluvium is described as a red silt and sand, which may contain gravels and clayey strata. The Redlands Alluvium is very stratified and is a product of erosion of the Entrada, Kayenta, Wingate and Chinle Formations. These soils often contain large amounts of Soluble Sulfate Salts and some Calcareous materials, usually concentrated as evaporative caliche layers. These soils are generally low to medium density, with some metastable strata.

The Redlands Alluvium is usually found as gentle slopes, unless being actively eroded and forming gully banks, which will only stand 6 to 10 feet high. A surface coating of Sulfate Alkali and silt forms on the surface which inhibits deep penetration of short-term precipitation.

A Colluvial Wedge is located along the base of the hill, to the east. In general, the Existing, active Redlands Canal, Second Lift, is along the lower boundary of the Colluvial Wedge. The Upper boundary of the Colluvial Wedge is approximately the alignment of the upper, abandoned canal trace.

The Colluvial Wedge is an unsorted, unconsolidated collection of debris from upper slopes, to include minor rockfall, talus, eroded ancient landslides and residually weathered materials which are in the process of being reworked and transported by gravity and water action.

The materials in the Colluvial Wedge are normally quite permeable, depending on the source materials. These soils may contain significant amounts of Soluble Sulfate Salts. The deposit usually

contains large amount of material which produces 'muddy' storm runoff. The deposits usually contain large amounts of coarser materials, which allow penetration of short-term precipitation. Often moderately susceptible to shallow seated slope failures, if these soils become oversteepened and saturated.

The site observations indicated the tract contains:
Potential Rockslide and Rockrolling Areas;
Ancient, very eroded Landslide Deposits;
Areas of Old (In-active) Soil Creep;
Areas of New (Active) Soil Creep and
Potentially Unstable Slopes, which would include areas of Old (In-active) and New (Active) Soil Creep.

GROUND WATER

Previous exploration borings (WESTERN COLORADO TESTING) placed in the Northwest half of the tract indicate a shallow free water table came to equilibrium during drilling at 10 to 14 feet below the present ground surface.

No free water is anticipated in the soils and upper rock formation in the southeast portion of the tract. Small areas of seasonal 'perched' water may occur during some wetter periods of the year.

SURFACE WATER

No surface water was observed on the site, at the time of our field observations. A shallow, existing drainage in the northwest corner of the tract may carry storm runoff, during periods of high precipitation. This drainage feature should be addressed as part of the site drainage plan.

ECONOMIC GEOLOGIC DEPOSITS

No other known economic deposits are present on or beneath this site. The presence of potable, 'Artesian' water within deeper, permeable rock formations is suspected, but not confirmed.

GEOLOGIC HAZARDS

Several Geologic Hazards are present on this site. The existing development plan is not in extreme conflict with these hazards. Proper design and construction of the subdivision improvements and the residential buildings will mitigate the geologic hazards identified on this site.

The Ancient Landslides comprise two types of features. The 2 features mapped in the central and north portion of the tract are eroded remnants of ancient features. Previous experience on similar slopes in the Redlands and surface features indicates these Landslide remnants are probably less than 6 feet thick. These features should be treated as potentially unstable, very similar to the Areas of Soil Creep.

The Landslide feature mapped along the South Property Line is significantly larger than the two features to the north. This larger Landslide Feature was possibly re-activated by water infiltration from the now Abandoned Canal. This Landslide appears to be a 'Circular' type of failure. The existing, abandoned canal trace does not indicate that a large amount of slope movement occurred which required canal reconstruction. The actual feature should be avoided for construction and the upper (eastern) portion of Lots 48 & 49 should be avoided for construction and marked as a NO BUILD ZONE.

The areas of Active and Inactive Soil Creep on the slopes are a product of wetter environmental conditions. These soil creep hazard areas are normally quite thin, less than 18 inches thick, and will require proper drainage above and within the zones.

Rockslide and Rockrolling Areas are actually quite limited in active area. The Abandoned, upper canal trace contains very few rocks or debris which originated out of the original canal construction zone. The only significant exception is an active or new Soil Creep feature, on the lower portion of Lot 61, which was re-activated by redirected drainage from the Ute Water Pipeline construction.

In general, the Rockslide and Rockrolling Areas are associated with ancient landslide features, which are very eroded. The source areas for future Rockfall, Rocksliding and Rockrolling is actually quite small and the hazard is considered very slight.

The Abandoned Canal (reportedly abandoned prior to the mid 1940's) is relatively free of rocks and slope debris, except for the Ute Water Easement and the Area of New Soil Creep, apparently re-activated by drainage directed from the Ute Water Easement and the waterline construction.

It is recommended that the upper slopes of Lots 48, 49, 50, 51 & 52 be mapped as Potential Rockslide and Rockrolling Areas and addressed in the covenants as requiring evaluation and possible mitigation for Rockslide and Rockrolling. Based upon our field observations, the remaining lots should experience no Rockfall, Rocksliding or Rockrolling hazard if the existing NO BUILD ZONES are maintained and enforced.

The Potential Unstable Slopes (not labeled on mapping) comprise the areas mapped as Ancient Landslides and Soil Creep. These areas have exhibited instability during previous periods of wetter environments and may be re-activated during and after development. Careful Excavation and Fill Placement associated with the Road Construction is extremely important.

The proposed Road Construction will involve cuts and fills across a relatively small, ancient, very eroded Landslide and a larger area of Old Soil Creep. The Road Construction will occur in the upper units of the Burro Canyon Formation. As the thin surficial (ancient Landslide and Old Soil Creep) deposits will probably be penetrated, the Mudstones, Siltstones, Claystones and thin Sandstones will govern the design process. It is anticipated the construction of Fills should be minimized and the cuts very carefully constructed, with any required slope retention. A specific Geotechnical Exploration will be required to finalize design parameters.

The presence of expansive soils within the Morrison Formation will require that all structures placed above the Abandoned Canal Trace (Lot nos. greater than 53) be designed and constructed with consideration for the expansive soil characteristics.

The sands and silts of the Redlands Alluvium contain strata of compressible and, possibly, metastable soils. In general, the majority of residential structures built in this general area,

upon the Redlands Alluvium, have experienced very few foundation problems. The Recommendations contained in the existing and any future Reports of Subsurface Soils Exploration within this subdivision should be carefully followed.

It is believed that all pertinent points have been addressed. If any further questions arise or if LINCOLN-DeVORE can be of any further service, please do not hesitate to contact this office at any time.

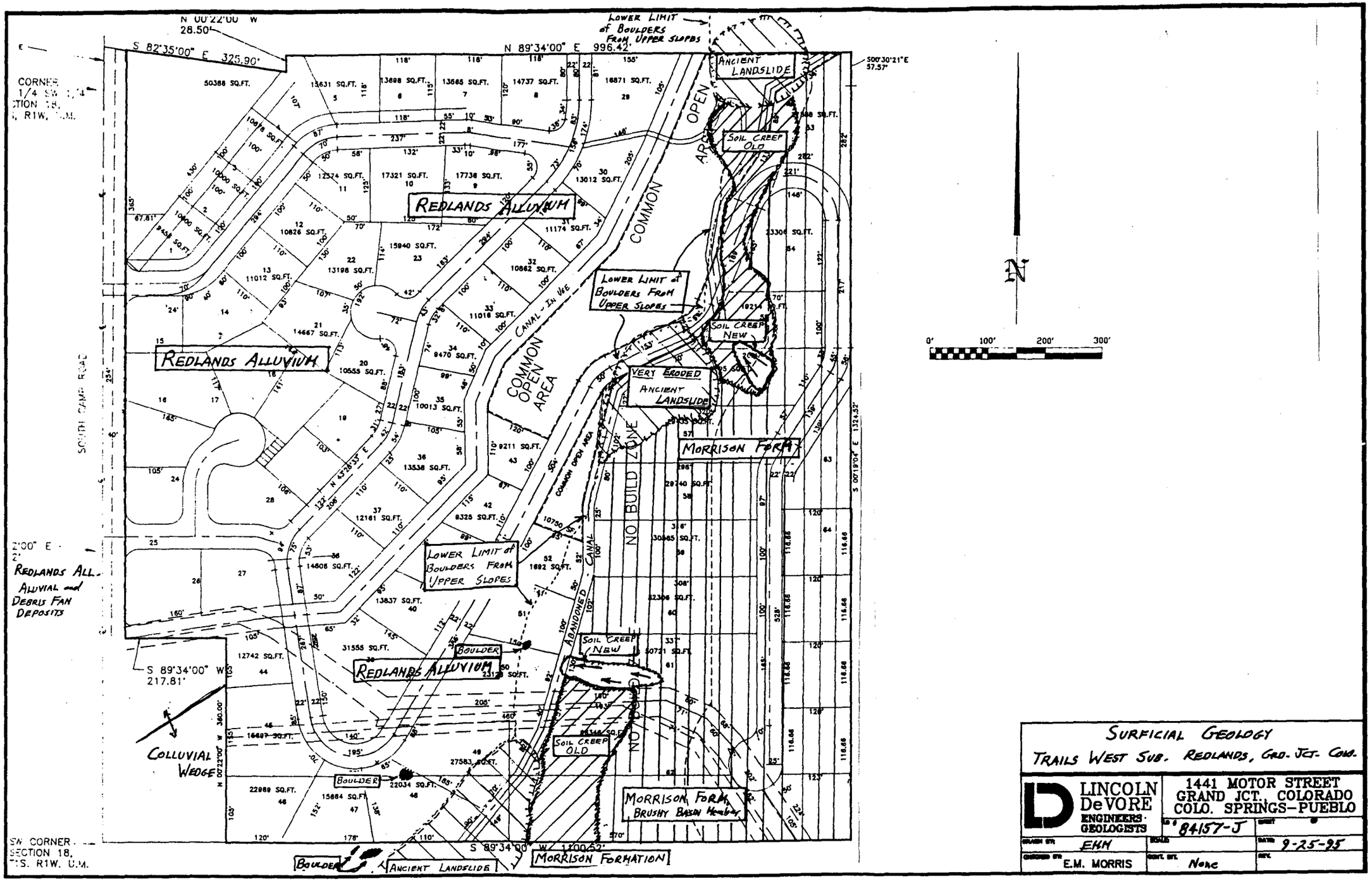
Respectfully submitted,

LINCOLN-DeVORE, INC.

by: Edward M. Morris ,PE

Engineering Geologist

LD Job # 84157-J



SURFICIAL GEOLOGY

TRAILS WEST SUB. REDLANDS, GRD. JCT. COLO.

LINCOLN DeVORE ENGINEERS · GEOLOGISTS	1441 MOTOR STREET GRAND JCT. COLORADO COLO. SPRINGS–PUEBLO	
	JOB # 84157-J	SHEET
DRAWN BY EHM	SCALE	DATE 9-25-95
CHECKED BY E.M. MORRIS	CONT. SHT. None	REV.

Lincoln DeVore, Inc.
Geotechnical Consultants
1441 Motor St.
Grand Junction, CO 81505

TEL: (303) 242-8968
FAX: (303) 242-1561

November 21, 1995

Mr. Dave Wens
3024 F 3/4 Road
Grand Junction, CO 81504

RE: Hydrological Report, Trails West Subdivision
Grand Junction, Colorado

Dear Mr. Wens;

Personnel of Lincoln DeVore are currently completing a Hydrologic Evaluation to determine the 100 Year Peak Flow of the drainage basin South of the Trails West Subdivision. Due to severe illness of the Principal Geotechnical Engineer/Hydrologist, the final report has not yet been completed but, is expected within the next few days. Preliminary, very conservative estimates of the 100 Year Peak Flow have been provided to Mr. Wayne Lizer, PE for use in making a preliminary sizing of the drainage features required to carry the peak flow from this basin through the subdivision. Based upon preliminary information, the 100 Year Peak Flow is conservatively estimated at 600 cfs. The hydrologic study is being computed by the computer program HEC-1E and additional information will be provided by the HEC-2 program.

We apologize for any inconvenience this has caused however, Mr. George Morris, PE the Principal Geotechnical Engineer/Hydrologist has been working on this project in the Colorado Springs office and due to the distance involved and other commitments the Grand Junction Office has not been able to provide assistance during Mr. Morris's time of illness. If we can answer any questions or provide additional information, do not hesitate to contact the undersigned at the Grand Junction Office, 242-8968.

Very Truly Yours,

Lincoln DeVore Inc.

Edward M. Morris PE

LD Job #84157-J

HYDROLOGY OF UNNAMED MAJOR BASIN
TRAILS WEST VILLAGE SUBDIVISION
GRAND JUNCTION, COLORADO

PURPOSE AND SCOPE

This report presents Lincoln DeVore's hydrologic analysis of stormwater flows entering the Trails West Village Subdivision in Grand Junction, Colorado, from an upstream contributing watershed ("major basin"). The purpose of the analysis is to evaluate hydrologic conditions in the major basin and, based on those conditions, to estimate the peak flows and runoff volumes that will enter the subdivision. The project civil engineer will use this information as input to the stormwater drainage design of the subdivision. Lincoln DeVore's scope does not include the analysis of stormwater runoff within the subdivision itself, nor does it include the design of any drainage structures or facilities.

In keeping with policies stated in the City of Grand Junction Stormwater Management Manual (SWMM), Lincoln DeVore analyzed storms with 2-year and 100-year frequencies. Specific items in the scope of work include:

- Reconnaissance of the major basin and adjoining areas;
- Field measurements of a culvert across South Camp Road, by which most runoff from the major basin enters the subdivision;
- Study of aerial photographs of the major basin and adjoining areas;
- Review of selected published and unpublished reports concerning soils, development, and hydrologic conditions in the area;
- Modeling stormwater runoff in the major basin; and
- Preparation of this report.

The analysis was made using the U. S. Army Corps of Engineers' Flood Hydrograph Package (HEC-1) computer program. Stormwater discharges and volumes presented in this report are taken from the HEC-1 output, and are based on input parameters estimated from field observations, aerial photographs, and published reports concerning the soils and development conditions in the major basin.

GENERAL LOCATION AND DESCRIPTION

A "General Site/Basin Location Diagram" attached to this report shows the location, shape, and topography of the study area. The proposed Trails West Village Subdivision occupies a 40-acre tract comprising most of the southwest quarter of the southwest quarter of Section 18, Township 1 South, Range 1 West of the Ute Principal Meridian in Mesa County, Colorado. The subdivision is in the City of Grand Junction and lies east of South Camp Road, about ½ mile south of the intersection of South Camp Road with South Broadway. The subdivision site is presently undeveloped. About one-third of the tract is a rocky hillside along the east and south boundaries, while the remaining two-thirds is irrigated farmland. The active Redlands Second Lift Canal crosses the tract from northeast to southwest, as does the abandoned Redlands Third Lift Canal.

Trails West Village Subdivision is in the watershed of an unnamed ephemeral stream that drains an area between the much larger Ute Canyon and Red Canyon watersheds. This unnamed stream heads in Colorado National Monument, about two miles to the southwest, and crosses the northwest corner of the subdivision itself on its way to the Colorado River. The 715-acre (1.12 square miles) upstream watershed of the unnamed stream is the major basin being analyzed for this report.

Most non-Federal land in the major basin is developed (or developing) as low-density, single-family housing. The exception is Wingate Middle School, which occupies a 14.2-acre tract west of South Camp Road, about one-half mile south of the proposed subdivision. While part of the school tract remains as open space, the building, parking lots, drives, and sidewalks constitute a significant impervious area. Furthermore, much of the tract is graded and graveled or planted in non-native grasses. The school was developed subject to Mesa County policies, with drainage facilities maintained by Mesa County School District 51.

South of the school are six subdivisions--Quail Estates, Buffalo Court, Long View Estates, Rockridge Estates, Red Valley Subdivision, and Monument Valley Estates--and several unsubdivided tracts to the south and west of South Camp Road. This area was developed under Mesa County control as widely separated, single-family houses at densities of about 0.5 to 2 units per acre. Most open space remains ungraded and in native vegetation; the ephemeral streams remain in their natural channels with little modification except where streets and driveways cross them. The main channel of the unnamed stream occupies one such channel which flows along the west side of Quail Drive. Drainage facilities are limited to small-diameter culverts where driveways cross the channels and roadside ditches, and to a few larger culverts where streets cross the channels.

North of the school is the Canyon View Subdivision on the west side of South Camp Road. This subdivision is being developed subject to City of Grand Junction control as single-family housing at a density of about 2 units per acre. Paved streets and their associated drainage facilities, including a detention basin, are now under construction. About 11.3 acres of Canyon View Subdivision are now in the major basin. However, about 17.5 acres of the subdivision will eventually drain to the unnamed stream via the detention basin after development.

Approximately 260 acres (0.41 square mile) of the major basin lies east and north of South Camp Road. This area is now undeveloped rangeland which lacks constructed drainage facilities. Runoff now collects in a ditch along the east side of South Camp Road, beginning at a point across from Wingate Middle School and continuing north into the proposed subdivision.

EXISTING DRAINAGE CONDITIONS

The unnamed stream drains a narrow, elongated, major basin which heads on the Uncompahgre Plateau at an elevation of about 6220 feet above mean sea level. From there, it drops steeply through the cliffs of Colorado National Monument and crosses a moderately to gently sloping complex of pediment surfaces, coalescing debris fans, and alluvial surfaces. The main channel enters the Trails West Village Subdivision via a culvert at an elevation of about 4750 feet. There the main channel joins a smaller tributary which drains an area mostly north and east of South Camp Road. The stream then flows through the site of a proposed detention pond in the northwest corner of the subdivision, at an elevation of about 4740 feet.

A "General Geology/Geomorphology" map attached to this report shows the physical features affecting the major basin. Areas identified as Plateau/Canyon, Gully/Foothills, and Mesa/Foothills are mostly exposed rock or rock covered by thin soils and rock debris. Rock types in the Plateau/Canyon sector tend to be resistant sandstones and metamorphic rocks. Those in the Gully/Foothills and Mesa/Foothills areas include some sandstones, but are more often mudstones, siltstones, claystones, and shales. Areas identified as Debris Fans (including other types of alluvial surfaces) are covered by significantly thicker deposits of soil and rock debris. These deposits tend to be coarser-grained near the upland areas and more soil-like at lower parts of the watershed.

The two sheets of the "Major Basin Drainage Map" attached to this report show the organization of the major basin into 10 subbasins. Seven of these subbasins are along the main channel of the unnamed stream. The remaining three discharge to a smaller tributary which drains an area mostly north and west of South Camp Road. The subbasins and their properties are as follows:

Subbasin A. This 45-acre subbasin is a tilted upland surface above the cliff line in Colorado National Monument. The soils are typically thin, rocky, and eroded. About 10 to 15 percent of the subbasin is covered by Dwyer loamy sand (Hydrologic Soil Group A); the remainder is Batterson-Rock outcrop complex (Hydrologic Soil Group D). The vegetation consists of scattered brush and juniper with a discontinuous ground cover of bunch grasses and associated plants. Subbasin A is undeveloped.

Subbasin B. This 43-acre subbasin includes the cliffs and canyon walls flanking the main stream within Colorado National Monument. Subbasin B is undeveloped. Soils are mostly thin or nonexistent. However, lower-lying areas below the cliffs have local deposits of rock debris and soils. About 80 percent of the subbasin is exposed Batterson-Rock outcrop complex or Rock outcrop (both Hydrologic Soil Group D), while the remaining 20 percent is other, unclassified soil types (assumed Hydrologic Soil Groups B and C). Vegetation is similar to that in Subbasin A.

Subbasin C. This 74-acre subbasin consists of cliffs, eroded badlands, and steep slopes in headwater areas adjoining subbasin B. Most of subbasin C lies within Colorado National Monument, although a small area extends onto privately owned lands. Most characteristics of Subbasin C resemble those of Subbasin B. The surface is about 70 to 75 percent Rock outcrop (Hydrologic Soil Group D) and 25 to 30 percent other, unclassified soil types (assumed Hydrologic Soil Groups B and C).

Subbasin E. This 173-acre subbasin consists mostly of moderately to steeply sloping hillsides and fan surfaces that are transitional between the cliffs and canyon walls to the southwest and the flatter terrain to the northeast. A small headwater area extends onto the eroded badlands and steep slopes southeast of subbasins B and C. Most of subbasin E is privately-owned land developed as low-density housing. However, the headwater area is undeveloped. The soils are

about 90 to 95 percent Glenberg sandy loam (Hydrologic Soil Group C), modified by development. The remaining 5 to 10 percent is Rock outcrop (Hydrologic Soil Group D). Vegetation is mostly bunch grasses and scattered brush, with some xeric landscaping around houses. The small culverts within the developed area appear to be mostly undersized for the 100-year runoff.

Subbasin F. This 71-acre subbasin is moderately to gently sloping fan and alluvial surfaces west and southwest of South Camp Road. It contains low-density housing, the Wingate Middle School campus, and part of Canyon View Subdivision. The soil is Glenberg sandy loam (Hydrologic Soil Group C), modified by development. Vegetation is mostly bunch grasses and associated plants, except at the school and near houses. Three culverts cross the unnamed stream at Wingate Middle School (Reference 5). The uppermost of these has an estimated capacity of 160 cfs without overflow when clean, but is about 50 percent blocked by debris. The middle culvert has an estimated capacity of 170 cfs without overflow when clean, but is about 25 percent blocked. The lowermost culvert has about the same capacity as the middle culvert. A fourth culvert at the entrance to Canyon View Subdivision has a design capacity of 419 cfs.

Subbasin G. This is the 156-acre headwater subbasin of the tributary stream which drains the area mostly east and north of South Camp Road. About 40 percent of subbasin G is a moderately sloping fan and alluvial surface southwest of South Camp Road, developing as low-density housing. The rest is undeveloped land north of the road. The soil is mostly Glenberg sandy loam (Hydrologic Soil Group C), modified by development south of South Camp Road. However, about 10 percent is Badlands (Hydrologic Soil Group D) at the north end of the subbasin. Vegetation is mostly bunch grasses and associated plants, except near houses.

Subbasin H. This 78-acre subbasin is the undeveloped middle watershed of the tributary stream. It lies directly across South Camp Road from Wingate Middle School and the Canyon View Subdivision. The southwest half of subbasin H is a moderately to gently sloping alluvial surface. However, the northeast half is a rocky slope eroded into the Morrison Formation. The soil is mostly Glenberg sandy loam (Hydrologic Soil Group C). However, about 15 percent is Badlands (Hydrologic Soil Group D). Vegetation consists mostly of bunch grasses and associated plants.

Subbasin I. This 64-acre subbasin includes the Trails West Village Subdivision itself, plus an adjoining upstream area east of South Camp Road. The rocky slope area to the east is Badlands (Hydrologic Soil Group D) and the rest of the basin is Glenberg sandy loam (Hydrologic Soil Group C), modified by irrigated agriculture. Subbasin I is sparsely vegetated with grass, weeds, sagebrush, and a few scattered cottonwood and Russian olive trees

Subbasin J. This small, 11-acre subbasin is the area west of South Camp Road between Canyon View Subdivision and the box culvert where the unnamed stream crosses the road. The soil is Glenberg sandy loam (Hydrologic Soil Group C), modified locally by irrigated. Vegetation is similar to that on the adjoining parts of Subbasin I, directly across South Camp Road.

DESIGN CRITERIA AND APPROACH

The major basin is a newly developing, largely nonurban watershed for which no overall, master drainage study has yet been performed. No 100-year floodplains have been officially designated, although preventing encroachment within the 100-year flooding level is a valid planning issue. Limited-scope drainage studies have been performed for Canyon View Subdivision. The most recent of these (Reference 5) includes HEC-1 input parameters and detention-basin hydraulic data for that part of Canyon View Subdivision which will contribute runoff to the major basin. Lincoln DeVore incorporated this information directly into the runoff modeling for this report.

Lincoln DeVore used HEC-1 (version 4.0.1E, May 1991) to model peak runoff rates and runoff volumes for the major basin. The model used SCS unit hydrographs based on the curve-number method for the basin, and modified Puls routing along stream channels (Reference 3). Runoff rates and volumes were modeled for rainstorms with 24-hour durations, a 2-year depth of 0.70 inches, and a 100-year depth of 2.01 inches. These values conform to current City of Grand Junction criteria (Tables VI-2 and A-2, Reference 1). Soils data were taken from published Soil Conservation Service maps (Reference 4). Basin topography was taken primarily from the U.S. Geological Survey's "Colorado National Monument, Colorado" quadrangle map (7.5-minute series), augmented locally by data from Mesa County's 1980 topographic base maps (Sheets 4-37 and 4-38). Land cover, development status, and watershed conditions were evaluated from City of Grand Junction orthophotomaps dated March 1994 (Reference 2).

Input parameters for the HEC-1 model were derived in the following ways.

- Rainfall Distribution: Soil Conservation Service Type II storm.
- Subbasin Areas and Slopes: Measured by planimeter and direct scaling from the topographic map.
- Runoff Curve Numbers: Estimated from SCS TR-55 tables (Appendix C, Reference 1) for Antecedent Runoff Condition II, weighted by proportion of each hydrologic soil group in each subbasin.
- Initial Abstractions and Lag Times: Estimated using standard SCS equations for the curve-number method.
- Channel Properties for Modified Puls Routing: Channel dimensions, slopes, and roughness estimated from topographic maps, orthophotomaps, and field reconnaissance. Normal-depth flow assumed.
- Time Interval for Computations: 15 minutes.

A "Hydrologic Data Sheet of Accumulative Runoff" in the appendix to this report tabulates the subbasin and channel parameters used in the HEC-1 analysis.

RESULTS AND CONCLUSIONS

Lincoln-DeVore's analysis yielded the following results for the combined flow of the main and tributary channels at Point 8a, located at the proposed detention pond for Trails West Village Subdivision:

- Peak Runoff Discharge: 10 cfs (2-year); 364 cfs (100-year)
- Time to Peak Discharge: 12.75 hr. (2-year); 12.25 hr (100-year)
- Total Runoff Volume: xxx acre-ft. (2-year); 29.5 acre-ft. (100-year)

The appendix to this report includes tabular and graphical hydrographs of runoff for both the 2-year and 100-year storms.

These runoff results may be used in the drainage design for Trails West Village Subdivision to achieve compliance with City of Grand Junction policies for stormwater management and SWMM design criteria (Reference 1). However, users of the results should understand and allow for the following limitations of the analysis:

- The analysis employs SWMM methods and criteria, and is subject to all applicable assumptions and limitations documented in that manual.

- Use of the standard rainfall depths prescribed in the SWMM may not accurately reflect storm behavior in the upland parts of the watershed. Actual rainfall depths and intensities may be greater at higher elevations in Colorado National Monument than in the city below.

- Runoff conditions in the upland areas are significantly different than those for which the SCS unit hydrograph method was derived. The extreme relief, sparse vegetation, thin soils, and extensive rock surfaces in the headwater areas will probably generate higher, faster runoff peaks for those areas than HEC-1 calculates. The impact of the headwater areas on the hydrograph at Trail West Village Subdivision should not be as extreme. However, a somewhat shorter time-to-peak-discharge and somewhat higher peak runoff could occur. This should be handled by conservative hydraulic design in the subdivision.

- The SWMM methods and criteria implicitly assume that runoff is clear water and neglect the effects of sediment transport, debris loading, and air entrainment. In steep desert watersheds, these effects often cause significant increases in discharge and changes in the hydraulic behavior of the stormwater. Such changes have maximum impact where flows emerge from canyons at the heads of debris fans, and become less important further downstream as debris and sediment drop out of the flow. However, hydraulic design for the subdivision should allow for sediment transport and deposition, and for periodic cleanout and maintenance of the channel and detention basin.

- The analysis does not consider the effects of potential channel shifts (avulsion) on debris fans. Such shifts are basin-wide problems that must be managed on the upper parts of the fans, and are beyond the control of the developers of Trails West Village Subdivision.

REFERENCES

1. City of Grand Junction, 1994. *Stormwater Management Manual (SWMM)*. Public Works Department, June 1994.

2. City of Grand Junction, 1994. *Geographic Information System Digital Orthography Project* [orthophotomaps]. Prepared by Merrick & Company for Department of Public Works and Utilities, scale 1 in. = 200 ft., date of photography March 21, 1994. Sheets 2945-18S, 2945-19N, 2945-19S, 2947-26S, 2947-35N, 2947-35S.

3. U.S. Army Corps of Engineers, 1990. *HEC-1 Flood Hydrograph Package - Users Manual, Version 4.0*. Hydrologic Engineering Center, Davis, California, September 1990.

4. U.S. Department of Agriculture, 1978. *Soil Survey of Mesa County Area, Colorado*. Soil Conservation Service, February 1978.

5. Williams Engineering, 1994. *Off-Site Drainage Impact Report of Canyon View Subdivision*. Unpublished report to Thomas & Sun, Inc. (Grand Junction, Colorado), January 1994.

Sub Basin	PT	Area Ac	Area Sq. Mi.	Slope 1/1	Av. CN	S	Tc Hrs	Hrs	Flow In.			Hours
A	1	45.3	.077	.0541	85	1.765	.280			.802	.168	.344
B	2	43.1	.067	.4359	87	1.494	.083			.914	.050	.071
C	3	74.6	.116	.3171	87	1.494	.121			.914	.073	.112
E	4	172.9	.270	.0892	76	3.158	.226			.419	.136	.349
F	5	71.2	.111	.0194	75	3.333	.403			.386	.242	.831
J	5A	11.2	.017	.0230	78	2.821	.203			.490	.101	.341
G	6	155.7	.243	.0540	75	3.333	.252			.386	.151	.424
H	7	77.7	.121	.0714	76	3.158	.194			.419	.116	.306
I	8	63.5	.099	.0875	77	2.987	.168			.454	.101	.251

STREAM STUDY

STA	PT	STREAM H	STREAM L	SLOPE 1/1
0 TO	1	205	3100	.0661
1 TO	2	850	1920	.4359
2 TO	2A	450	450	.1111
2A TO	3	110	950	.1158
3 TO	4	129	2300	.0561
4 TO	5	81	3480	.0233
5 TO	8	40	1450	.0276
00 TO	6	82	3100	.0265
6 TO	7	38	2080	.0183
7 TO	8	40	1850	.0216

Lincoln DeVore, Inc.
Geotechnical Consultants

HYDROLOGIC DATA SHEET of ACCUMULATIVE RUNOFF

TRAILS WEST VILLAGE SUB.

DATE 12-8-95

JOB NO. 84157-J

DRAWN

TRAFFIC STUDY

FOR

TRAILS WEST VILLAGE

Prepared for:

DAVID WENS
3024 F 3/4 Road
Grand Junction, CO 81504
(970) 434-4448

Prepared by:

LANDesign, LLC
PLANNING ENGINEERING SURVEYING
200 North 6th Street
Grand Junction, CO 81501
(970) 245-4099

August 18, 1995

Job No. 95112

Prepared by:

Jeffory P. Crane

I certify that this study has been prepared by me or under my direct supervision.

Philip M. Hart, P.E.
State of Colorado, No. 19346

TABLE OF CONTENTS

A. INTRODUCTION

1. Location & Land Use

The subject property is located within G.L.O. Lots 3 and 4 of Section 18, Township 1 South, Range 1 West, of the Ute Principal Meridian and contains 40 +/- acres. More specifically the site is located approximately 1/2 mile north of Buffalo Drive along the east side of South Camp Road and approximately 7/10ths of a mile south of South Broadway.

The site is presently an undeveloped vacant parcel of land. The Redlands Canal Second Lift traverses the site from Southwest to Northeast and crosses South Camp Road at the Southwest corner of the property.

The property immediately surrounding the proposed development is either undeveloped vacant land or agricultural fields. The property directly across the street is currently planted in corn. Further outlying property has been developed into residential subdivisions of single family homes. Wingate Elementary School is located on the Northwest corner of Buffalo Drive and South Camp Road. See figure 2 for Location and Zoning Map.

The proposed development will consist of 69 single family residences on 40 acres with a maximum density of 3 units per acre. Current zoning for the site is RSF-4.

2. Access

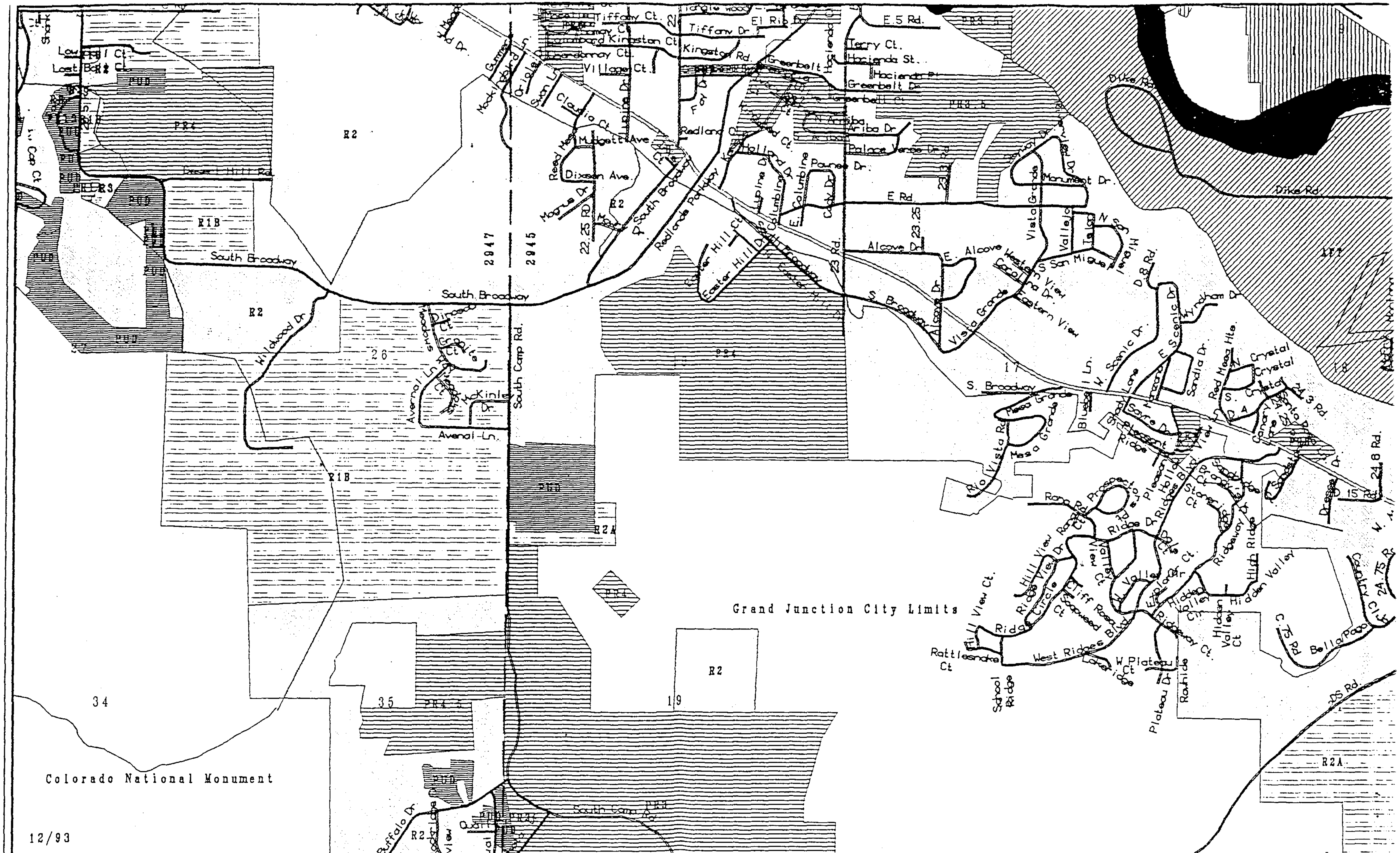
Primary access to the development will be attained through two urban residential roadways located at the north and south ends of the development approximately 500' apart. South Camp Road is classified as an urban residential collector street with a posted speed limit of 45 mph, however, average running speed can be in excess of 50 mph at the site. Site distance on South Camp Road are well beyond the required 740' for speeds of 50 mph.

This study will concentrate on the analysis of the two intersections of South Camp Road with the access roads to the proposed development. See figure 1 for proposed site layout.

3. Purpose of Report

The purpose of this report is to determine the impact of this development on the current street transportation system in the general vicinity of the development and determine what, if any, improvements should be recommended to compensate for the additional traffic generated by this proposed development. Furthermore, this report may be used to assist Mesa County Planners in determining future improvements of the transportation system in the area due to anticipated growth patterns.

Site Layout
Figure No. 1



Mesa County, Colorado
Dept. of Public Works - Land Records/GIS

Mesa County Zoning

Geographic Information System

16

B. TRIP GENERATION & DESIGN HOUR VOLUMES

1. Trip Generation

See appendix for chart of average trip ends vs. dwelling units on a weekday.

LAND USE	SIZE	AVERAGE TRIP GENERATION RATES			TOTAL TRIPS GENERATED		
		total daily	am peak	pm peak	total daily	am peak	pm peak
SINGLE-FAMILY DETACHED HOUSING (<300)	69 UNITS	9.55	0.76	1.02	659	53	71

Trip generation rates were obtained from Trip Generation, 5th edition, published by The Institute of Transportation Engineers (ITE), 1991.

2. Design Hour Volumes

Traffic counts on South Camp Road were recorded for Mesa County Traffic Services in 1993 and obtained from Ken Simms for use in this report. For South Camp Road an ADT of 740 was recorded north of Buffalo Drive and an ADT of 1500 was recorded south of Broadway. The peak rate of flow was recorded at 6:00 PM at 13.4% of the ADT or 201 pcph. Considering an average growth rate of 2.2% in the valley, this would bring the adjusted peak flow to 210 pcph for 1995.

In addition, traffic counts were performed on South Camp Road by LANDesign at the proposed development on August 16th between 4 and 6 PM. The peak hour rate was calculated to be 103 pcph with a Peak Hour Factor (PHF) of 0.86 determined from peak 15 min. flow rates. 58% of the traffic was headed north, however, due to the relative short time of observation this study will assume a 50-50 split north and south. For the purpose of this study a peak hour flow of 210 pcph will be utilized.

C. TRIP DISTRIBUTION

Trip distribution from the site will be assumed as follows:
1. As published in Trip Generation, 74% of generated traffic will be exiting the site at the AM peak hour at the average rate of 0.76 trips/unit. Therefore 53 vehicle trip ends will be generated by traffic exiting the site at the peak AM hour.
2. 50% of the development generated traffic will leave from the north exit and 50% from the south thereby generating 27 vehicle trip ends at the AM peak hour at each access.
3. 60% of the development generated traffic exiting from the north access will travel north toward South Broadway and the commercial centers along U.S. 6 & 50. Likewise 60% of the traffic exiting the south access will travel south toward Monument Road and downtown. Consequently 12 vehicles will exit the north access and travel north while 8 vehicles exit the south access and also travel north. Subsequently 12 vehicles will exit the south access and travel south while 8 vehicles will exit the north access and also travel south.

ACCESS ROAD	% OF TOTAL TRIPS	TOTAL TRIPS	TRIPS HEADING NORTH	TRIPS HEADING SOUTH
NORTH	50	20	12	8
SOUTH	50	20	8	12

D. TRIP ASSIGNMENT

Trip assignment to the site will be assumed as follows:
1. As published in Trip Generation, 64% of generated traffic will be entering the site at the PM peak hour at the average rate of 1.02 trips/unit. Therefore 46 vehicle trip ends will be generated by traffic entering the site at the peak PM hour.
2. 50% of the development generated traffic will enter the north access and 50% the south thereby generating 23 vehicle trip ends at the PM peak hour at each access.
3. 60% of the development generated traffic entering the north access will travel from north and likewise 60% of the traffic entering the south access will travel from south. Consequently 14 vehicles will enter the north access from the north while 9 vehicles enter the south access also from the north. Subsequently 14 vehicles will enter the south access from the south while 9 vehicles will enter the north access also from the south.

ACCESS ROAD	% OF TOTAL TRIPS	TOTAL TRIPS	TRIPS ENTERING FROM NORTH	TRIPS ENTERING FROM SOUTH
NORTH	50	23	14	9
SOUTH	50	23	9	14

E. TRAFFIC VOLUMES

Presently there are no roads and therefore no existing turning movements in or out of the site. The PM peak hour volume of 201 is the largest volume recorded for traffic on South Camp Road south of South Broadway. A portion of this traffic is bound for McKinley Drive and Avenal Lane and will not impact the proposed development, however, for the purpose of this study the peak AM and PM hour volumes will be 210 pcph. This figure has been adjusted for growth in the vicinity and will be split 50-50 for north and south bound traffic.

Figures 3 and 4 show AM and PM peak hour through volumes and turning movement volumes respectively for build out conditions. The maximum existing total daily traffic for the street system at the proposed site 1,566 vehicles. The impact from the completed build out of the proposed development will increase that number by 659 vehicles to a projected total of 2,225 vehicles.

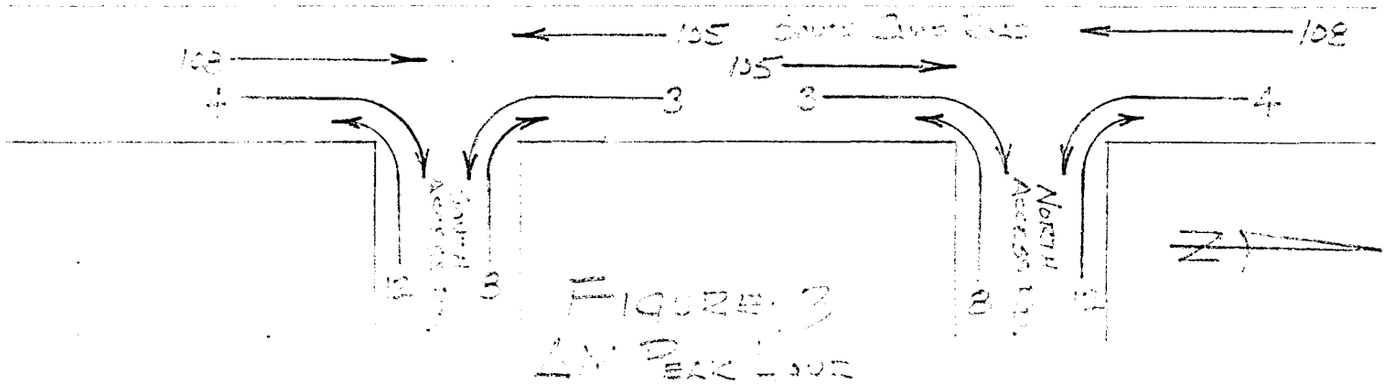


FIGURE 3
AM PEAK HOUR

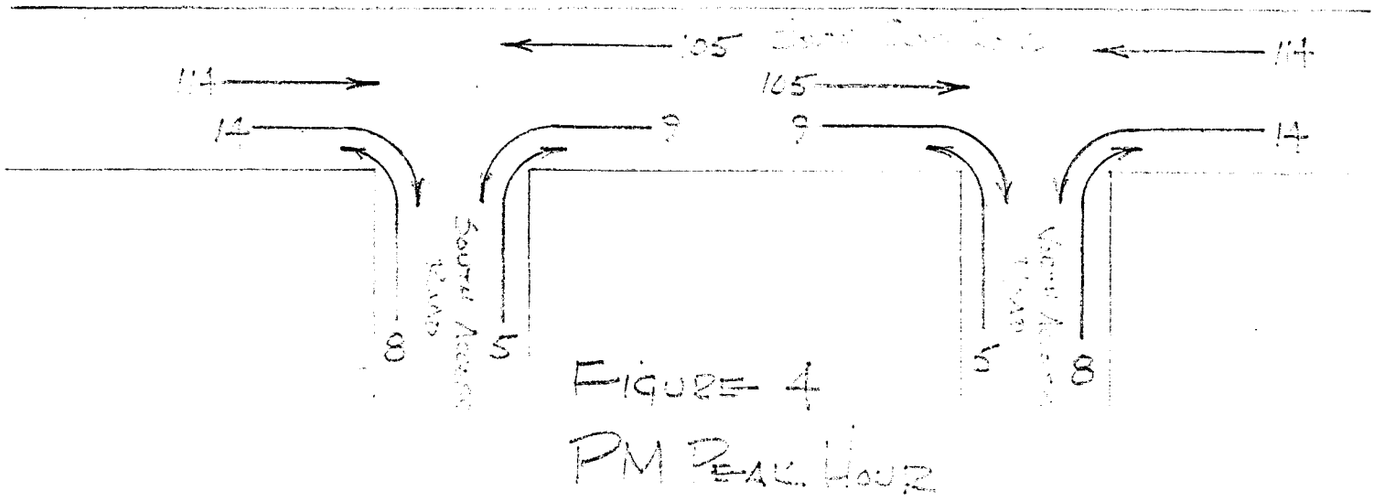


FIGURE 4
PM PEAK HOUR

F. CAPACITY ANALYSIS

The Highway Capacity Software (HCS) release 2 was utilized for the analysis of this study.

The level of service at the maximum rate of flow at the PM peak hour at both intersections to the development remains well within the A category for complete projected build out. See appendix for the computer analysis printouts.

G. CONCLUSIONS and RECOMMENDATIONS

The construction of a standard local residential street with shared lanes at both proposed access roads to the development will be sufficient to maintain an 'A' level of service at the intersections with South Camp Road at full build out. Left or right turning lanes on South Camp Road will not be necessary to improve the level of service.

APPENDIX

Single-Family Detached Housing (< 300 Units)
(210)

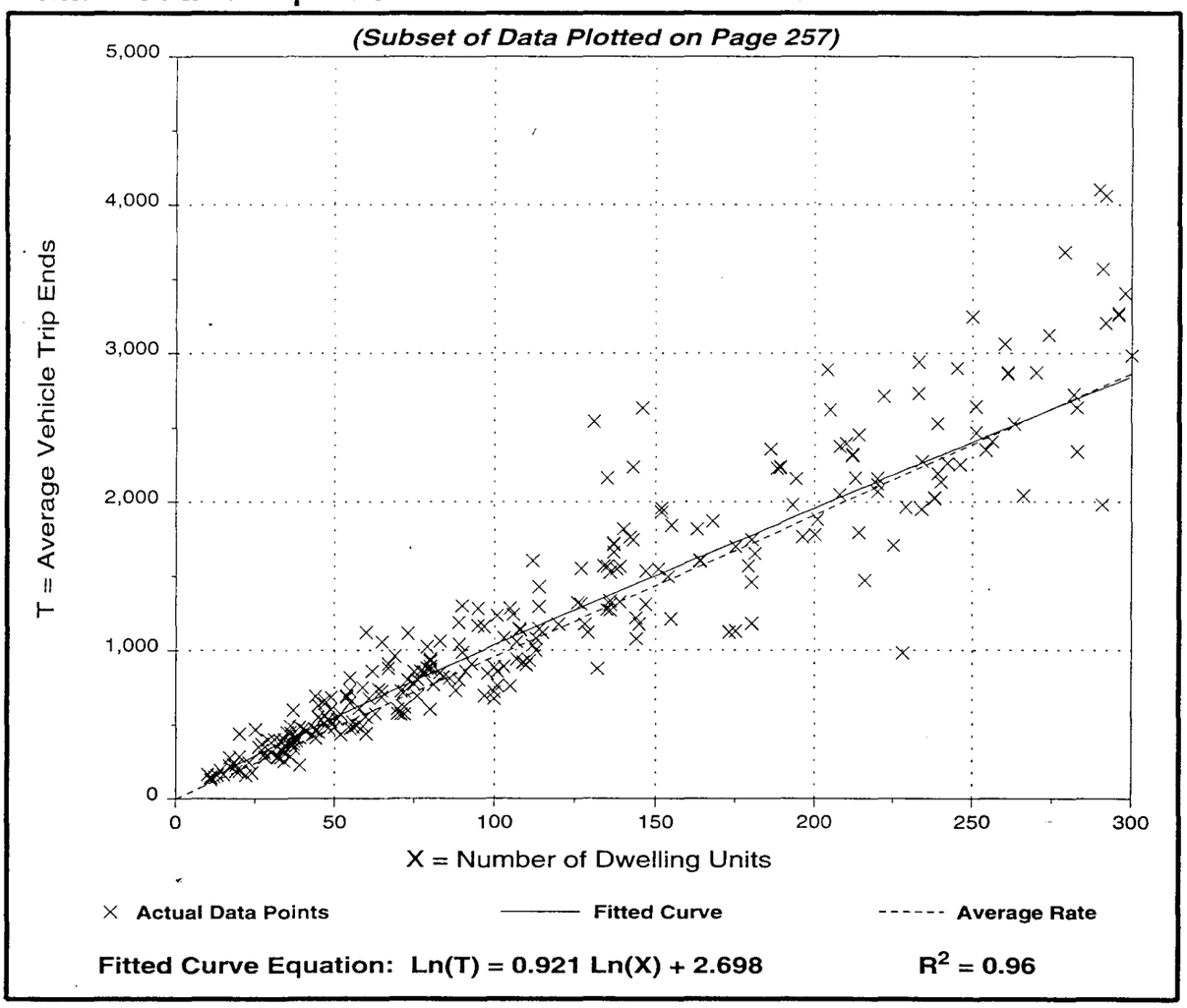
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 348
Average Number of Dwelling Units: 206
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.55	4.31 - 21.85	3.66

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.921 Ln(X) + 2.698 **R^2 = 0.96**

Single-Family Detached Housing (< 300 Units)
(210)

Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
A.M. Peak Hour of Generator

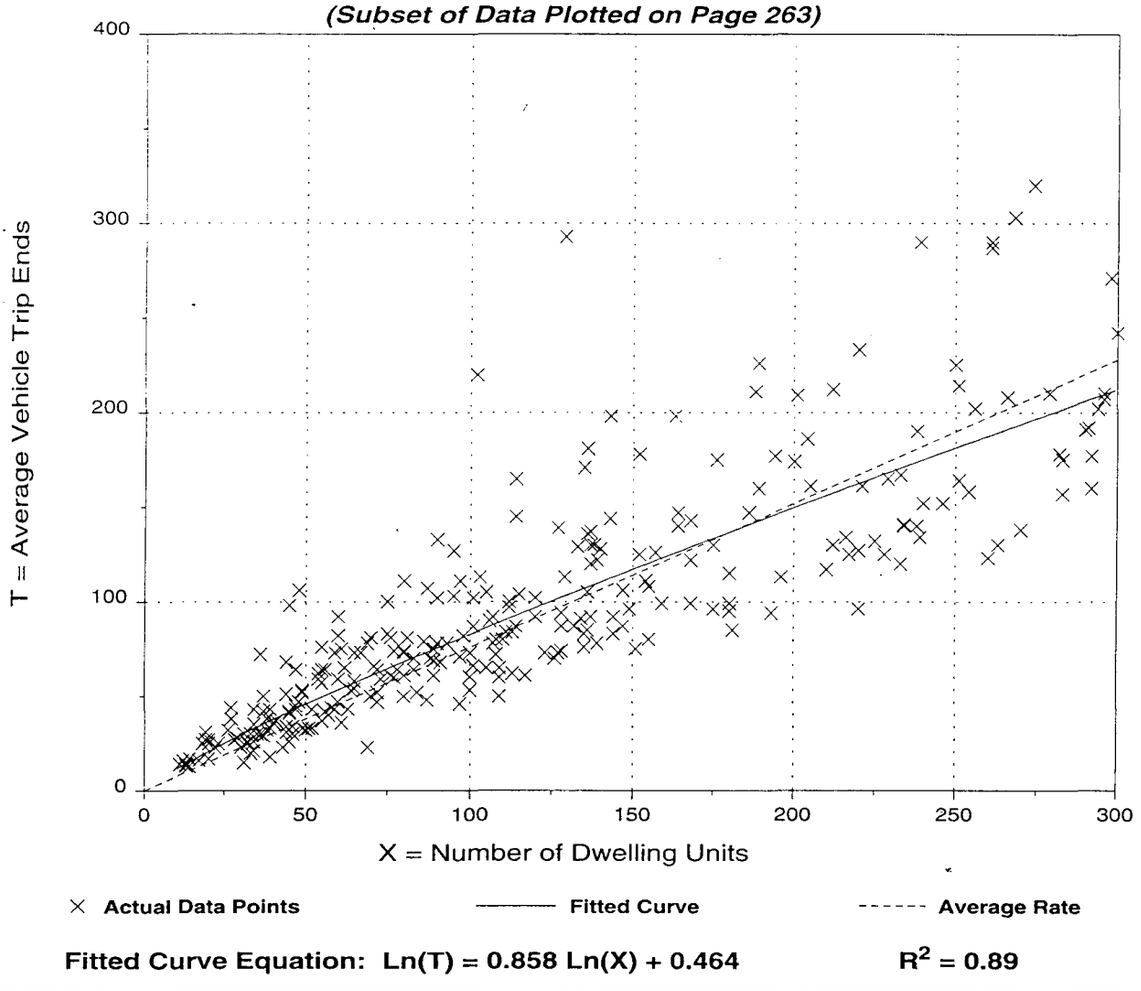
Number of Studies: 339
Average Number of Dwelling Units: 190
Directional Distribution: 26% entering, 74% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.76	0.33 - 2.27	0.91

Data Plot and Equation

(Subset of Data Plotted on Page 263)



Fitted Curve Equation: Ln(T) = 0.858 Ln(X) + 0.464 **R^2 = 0.89**

Single-Family Detached Housing (< 300 Units)
(210)

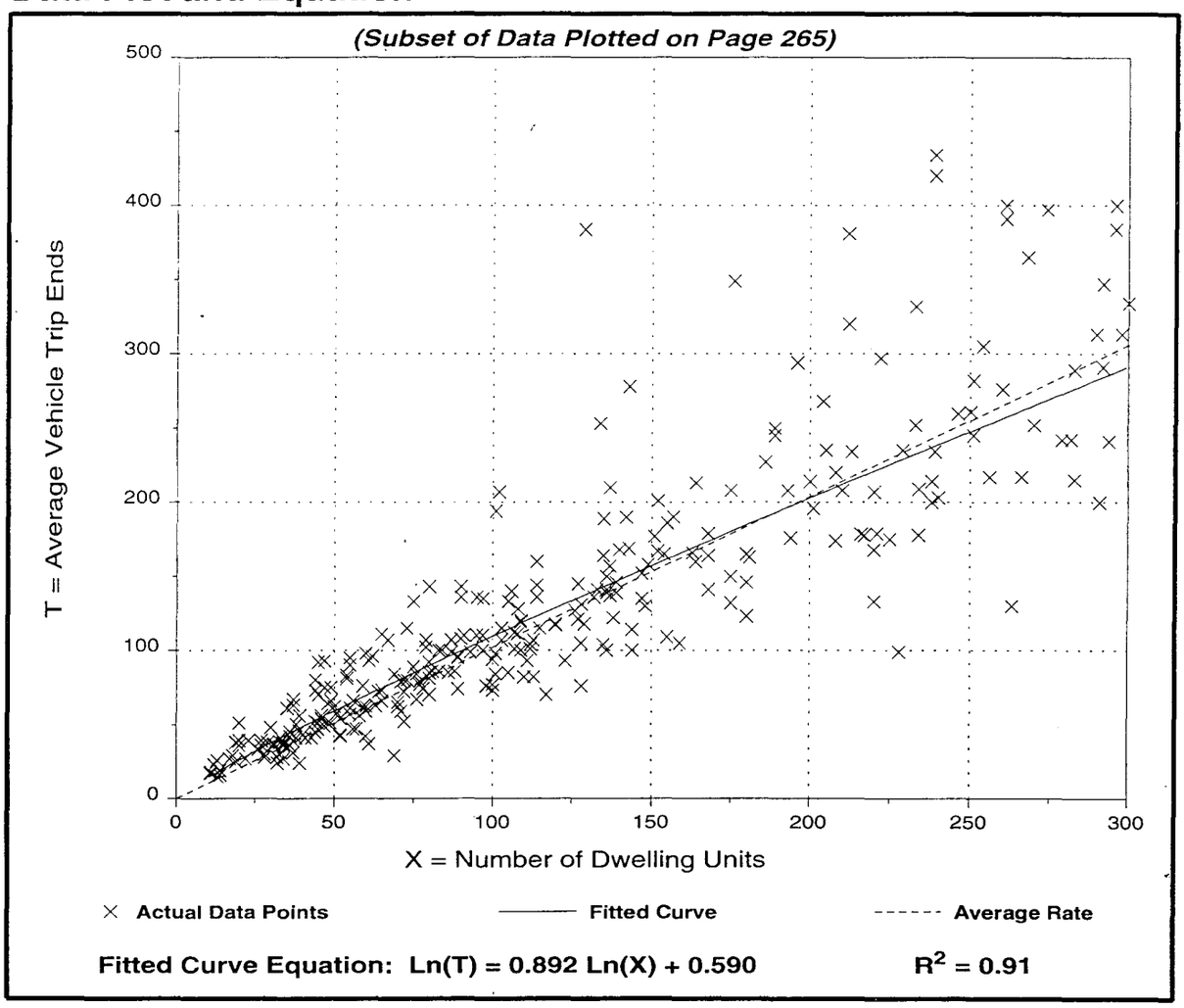
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
P.M. Peak Hour of Generator

Number of Studies: 357
Average Number of Dwelling Units: 183
Directional Distribution: 64% entering, 36% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
1.02	0.42 - 2.98	1.05

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.892 Ln(X) + 0.590 **R^2 = 0.91**

****

File Name WENS.HC0
Streets: (N-S) SOUTH CAMP ROAD (E-W) LOCAL ACCESS-UNNAMED
Major Street Direction.... NS
Length of Time Analyzed... 60 (min)
Analyst..... JPC
Date of Analysis..... 8/22/95
Other Information..... T-INTERSECTION

Two-way Stop-controlled Intersection

	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1<	0	0>	1	0	0	0	0	0>	0<	0
Stop/Yield			N			N						
Volumes		114	23	114	23					20		20
PHF		.86	.86	.86	.86					.86		.86
Grade		0			0			0			0	
MC's (%)		0	0	0	0					0		0
SU/RV's (%)		0	0	0	0					0		0
CV's (%)		0	0	0	0					0		0
PCE's		1.1	1.1	1.1	1.1					1.1		1.1

Adjustment Factors

Vehicle Maneuver	Critical Gap (tg)	Follow-up Time (tf)
Left Turn Major Road	*5.50	2.10
Right Turn Minor Road	*6.50	2.60
Through Traffic Minor Road	*7.50	3.30
Left Turn Minor Road	*8.00	3.40

WorkSheet for TWSC Intersection

Step 1: RT from Minor Street	WB	EB
Conflicting Flows: (vph)	126	
Potential Capacity: (pcph)	1154	
Movement Capacity: (pcph)	1154	
Prob. of Queue-free State:	0.98	
Step 2: LT from Major Street	**SB**	**NB**
Conflicting Flows: (vph)	137	
Potential Capacity: (pcph)	1447	
Movement Capacity: (pcph)	1447	
Prob. of Queue-free State:	0.90	
TH Saturation Flow Rate: (pcphpl)	1700	
RT Saturation Flow Rate: (pcphpl)		
Major LT Shared Lane Prob. of Queue-free State:	0.90	
Step 4: LT from Minor Street	**WB**	**EB**
Conflicting Flows: (vph)	262	
Potential Capacity: (pcph)	669	
Major LT, Minor TH Impedance Factor:	0.90	
Adjusted Impedance Factor:	0.90	
Capacity Adjustment Factor due to Impeding Movements	0.90	
Movement Capacity: (pcph)	600	

****

Intersection Performance Summary

Movement		FlowRate v(pcph)	MoveCap Cm(pcph)	SharedCap Csh(pcph)	Avg.Total Delay	LOS	Delay By App
WB	L	25	600	790	4.9	A	4.9
WB	R	25	1154				
SB	L	146	1447		2.8	A	2.3

Intersection Delay = 1.6

Common Name : S. CAMP ROAD
Counter location : SOUTH OF S. BRDWY
Comments :
Interval : Single
Width of roadway : 22
Number of lanes : 2
Start Date : 03/03/93
Start Time : 10:10
Days to count : 1
Type of count : Vehicle
Rural or Urban : Urban
District : Residential
Road classification : Collector

Date of action	Counter Reading	Daily Total	Daily Factor
Wed March 3, 1993	87,706		
Thu March 4, 1993	89,235	1,529	
ADT		1,500	
Adjusted ADT			No daily adjustment factor
AADT			No monthly adjustment factor
Estimated PHV		80	
Estimated DHV		110	
85th Percintile		00.0	MPH

Common Name : SOUTH CAMP ROAD
Counter location : NORTH OF BUFFALO DR.
Comments : (S/B) D0602004.PRN(22000038303)
Interval : Single
Width of roadway : 22
Number of lanes : 2
Start Date : 06/02/93
Start Time : 10:00
Days to count : 1
Type of count : Classify
Rural or Urban : Urban
District : Residential
Road classification : Collector

Date of action	Counter Reading	Daily Total	Daily Factor
Wed June 2, 1993	0		
Thu June 3, 1993	729	729	
	ADT	730	
	Adjusted ADT		No daily adjustment factor
	AADT		No monthly adjustment factor
	Estimated PHV	40	
	Estimated DHV	50	
	85th Percintile	54.0 MPH	

Seq: 001 Sta: 0000000000001 Id: 073750222001 CommId: 01

City/Town: Grand Junction County: Mesa

Location: Redlands Parkway East of South Camp Rd. Fmt: Dir

Lane/s: 1-1 Sta Type: REMOTE

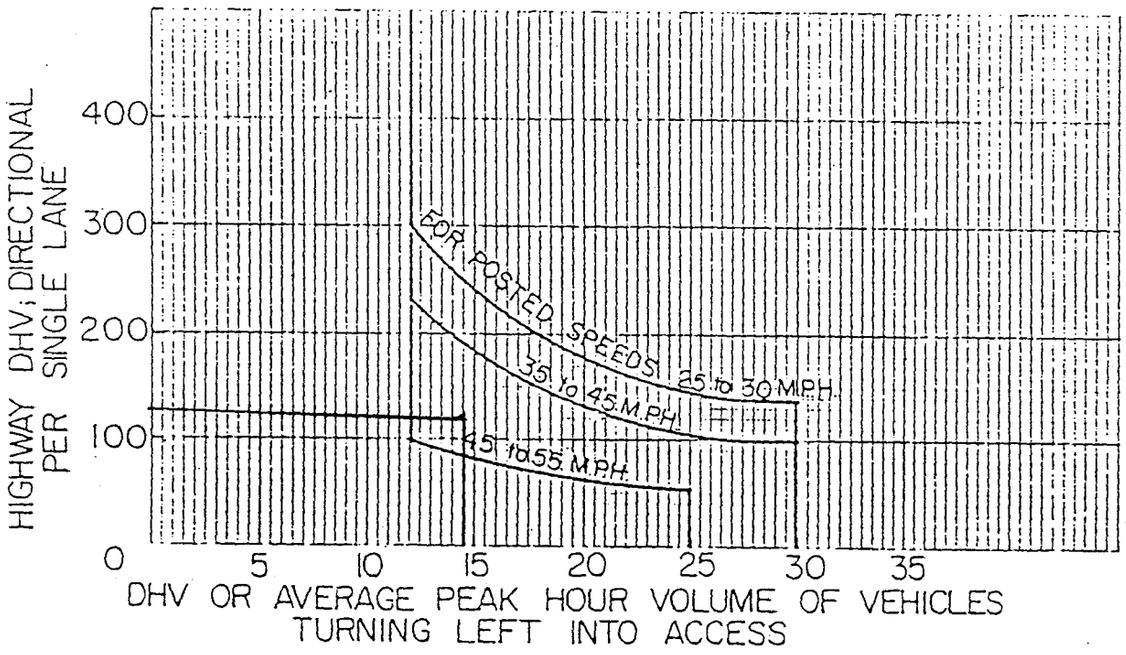
Ln1-South

Month	Day Mo.	Day Wk.	Hour	Count	Perc.	Month	Day Mo.	Day Wk.	Hour	Count	Perc.
May	17	Tue	18	272	17.2	Jul	07	Thu	18	212	13.4
Jul	20	Wed	15	251	15.9	Aug	03	Wed	18	212	13.4
Jun	09	Thu	18	243	15.4	Aug	04	Thu	18	212	13.4
Jun	30	Thu	18	241	15.3	Aug	16	Tue	18	212	13.4
Jul	27	Wed	18	231	14.6	+Sep	21	Wed	18	212	13.4
May	10	Tue	18	229	14.5	Oct	26	Wed	18	212	13.4
Aug	23	Tue	18	228	14.4	Apr	14	Thu	18	211	13.4
Nov	08	Tue	18	226	14.3	Oct	31	Mon	19	211	13.4
May	23	Mon	18	224	14.2	May	05	Thu	18	210	13.3
+Aug	26	Fri	18	223	14.1	Jun	22	Wed	18	210	13.3
Nov	09	Wed	18	222	14.1	Sep	01	Thu	18	210	13.3
Jun	02	Thu	18	221	14.0	Jun	01	Wed	18	209	13.2
Sep	13	Tue	18	221	14.0	Jun	14	Tue	18	208	13.2
Sep	28	Wed	18	221	14.0	Nov	21	Mon	18	208	13.2
May	16	Mon	18	219	13.9	+Dec	20	Tue	18	208	13.2
May	25	Wed	18	219	13.9	Jul	13	Wed	18	207	13.1
Oct	05	Wed	18	218	13.8	Sep	08	Thu	18	207	13.1
Sep	27	Tue	18	217	13.8	Oct	12	Wed	18	207	13.1
May	12	Thu	18	216	13.7	Oct	22	Sat	15	207	13.1
+May	19	Thu	18	216	13.7	Nov	15	Tue	18	207	13.1
Jun	06	Mon	18	216	13.7	Apr	06	Wed	18	206	13.1
May	18	Wed	18	215	13.6	Aug	02	Tue	18	206	13.1
Aug	29	Mon	18	215	13.6	Aug	24	Wed	18	206	13.1
Apr	19	Tue	18	213	13.5	Oct	25	Tue	18	206	13.1
Jul	14	Thu	18	213	13.5	+Dec	14	Wed	18	206	13.1

+ = Every 10th Peak Hour

PM PEAK HOUR VOLUMES ON SOUTH CAMP ROAD.

AND PERCENTAGE OF TDT



STATE HIGHWAYS AND CITY STREETS

CITY OF GRAND JUNCTION
DEPARTMENT OF PUBLIC WORKS

VOLUME WARRANTS FOR LEFT-TURN DECELERATION LANES

FIGURE 5

REVIEW COMMENTS

FILE #PP-95-157 **TITLE HEADING:** Preliminary Plan - Trails West Village

LOCATION: E of South Camp Road, S of South Broadway

PETITIONER: Dave Wens

PETITIONER'S ADDRESS/TELEPHONE: 3024 F 3/4 Road
Grand Junction, CO 81504
434-4448

PETITIONER'S REPRESENTATIVE: Wayne Lizer

STAFF REPRESENTATIVE: Kathy Portner

NOTE: THE PETITIONER IS REQUIRED TO SUBMIT FOUR (4) COPIES OF WRITTEN RESPONSE AND REVISED DRAWINGS ADDRESSING ALL REVIEW COMMENTS ON OR BEFORE 5:00 P.M., SEPTEMBER 25, 1995.

CITY POLICE DEPARTMENT **9/7/95**
Dave Stassen **244-3587**

This proposal poses no concerns for the Police Department. In fact, the limited access and numerous cul-de-sacs follow current design concepts for adding a measure of crime prevention to the project.

CITY FIRE DEPARTMENT **9/8/95**
Hank Masterson **244-1414**

The proposed new water lines will result in a dead-end 8" line greater than 1,000' in length along Conestoga Way to the end of the cul-de-sac. This line should be looped to reduce the dead end length to less than 1,000'. As an alternative the Fire Department will accept stamped calculations from a licensed engineer showing that required fire flows of 500 gallons per minute will be available from the end of the 8" line at peak domestic demand.

A utility composite is required showing locations of all proposed hydrants. Hydrants must be located at all major intersections, spaced at 500' intervals and placed so that no property frontage is more than 250' from the nearest hydrant as measured along public roads.

Grades of all streets must not exceed City standards.

CITY PARKS & RECREATION DEPARTMENT **9/18/95**
Shawn Cooper **244-3869**

1. Collect open space fees.
2. Investigate additional trail easements connections on the abandoned easement and also the Redland Second Lift Canal. The canal will provide access through the Redlands area. The abandoned lime easement will also provide good access and recreational opportunities.

CITY PROPERTY AGENT **9/15/95**
Tim Woodmansee **244-1565**

The legal description of the property boundary does not close. Bearings and distances on the plan drawing differ significantly from the legal description. Collateral calls need to be shown and labeled on the plan drawing and subsequently on the survey plat. Limits of the no build zone needs to be described by metes and bounds. How might this development impact landlocked parcels to the east? How might development/construction activities affect the integrity of the Ute water mains? The proposal should include a detailed grading & drainage plan which addresses a break or rupture of the Ute water main. Items 6 through 10 on Schedule B of the Title Commitment need to be researched and depicted as existing encumbrances.

PUBLIC SERVICE COMPANY **9/15/95**
G. Lewis

Request standard 14' front lot easements per City of Grand Junction requirements.

UTE WATER **9/15/95**
Gary R. Mathews **242-7491**

Ute Water also has a 24" main line running on the east side of South Camp Road. Contact with Ute Water is needed to locate the 24" main. Ute Water will not be held liable for homes built on lots which the 24" main line crosses.

The 8" on Trails West Court can be down sized if a fire plug is not required.

Water mains shall be C-900, class 150. Installation of pipe fittings, valves and services including testing and disinfection shall be in accordance with Ute Water standard specifications and drawings.

Developer is responsible for installing meter pits and yokes for a complete installation. Ute Water will furnish the meter pits and yokes.

Policies and fees in effect at the time of application will apply.

REDLANDS WATER & POWER COMPANY **9/15/95**
Gregg Strong **243-2173**

1. Camelot Investments, LLC currently owns 23 shares of water. Due to that fact, Redlands very much recommends a holding facility for irrigation water be included into the plans.
2. There will be no pumps or pumping directly out of Redlands Canal.
3. No pumps, pumping stations, seep pumps, holding tanks, water reservoirs, ponds or etc. on Redlands Canal banks or right-of-way.
4. Redlands reserves the right to remove any and all of the above items at the Developers or Landowners expense.
5. A 50' right-of-way on Redlands Canal will be ENFORCED!! 25' each side from centerline of Redlands Canal.
6. The issue of access over Redlands Canal must be addressed immediately.
7. Redlands reserves the right to approve any canal crossings prior to construction. Construction detail is to be provided to Redlands Board of Directors for approval.

8. There will be no domestic water, irrigation water, sewer lines, telephone, cable or electrical lines over or under Redlands Canal without prior approval from Redlands Board of Directors.
9. A "HOLD HARMLESS" clause to Redlands Water & Power Company against water contamination of any kind, shall become a part of the Covenants in "PERPETUITY".
10. Drainage design must not divert any additional water into Redlands Canal.
11. All irrigation water and wastewater must be diverted away from Redlands Canal.
12. Redlands Canal banks and Canal Roads are strictly for the use of Redlands employees and shareholders, for the OFFICIAL BUSINESS of Redlands Water & Power Company ONLY!
13. Redlands ABSOLUTELY REFUSES to accept responsibility for the safety of people or property of pedestrian traffic on or along Redlands Canal bank and right-of-way.
14. No encroachment of any kind on Redlands right-of-way, including spoil from upslope excavation.
15. Redlands needs to know what assurances the Developer and Landowner sill take that will not cause adverse impacts to Redlands facilities.
16. No fences, gates, trees or shrubs will be put on or along Redlands Canal bank or right-of-way.
17. Redlands reserves the right to remove any and all fences, gates, trees and shrubs at Landowners expense.
18. Any legal fees incurred by Redlands to protect their water rights, property, canals or facilities will be the responsibility of the Developer or Landowner.
19. Copy of Redlands Water & Power Company Standard Specifications attached.

CITY UTILITY ENGINEER **9/18/95**

Trent Prall **244-1590**

WATER - UTE

1. Ensure Ute's 24" steel waterline is adequately protected for both road crossings as well as potential driveways.
2. 8" water deadends after more than 3000'. Current fire protection standards, as outlined in City Ordinance 2627, call for no more than 1000' for a dead end line. Please either:
   A) Redesign to conform to the ordinance, or
   B) Provide calculations ensuring fire flows of 500 gallons per minute at 20 pounds per square inch residual pressure are achieved at systems furthermost hydrant.
3. Proposed 8" waterlines should tap Ute's waterline rather than the South Camp Road centerline.

SEWER - CITY

1. A sewer trunk extension fee, payable to the City of Grand Junction, shall be required prior to giving approval for the plat to be filed. The amount of the fee is based on proposed density. As 69 single family lots are proposed for the 40 acre site (1.7 units/acre), the trunk extension fee would come to $46,575 (69 lots x $675/lot).
2. Sewer along lots 24-43 and lots 63-68 appears to have manhole spacing much greater than 400'. City standard is for spacing not to exceed 400' without prior approval.
3. Proposed sewers should outlet to existing South Camp Road sewer rather than the South Camp Road centerline.
4. Street and sewer profile was not submitted; however as the proposed sewer will have fairly steep slopes that transition to mild slopes, please ensure that all hydraulic jumps occur in manholes. Where the sewage does transition from supercritical flow, please epoxy coat those manholes.

More comments on final submittal.

CITY DEVELOPMENT ENGINEER **9/14/95**
Jody Kliska **244-1591**

See attached comments and attachments.

MESA COUNTY PLANNING **9/18/95**
Linda Dannenberger **244-1771**

A topo map was not provided but County staff are familiar with this site. A drainage from the Monument crosses South Camp Road from the west side and affects the northwest portion of the site. It is mapped as floodplain on the Redlands Geologic Hazards maps.

The developer should demonstrate how structures on lots 49-69 will have minimal visual impact to the area. It will be a shame to scar the escarpment with curb, gutter, asphalt and sidewalk and homes. The Redlands Policies have not been superseded and recommend blending with hillsides and minimal disturbance of steep slopes subject to rockfall.

U.S. POSTAL SERVICE **9/18/95**
Cheryl Fiegel **244-3435**

This is rural territory for U.S. Postal Service delivery. If sidewalks are installed, then delivery must be centralized. Unless there is a detached curb, leaving space for a curbside mailbox. Delivery can begin as soon as there is one box per 1/2 mile from the present line of travel.

MESA COUNTY SCHOOL DISTRICT #51 **9/18/95**
Lou Grasso **242-8500**

SCHOOL	ENROLLMENT/CAPACITY	IMPACT
Wingate Elementary	436 / 600	18
Redlands Middle School	559 / 650	9
Fruita Monument High School	1312 / 1100	11

COMMUNITY DEVELOPMENT DEPARTMENT **9/18/95**
Kathy Portner **244-1446**

1. Trail easements and/or ROW should be preserved along both the active Redlands Canal and the abandoned canal.
2. A detached pedestrian/bicycle path should be provided along South Camp Road.
3. All streets must be City urban standards.
4. Describe the legal ownership of the land with the active canal and the abandoned canal.
5. Lots 39, 49 and 50 are greatly impacted by the Ute Water line easement. Show how a typical building footprint can fit on those lots.
6. The road far exceeds the City of Grand Junction's recommended maximum length of a cul-de-sac of 1,000 feet.
7. The State Geological Survey's report that was included in the packet refers to a 24" and 10" water line that crosses the property. The 10" is not shown on the composite.
8. The State Geological Survey's report also discusses rock fall areas and steep escarpments that must be protected. The plan seems to ignore those recommendations.
9. A geologic hazards map is required to support the geotechnical report identifying rock fall areas and run-outs, rock outcrops, steep slopes, etc.

10. Can sufficient water pressure be provided to the upper lots.
11. Section 6-1-1 of the Zoning and Development Code includes the following stated goals of the subdivision regulation:
    I. To preserve natural vegetation and cover, and to promote the natural beauty of the City;
    J. To prevent and control erosion, sedimentation, and other pollution of surface and subsurface water;
    L. To restrict building in areas poorly suited for building or construction;
    M. To prevent loss and injury from landslides, mud flows, and other geologic hazards.

    Staff feels the subdivision as proposed is in direct conflict with the above stated goals. As stated in the pre-application conference, staff believes the development should be confined to the lower part of the property, leaving the steep slopes undeveloped. The applicant has not adequately addressed the geologic concerns to support the extend of development proposed. The hillside will be irreparably scarred from the location of houses and the cut and fill necessary to provide building sites and the road.

ADDITIONAL COMMENTS

UTE WATER **10/4/95**
Gary R. Mathews **242-7491**
Low pressure exists at the elevated areas and would effect fire flow requirements and domestic needs (low pressure of 35-45 can be expected).

TO DATE, NO COMMENTS HAVE BEEN RECEIVED FROM:
City Attorney
U.S. West
Colorado Geological Survey
TCI Cablevision

September 14, 1995

REVIEW COMMENTS FOR: **PP-95-157 Trails West Village**

TYPE OF REVIEW: **Preliminary Plan**

REVIEWED BY: **Jody Kliska**

Streets and Traffic

A standard City Residential Street section is required. This is not what was proposed. The rural street section is not acceptable, and in any event would not fit in the proposed 44' ROW.

The profiles provided with the proposal show steep cuts in some sections of the roadway. The most severe cut is 14' deep and occurs at the curve above the abandoned canal on Conestoga Way. How does lot 53 access the street from 14' above it? It appears if this road is even feasible, some additional right of way or slope easements will be required. Other areas of concern are a cut of 6-7' in the vicinity between the two common areas, and cuts of 4-6' on the curve adjacent to lots 45,46,47 and 39. At the intersection of Arrowhead Drive and Conestoga Way a 3' cut is required. More details will be required in these areas to see if it is feasible to construct and how the adjacent lots will access.

City Standards require a minimum spacing of 300' for intersections on collector streets. South Camp Road is classified as a collector, and thus the proposed intersections are too closely spaced.

The traffic study submitted concludes no improvements are necessary. This is not correct, as shown on the attached chart from the City Tranpsortation Engineering Design Standards, which requires construction of a left turn lane. The staff is willing to waive the half-street improvements requirement for South Camp if turn lanes are constructed. Adequate right of way exists on South Camp Road to accomodate these improvements. A detached path along South Camp Road may be required, as it is a designated bicycle route in the Multi-Modal Plan adopted by the City and County.

The proposed cul-de-sac length exceeds the maximum 1000' allowed in the Transportation Engineering Design Standards.

On future submittals of plans and profiles, please indicate stationing on the plan view so it can be correlated with the profile. The end station on the profile of Conestoga Way does not match when all segments of the street are added. The location and depth where the Ute Water line(s) cross under the proposed street

is necessary to determine whether the proposed cut areas will affect the water line. The submitted letter from the State Geologic Survey indicated there is a second 10" water line across this property which was not indicated on any of the submitted plans.

What kind of structures are proposed for crossing the canal and the abandoned canal?

While the proposed street grades technically meet the City requirements of a maximum of 8%, there is concern for winter maintenance, particularly in the areas of steep cuts, where ice will form and stay and additional maintenance will be required.

Drainage

The submitted drainage report was deficient in several areas. A SSID checklist is attached. The report brought up several questions and concerns as outlined below:

Show the 580 acres upstream from the site on the drainage basin map. This is a large and significant area of concern. How much is currently draining through this site and where does it go?

The assumption that runoff above the canal will sheetflow across the canal leaves me wondering how much and where does it go from there? From the drainage plan, it appears all the property below the canal proposed for housing is lower than the canal. Will this cause flooding of these properties?

The report indicates additional detention basins may be required. Although the preliminary drainage report does not require calculations at this stage, perhaps some should be made to determine if and where these basins will be needed so they can be shown on the preliminary plan prior to approval.

Since the rural road section will not be allowed, the assumption that drainage will be picked up in roadside swales is incorrect. Based upon the grades proposed, it is likely a more extensive stormwater conveyance system will be required.

The report proposes release along the east side of South Camp Road. A determination of the capacity of facilities, if any, will be required prior to approval of any stormwater discharge system.

The report calls out our phases of development. These phases should be identified on the preliminary plan.

Prior drainage reports for this property were not referenced or submitted.

Geotechnical Report

Attached is the SSID checklist for the Geotechnical Report, in which the circled items were not addressed in the submitted report. The submitted letter from the State Geologic Survey indicates there are some serious areas of concern on this site, of which was addressed in the latest report.

All of the test holes were done in the flat part of the property, and thus the report only addressed construction in this area. We are particularly concerned with the geological hazards, potentially unstable slopes, and the rockfall runout zones alluded to in the State letter. The state letter contained a specific recommendation for rockfall retaining barriers. No mention of that is anywhere in the geotechnical report or shown on any drawings.

The proposal for street cuts up to 14' deep need to be addressed in this report in relation to any potential construction difficulties, maximum allowable slopes for stability, and the need for retaining structures.

Depending on the type of structure proposed for crossing the canal and abandoned canal, some geotechnical investigation for the foundations of these structures may be required.

No pavement design was included in this report.

A copy of the state's letter and the previous geologic report refereed to in the letter should be given to the present geotechnical consultant.

Miscellaneous

Building envelopes for the lots where the Ute Water line crosses need to be identified, as it appears it may not be feasible to build on several of these lots with the restrictions of the easement. There may also be some safety concerns if a breakage of this line ever occurs.

What do the hours of operation from 7 a.m. to 10 a.m. in the General Project Report refer to?

On the utility composite, the water line is shown connecting to the centerline of South Camp Road.

REDL DS WATER & POWER COMPANY

STANDARD SPECIFICATIONS

GENERAL CONDITIONS

1.0 Any person, agency or company proposing to perform construction of any nature on or near Redlands facilities shall comply with these specifications. Plans for all proposed construction work will be submitted to the Superintendent of Redlands Water & Power Company before any work begins. If the Superintendent deems it necessary, the plans for any work will be presented to the Construction Committee of the Board of Directors for approval not less than 30 days before any work begins.

1.1 All construction work of any nature will be inspected by Redlands for conformance with these specifications and any other requirements set by Redlands. Any work Redlands deems to be improper, which does not meet these specifications or is in any way deficient as to materials and or labor will be corrected at the sole expense of the contractor.

1.2 Redlands, may require a bond for performance and materials to be supplied by the contractor at the contractors expense. Said bond or bonds will guarantee the faithful performance of the work and relieve Redlands of any and all liability to Redlands facilities, workmen, suppliers or any third party, and hold Redlands harmless in all situations.

1.3 The Contractor shall take all precautions necessary or desirable to protect all of Redlands property and facilities on or near the proposed work. Stakes for line and grade will be protected from being disturbed, and will be reset at the contractor's sole expense. Any conditions which are materially different from those placed on the plans will be immediately brought to the attention of Redlands Superintendent. If the Superintendent deems it necessary, all work shall cease until the problem has been resolved and authorized, either by the Superintendent or the Construction Committee.

1.4 The Contractor shall comply with all laws, regulations and ordinances in effect at the time of doing the work. The Contractor shall carry all Workman's Compensation, Liability and any other insurances as required and hold Redlands and it's employees harmless in all situations.

1.5 The Contractor warrants that all materials and labor placed by them in, on or around Redlands Water & Power Company's property will be held free from any claims, leins, or encumbrances, and that all payments will be made by the Contractor to all people working on the job and entitled to compensation, including trust funds and to all material persons who may deliver materials thereto.

1.6 The Contractor shall and does hereby indemnify, save and hold harmless Redlands Water & Power Company from all claims, damages, leins, encumbrances or losses, including all costs and reasonable attorney's fees which they may suffer by reason of the filing of any notices, leins or encumbrances, or the failure of the Contractor to obtain cancellation and discharge thereof.

SPECIAL CONDITIONS

2.0 **DITCH OR CANAL CROSSINGS:** No canal or ditch shall be open cut. Any utility or other contractor wishing to cross Redlands ditch shall submit plans for such crossing to Redlands for approval 30 days prior to any construction.

2.1 All underground utilities, including but not limited to water, gas, electricity, drainage or sewer, shall place such pipes in a casement pipe. Such casement normally shall not be less than three feet below the bottom of the ditch when the ditch is concrete lined. In earthen ditches, the casement shall be not less then three feet below the bottom of the ditch. This shall be the distance from the top of the casement pipe to the bottom. The casement pipe shall extend beyond the toe of the bank horizontally from the top of the concrete lining or top of the ditch bank. If the topography of the crossing requires a variance, then the pipe extension shall be determined by Redlands Superintendent or Construction Committee. The size of the casing shall be in diameter at least 2 inches larger than the outside diameter of the pipe being installed for 4 inch or larger diameter pipe. If steel pipe is to be used, it shall be a minimum wall thickness of 16 gage for casing 12 inches or larger. Use of conduit or other thin wall pipe will not be approved. Use of fiberlass or orangeberg pipe is prohibited. PVC pipe must be of SDR 35 or thicker wall pipe. For example, a casing for a 1 inch diameter cable should be 2 inch Schedule 40 PVC.

2.2 **OVERHEAD CROSSINGS:** Any pipe, cable or wire for electrical purposes which crosses any ditch or canal, shall have a minimum vertical clearance from the canal or ditch road to the lowest sag of 14 feet. Supporting poles or towers shall be placed a minimum of 15 feet horizontally from the edge of the road; on the side of the ditch where there is no road, it shall be beyond the toe of the bank.

2.3 **GATES:** No gates are permitted to cross any canal or ditch road, or any traveled way used by Redlands. If it is necessary for the confinement of livestock, limited to cattle, horses, sheep, llamas or goats, then with the permission of Redlands Construction Committee, a single metal gate may be allowed. No wire gates will be permitted. Metal gates must be a minimum of 12 feet open width, suspended from a gate post on the side of the road away from the ditch, and placed a minimum of 2 feet from the edge of the road. The gate must swing in each direction and have provision for Redlands to put its own padlock on the gate. A cattle guard may be required instead of a gate if Redlands Construction Committee deems it necessary to keep the canal road free and clear of obstruction.

2.4 **ROADS:** No alteration of any kind, including but not limited to digging, cutting or boring along, down or on any ditch or canal road will be allowed without the permission of Redlands Construction Committee. Roads must be kept clear, free from any obstruction or debris of any kind. Owners of property adjacent to the canal or road are responsible for keeping Redlands property clear. No person, corporation or agency, public or private will be allowed to use the canal roads for any purpose whatsoever. All unauthorized uses such as walking, jogging, hiking, biking, motorized vehicles of all kinds, horse back riding or leading constitutes trespass and such instances of unauthorized use will be dealt with accordingly.

2.5 **BRIDGES:** All bridges constructed across any canal, ditch or other facility of Redlands Water & Power Company shall be fabricated of reinforced Portland Cement Concrete meeting the specifications of the Mesa County Road Department. Bridges made of any other material such as treated lumber will require plans to be submitted to Redlands Board of Directors for approval.

Abutments for any bridge shall be placed a minimum of two feet away from the top of the lining or top of bank of the canal.

Clearance of a minimum of one foot above the top of the canal lining or top of bank shall be maintained.

2.6 **VEHICULAR CROSSINGS:** Pipe to be placed in any canal to afford a crossing for vehicles of any description shall be Reinforced Concrete Pipe as required by Mesa County Road Department Specifications.

All such pipe shall be of sufficient inside diameter to permit the full flow of water at such location chosen with the pipe not more than three quarters depth of flow. All such pipe shall be installed with the invert of the pipe set at least two inches below the flow line or bottom of the canal. Headwalls and transition flow structures shall be installed at each end of the pipe to reduce head losses and carry the required flow of water. The length of pipe shall be adequate for the purposes of the installer, but in no case less than twelve feet long for any vehicular passage.

This Standard Specifications having been duly adopted by the Board of Directors on May 11, 1994 becomes effective on this date.

NOTICE: The terms and conditions as stated in these Standard Specifications are subject to change at any time and without prior notice at the discretion of the Redlands Water & Power Company Board of Directors or Construction Committee.

W.H. LIZER & ASSOCIATES
Engineering Consulting and Land Surveying
576 25 Road, Unit #8
Grand Junction, Colorado 81505
241-1129

September 25, 1995

Responses for Review Comments
TRAILS WEST VILLAGE

To: Kathy Portner - Staff Representative

CITY FIRE DEPARTMENT

All water lines longer than 1000 feet serving a fire hydrant will be looped.

Hydrants are now shown on the utility composite.

Street grades do not exceed City of Grand Junction standards which is 8%.

CITY PARKS & RECREATION DEPARTMENT

1. A trail easement has been added to the plan which connects Trails End Road (formerly shown as Conestoga Way) to the abandoned Redlands Canal at the East end of the proposed subdivision.

2. The Redlands Water and Power Company is opposed to any trail along the Redland Second Lift Canal.

CITY PROPERTY AGENT
Tom Woodmanssee

The error on the legal description has been found and corrected which was the call distance of 1100.52 feet on the South side instead of 1110.52 as shown on the description.

Bearings and distances have been corrected on the plan to coincide with the legal description.

Limits of no-build zone will be revised showing bearings and distances on the plan with ties to substantial corners upon completion of Geologic Study.

The parcel to the East is not land locked by this parcel. A portion of the right of way of Trails End Road (formerly Conestoga Way) is adjacent to the East side and a tee intersection would be feasible for a connection to Trails End Road.

All final construction plans will be submitted to Ute Water for their approval prior to final platting and will be designed according to Ute Water's current specifications. This will involve all streets and driveways crossing Ute Water lines.

Details will be worked out with Ute Water concerning any special drainage considerations.

Items 7 through 10 on Schedule B of the Title Commitment have been shown on the plan. A copy of term 6 is attached.

UTE WATER
Gary R. Mathews

Contact will be made with Ute Water concerning location of the 24 inch water line on the East side of South Camp Road.

No houses will be constructed within any Ute Water Easements.

All construction and materials will be according to Ute Water's current specifications.

REDLANDS WATER AND POWER COMPANY
Gregg Strong

All 19 points are agreed upon with the following exceptions or clarifications.

Item 5. The right of way of Redlands Canal is shown to be 40 feet wide (2nd and 3rd lift canals). Book 412, Page 334.

Encroachments - No encroachment of any type will be allowed with the Redlands Power and Water Company's right of way.

Construction - any construction of streets, bridges, pipelines, etc. will have plans submitted to the Redlands Water and Power Company which will require said Redlands Water and Power Company's approval prior to construction.

CITY UTILITY ENGINEER
Trent Prall

1. All street and driveway plans for crossing Ute Water lines shall be submitted to Ute Water for approval for each filing.

2. All eight inch water lines will be looped if longer than 1000 feet.

3. Drafting error corrected to show water line tapping into water line instead of road centerline.

SEWER

2. Manhole spacing checked for spacing of 400 feet or less.

3. Drafting error corrected to show sewer connecting into sewer line on South Camp instead of road centerline.

4. Street profiles will be submitted. Hydraulic jumps will be designed to occur in manholes and transition manholes from supercritical flow to subcritical flows will be epoxy coated which will be submitted with each filing.

CITY DEVELOPMENT ENGINEER
Jody Kliska

Streets and Traffic

The rural street section has been replaced with a standard City residential street section.

The areas where cuts ranging from 6 feet to 14 feet can be lessened.

On Trails End Road (formerly shown as Conestoga Way) slope maintenance easements as required will be provided on final platting.

The minimum spacing for intersections on collector streets has been increased to over 300 feet.

The petitioner agrees to put in turn lanes.

The petitioner is requesting a cul-de-sac length exceeding 1000 feet due to the topography of the land not allowing a lesser length.

Stationing has been added to the plans to better correlate the plan and profile sheets.

The end station on Trails End Road (formerly shown as Conestoga Way) has been corrected.

The depth of water lines are 4 to 5 feet below ground surface. Upon final design, these will have to be pothole to verify depth and adjust street grades accordingly, if necessary.

The 10" water line is now shown on the plans.

A bridge, meeting City of Grand Junction and Redlands Power and Water Company's approval, is proposed for the Redland Canal Second Lift. No crossing is proposed for the abandoned canal.

DRAINAGE

An topographical map is attached which shows the 580 acre drainage basin upstream from the site. The total area crosses South Camp through a 4' x 8' box Culvert at approximately 150 feet North of Sagewood Road, then along the East side of South Camp where it will ultimately reach the Colorado River. It is recognized that drainage improvements will be required along the East side of South Camp Road to the North end of the proposed subdivision.

The assumption that runoff above the Redlands Canal Second Lift will cross as sheet flow is based on the canal being at full capacity from contribution above the development.

Also, undeveloped areas such as the common open area above the canal at the North end of the development will generate substantial amounts of runoff due to steep slopes and rock cover.

Residences will be required to have positive drainage swales along side of structure to convey any storm water through the property to the street below.

Trails End Road (formerly shown as Conestoga Way) will pick up some part of this drainage. Due to the length and slope of this street, there are areas where detention basin could be placed to take water from the street, then discharge back into the street at a reduced flow rate. A detention basin could be placed in the common open area North of the revised lot 44.

A standard road Section is proposed rather than a rural road section.

Storm facility plans will be submitted with each filing.

A phasing map is attached.

Prior drainage reports are attached that came out of the county files.

GEOTECHNICAL REPORT

A separate Geotechnical update is being prepared by Lincoln-Devore and will be attached.

Building envelopes are shown on the plan on lots adjacent to the Ute Water line easements.

Hours of operation should not be applicable since this is a residential development.

Drafting errors for water connections in South Camp Road have been corrected.

A meeting concerning road plans is required at your earliest convenience.

MESA COUNTY PLANNING
Linda Dannenberger

The flood plain will require some drainage channelization which will be submitted with the first filing for City approval.

The developer and engineer will be working with the geologist to determine the best method of least disturbance to rock fall potential together with esthetic appearances.

US POSTAL SERVICE
Cheryl Fiegel

Neighborhood boxes will be placed at 1/2 mile intervals subject to approval by the US Postal Service.

COMMUNITY DEVELOPMENT DEPARTMENT
Kathy Portner

1. Trail Easements will be provided along the abandoned Redlands Canal. The Redlands Water and Power Company is opposed to any development along the Second Lift Canal.

2. A pedestrian/bicycle path will be put in the right-of-way of South Camp Road, however details regarding this and turn lanes will need to be worked out with city engineering.

3. Streets will meet urban standards.

4. The active canal is owned by the Redlands Water and Power Company. The inactive canal has previously been quit claimed by the Redlands Water and Power Company.

5. Lots adjacent to Ute Water Line Easements have a building envelope shown on the lot.

6. The petitioner is requesting a longer length than 1000 feet for the cul-de-sac due to topographical conditions not allowing any closer intersecting streets.

7. The 10" water line is now shown on the utility composite.

8. An updated geological investigation is being completed by Lincoln- Devore and is attached.

9. Same as 8.

10. Discussions with Ute Water indicate there is adequate pressure from the 10 inch water line.

11. I, The common open area and no build zone will help preserve natural vegetation and scenery.

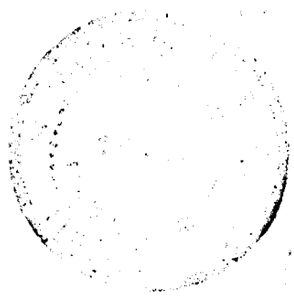
J,L The developer and engineer will work with the geologist for erosion control and building site locations.

It is the intent of the developer to develope a site with houses and sites that will attract, rather than distract from the natural beauty of the site.

Respectfully submitted,

Wayne H. Lizer, P.E., P.L.S.

WHL:dp



TRAILS WEST VILLAGE
0090 Caballo Road
Carbondale, CO 81623
Tel/Fax: (970)-963-0627

FAXED 1-12-96

January 12, 1996

Ms. Katherine M. Portner
Grand Junction Community Development Department
250 N. 5th Street
Grand Junction, CO 81501-2668

VIA FAX

Re: Trails West Village Preliminary Plan / File No. PP-95-157

Dear Kathy:

I am writing to request an appeal before the City Council of the Planning Commission's denial of the above-referenced preliminary plan. Please advise me of the date and time for the appropriate City Council meeting.

Thank you,

Brian L. Stowell

cc: Mr. Paul W. Stowell
Mr. Phil Hart

RECEIVED GRAND JUNCTION PLANNING DEPARTMENT
JAN 16 RECD

STAFF REVIEW

FILE: #PP-95-157

DATE: January 30, 1996

STAFF: Kathy Portner

REQUEST: Preliminary Plan--Trails West Village

LOCATION: E of S. Camp Road, S of S. Broadway

APPLICANT: Camelot Investments, LLC

EXECUTIVE SUMMARY:

The developer of the proposed Trails West Subdivision has appealed the Planning Commission denial of the Preliminary Plan for 66 single family lots on approximately 40 acres.

EXISTING LAND USE: Undeveloped

PROPOSED LAND USE: Single Family Residential, approximately 1.7 units per acre

SURROUNDING LAND USE:

NORTH:	Single Family Home, Church and Undeveloped
SOUTH:	Undeveloped
EAST:	Undeveloped
WEST:	Agriculture, Undeveloped

EXISTING ZONING: RSF-4

PROPOSED ZONING: RSF-4

SURROUNDING ZONING:

NORTH:	RSF-4 (Residential Single Family, 4 units per acre)
SOUTH:	PR-4 (Planned Residential, 4 units per acre)
EAST:	RSF-4
WEST:	R1B (County zone, 2 units per acre)

RELATIONSHIP TO COMPREHENSIVE PLAN:

No Comprehensive Plan exists for this area.

STAFF ANALYSIS:

The proposal is to develop 66 single family lots on approximately 40 acres for a density of 1.7 units per acre. The property is zoned RSF-4 (Residential Single Family, 4 units per acre). Lots 1 through 39, between South Camp Road and the Redlands Canal Second Lift, consists of gently sloping topography. Lots 40 through 53, located between the Redlands Canal Second Lift and the abandoned Redlands Canal are more steeply sloping and the buildable areas of lots 54 through 66 are at the top of a steep escarpment.

The City has required more detail than is normally required with a preliminary plan review for this site because of the steep topography and drainage concerns. Following is a summary of those issues.

Drainage

The Trails West Village Subdivision is within the 715 acre watershed of an unnamed ephemeral stream that drains an area between the much larger Ute Canyon and Red Canyon watersheds. The main channel of the watershed enters the Trails West Village Subdivision via a culvert under South Camp Road where it joins a smaller tributary which drains an area mostly north and east of South Camp Road. The stream then flows through the site of a proposed detention pond in the northwest corner of the subdivision.

Comments received by Mesa County Planning indicate the existence of a floodplain as mapped on the Redlands Geologic Hazards maps. It is assumed that this would be a flash flood area. The applicant's Hydrologic Study for the site indicates that "no 100-year floodplains have been officially designated, although preventing encroachment within the 100-year flooding level is a valid planning issue". Clarification of the existence of this hazard area should be required with the final drainage study.

The Hydrologic Report also indicates a peak runoff discharge of 364 cfs in the 100-year storm event. The drainage report noted that part of the scope of work was to include field measurement of the culvert across South Camp Road which would be carrying this runoff. That report did not include those measurements; however, the Preliminary Drainage Analysis, submitted by Wayne Lizer stated that the culvert would carry approximately 150 cfs. Final design would have to include the enlargement of the culvert, if necessary, in conjunction with the required road widening. Final design would also need to show how the drainage will be carried along the east side of South Camp Road, along the subdivision boundary. With the required road widening will the drainage be accommodated within the ROW or will additional easement width be necessary?

The drainage detention areas must be designated as common tracts to be owned and maintained by the homeowners. The off-site drainage report refers to an appendix with computations which was not provided.

Geotechnical

The Engineering Geology Investigation report, completed by Lincoln DeVore, Inc., describes the general geology of the site. The report states that several geologic hazards are present on the site and that the development plan is not in extreme conflict with these hazards. The geologic study identified three areas of ancient landslides, soil creep areas and rockslide and rock rolling areas.

The report indicates that the landslide areas should be treated as potentially unstable, similar to the areas of soil creep. The report recommends the upper slopes of lots 48, 49, 50, 50 and 52 (lots 49, 59, 51, 52 and 53 on the revised plan) be mapped as Potential Rockslide and Rockrolling Areas and addressed in the covenants as requiring evaluation and possible mitigation for rockslide and rockrolling. The proposed no build areas should mitigate the remaining rock fall potential. The report also indicates that the proposed road construction through the unstable slopes could create some problems.

The geotechnical report contains several statements which need further explanation or detail. Some might be appropriately left to be included with the final submittal, but others raise concerns with the design at the preliminary stage. The concerns are as follows:

Page 6--"Special care should be taken to maintain vegetation on the steeper slopes." Specific recommendations for the type of care and which slopes should be included in the final plans.

Page 11--"Great care is required to design subsurface drainage and cuts and fills in order to minimize the possibility of a large scale movement." It appears the roadway design will need to include specific designs for subsurface drainage. Although the report does not specifically address it, conversations between Ed Morris of Lincoln-DeVore and Jody Kliska, the City Development Engineer, indicated that Mr. Morris would not recommend any concrete (curb, gutter and sidewalk) be constructed in the proposed through cuts for 7 to 10 years to give the disturbed area time to make whatever movement it would make after disturbance. The assumption is that he expects some movement. This is not acceptable to the City.

In the response to these comments dated 1/9/96, submitted at the Planning Commission hearing, Mr. Morris clarifies that there are several variations to the City street standard he would recommend with the final design to accommodate the steep terrain. He also comments that mass movement is not necessarily anticipated.

Page 11--"The site drainage and appropriate cuts and fills must be carefully controlled to avoid inadvertent triggering of hillside creep or mass movement." The on-site preliminary drainage report does not address this at all. The final drainage report will be required to address this concern. The report also warns on page 13 of the possibility of "a troublesome perched water condition may develop which will provide construction difficulties."

Page 14--"The site condition which would have the greatest effect on the planned development is the potential for slope instability as pertaining to the construction of Trails End Road and the construction of single family residences on top of the Mesa and the presence of expansive

clays which would affect the foundations of structures on lots 54-66." Pages 32-33 contain specific recommendations for roadway cuts and fills, which appear to be intended to alleviate the anticipated slope instability. Conversations with Ed Morris included the possibility of blasting for foundations on the top of the mesa and the possible effects this could have on slope stability. The other concern that arose from this conversation was how sewer line construction would be accommodated since the lines would be required to be 6' below the roadway grade. No excavation pit logs were provided with the report but will be required to evaluate areas where rock is encountered.

In Mr. Morris' response he indicates that rock blasting would be a last resort after attempts to rip the shales, mudstones, siltstones and sandstone beds have proven inappropriate.

Page 35--The results of laboratory testing for pavement design are shown and are followed by the statement "Displacement values higher than 4.00 generally indicate the soil is unstable and may require confinement for proper performance." This indicates a more comprehensive pavement design will be required with the final plan. The report goes on to indicate geotextile fabric may be required. Discussions with Ed Morris indicate he has more specific pavement design recommendations than are presented in the report.

All of the above issues with the construction of roadway cuts and fills are a concern for the City because it appears if construction is not done properly, the portion of the roadway which is either in a large fill or cut may be a maintenance problem for the City. The City is not equipped to deal with streets with steep slopes or rockfall potential.

Other Comments

The petitioner has not satisfactorily addressed the impact a break in the 24" Ute Water line would have on downstream lots and how it could be mitigated.

The City is requesting land or easement dedication along both the active and inactive Redlands canal for public trails use. The applicant has indicated agreement with that request. Details of the dedications would be included with a final submittal.

Proposed street stubs to adjoining properties must be constructed with this subdivision. Final design would need to show how Trails End Road could access the adjoining land-locked parcels on top of the mesa.

The final submittal should show the buildable area for some of the smaller and more constrained lots, such as lots 31, 36, 39 and 54. The existing zoning of RSF-4 requires setbacks of 25' along South Camp Road and 23' from all internal streets, 30' rear yard setback and 7' sideyard setback. The proposal for single story structures on the upper lots will greatly restrict the square footage of the homes along the ridgeline.

The required improvements along South Camp Road will include widening for a left turn lane and a detached bicycle/pedestrian path.

Ute Water noted that adequate water pressure might not be available for the upper lots. Confirmation of necessary water pressure would be required with the final submittal.

The intersection of Mescalero and Montero should be as close to 90° as possible.

General Policies

Section 6-1-1 of the Zoning and Development Code includes the following stated goals of the subdivision regulation:

I. To preserve natural vegetation and cover, and to promote the natural beauty of the City;
J. To prevent and control erosion, sedimentation, and other pollution of surface and subsurface water;
L. To restrict building in areas poorly suited for building or construction;
M. To prevent loss and injury from landslides, mudflows, and other geologic hazards.

Staff feels the subdivision as proposed is in direct conflict with the above stated goals. As stated in the pre-application conference, staff believes the development should be confined to the lower part of the property, leaving the steep slopes undeveloped. The hillside will be irreparably scarred from the location of house and the cut and fill necessary to provide building sites and the road. Staff agrees that the applicant has made a very good attempt at mitigating the visual impacts of the homes on the ridgeline by moving them back from the ridge and restricting them to single story, but rooflines will still be visible. The scarring of the hillside will be extensive from the road construction and the necessary cut and fill for the homes located at the lower reaches of the escarpment, between the active Redlands Canal and the abandoned Redlands Canal. The proposed homes located on top of the mesa might be better suited for development at the time they can be accessed from a different area that doesn't require a road cut up the face of the escarpment.

STAFF RECOMMENDATION:

Staff recommends denial of the preliminary plan as submitted. If City Council considers approving the preliminary plan staff recommends that it be for lots 1 through 39 only with the following conditions:

1. The petitioner satisfactorily address the impact a break in the 24" Ute Water line would have on the lots and how it could be mitigated.

2. The land or easements be dedicated along the active and inactive Redlands canal for public trail use.

3. The proposed street stub to the adjacent property must be constructed.

4. The final submittal must show that all lots are buildable under the RSF-4 zoning required setbacks.

5. The required improvements along South Camp Road shall include widening to include a center turn lane and a detached bicycle/pedestrian path.

6. The intersection of Mescalero and Montero should be as close to 90° as possible.

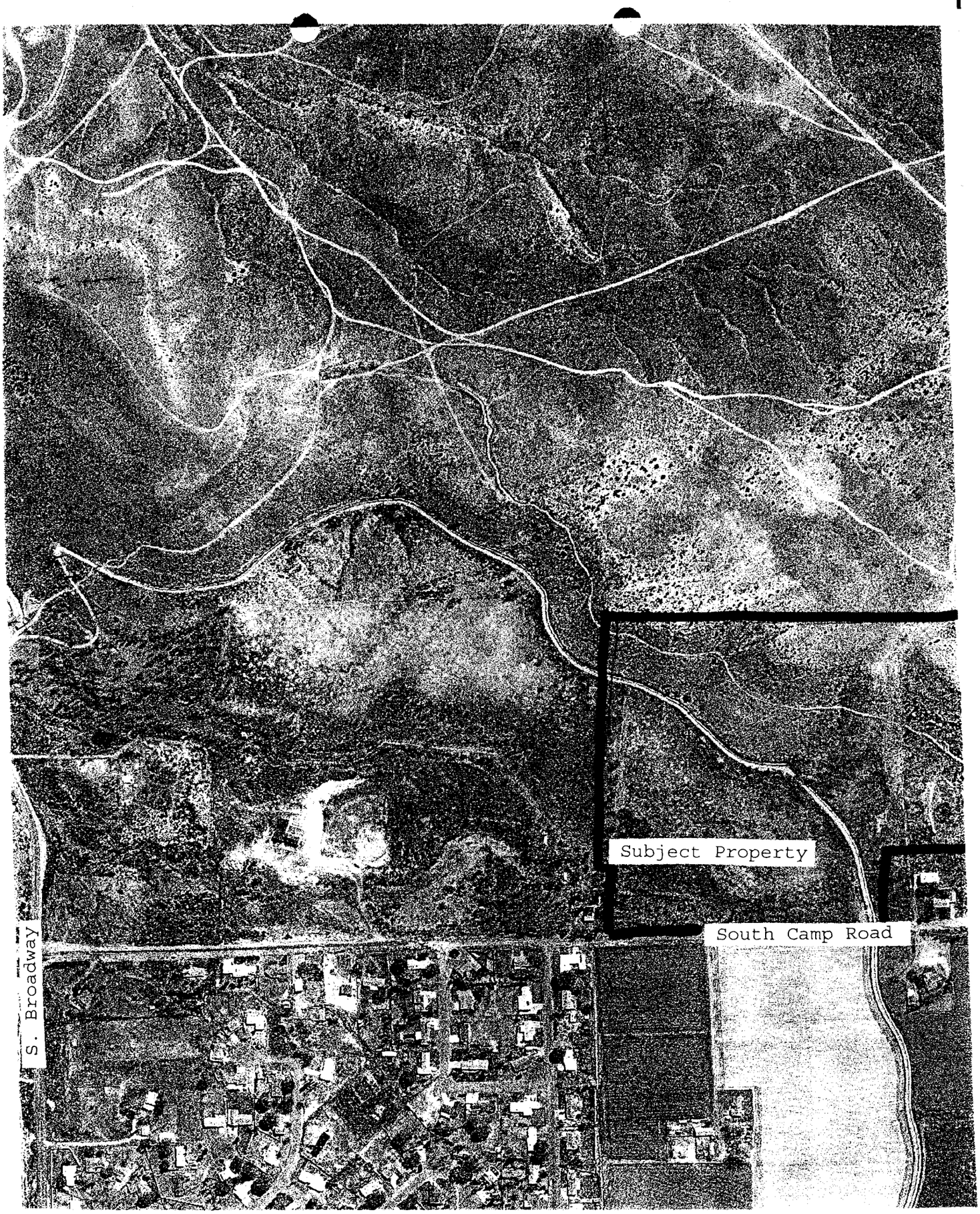
7. All required drainage improvements will be determined with the final submittal, including the enlargement of the culvert under South Camp Road if necessary.

8. The detention area(s) and other common areas must be platted as common tracts and dedicated to the homeowners.

9. The remainder of the parcel would be platted as one out-lot. A preliminary plan would be considered for lots 40 through 53 at a future time when it was redesigned with Trails End Road not continuing up the escarpment and all engineering and design concerns were addressed. Lots 54 through 66, on top of the mesa would not be platted until access could be provided from the top of the mesa.

PLANNING COMMISSION RECOMMENDATION:

At their January 9, 1996 hearing, the Planning Commission denied the preliminary plan for Trails West Subdivision. The applicant has appealed that denial to City Council.


Subject Property
South Camp Road
S. Broadway

Grand Junction Community Development Department
Planning • Zoning • Code Enforcement
250 North Fifth Street
Grand Junction, Colorado 81501-2668
(970) 244-1430 FAX (970) 244-1599

March 12, 1996

Brian Stowell
Camelot Investments, LLC
0090 Caballo Rd.
Carbondale, CO 81623

RE: Trails West Village

Dear Brian:

This is in follow-up to the Preliminary Plan approval for Trails West Village. At their February 21, 1996 hearing, the City Council approved the Preliminary Plan for lots 1-39 with the following conditions:

1. The petitioner must satisfactorily address the impacts a break or leak in the 24" Ute Water line would have, including the danger to lots, and how it could be mitigated.

2. Petitioner must dedicate public use easements along both the active and inactive Redlands canals. Regarding the fee title underlying the easement(s), Petitioner may retain ownership, may convey such to the City if the City consents, or may provide for the homeowner's association to retain ownership.

3. The proposed street stub to the adjacent property, as shown on the maps, must be constructed as a part of the construction of the first two filings (Lots 1-39); such stub shall be constructed at the same time as the improvements for the filing in which it is contained are constructed.

4. The final plat submittal must show that all lots are buildable under the RSF-4 zoning required setbacks. "Buildable", for purposes of this requirement, means the minimum square footage of each dwelling as required by the covenants, conditions or restrictions ("CCRs") imposed by the landowner.

5. The required improvements along South Camp Road, to be built together with the improvements required by approval of the first plat, shall include widening to include a center turn lane onto Mescalero Drive and onto Aztec Drive, and a detached 10 foot wide concrete bicycle/pedestrian path.

6. The intersection of Mescalero and Montero should be as close to 90° as possible.

7. All required drainage improvements will be determined with the final submittal, including the enlargement of the culvert under South Camp Road if necessary.

8. The detention area(s) and other common areas must be platted as common tracts and dedicated to the homeowners association at the time of final platting of the first phase. The homeowners association must be formed at the time of final platting of the first phase. The CCRs and homeowners association documents must provide for annexing future filings so that only one association exists upon the completion of the development. The detention areas must be sized to accommodate all future filings.

With regard to proposed lots 40-53, the first plat shall contain language such as "This Outlot A is appropriate for development, so long as all requirements of the City are met. Numbers of lots and layout cannot be determined until preliminary plat approval has been granted by the City." Staff agrees that Lots 40 through 53 are developable in concept, when Outlot A is redesigned with Trails End Road not continuing up the escarpment and when all engineering and design concerns are addressed.

With regard to the remainder of the property (the area to the east of the inactive Redlands canal, in which proposed lots 54-66 are shown on the preliminary plan dated January 17, 1995), it shall be platted as Outlot B. Outlot B shall be identified, on the first final plat, with language such as "This outlot may not be developed until acceptable access is provided from the north and/or east. If this outlot, or any portion, is to be developed, staff recommends that access be from the north or east of this Outlot B. Access to Outlot B shall be safe, pleasing and be minimally visible. Single family homes, if approved, must be situated and constructed so that only a minimal portion of the rooflines will be visible to a person standing at any point on that portion of South Camp Road which is adjacent to this development.

Future plans and filings for the property will require a pre-application conference with a planner prior to submittal of plans. If you have any questions, please call me at 244-1446.

Sincerely,

Kathy

Katherine M. Portner
Planning Supervisor

(All City Council Members Rec'd a copy)

4/10/96

To: Kathy Portner

TO: GRAND JUNCTION CITY COUNCIL
MESA COUNTY COMMISSIONERS

FROM: ED AND PEGGY LIPPOTH

SUBJECT: COUNTYWIDE LAND USE PLAN

We have studied the proposed City/County Land Use plan and would like to share the following concerns:

It is our understanding that in order to preserve the character and way of life in our valley we would all like to preserve as much of the agricultural/orchard areas as possible and not have them be gobbled up for housing just because they are flat and easy to build on. One of the proposed regulations would restrict hillside and ridgeline development. This would stop development on the Redlands Ridges as well as Mantey Heights and Orchard Mesa. All of these particular areas are marginal lands as far as agriculture development are concerned and yet would make very attractive housing areas. We already have considerable development in place in all three of these areas so limiting any future growth on ridges seems a little late.

Unsafe slopes are, of course, to be taken into consideration but the so called "aesthetic" concerns are not well defined.

We own property on the West Ridges area and when a developer tried to develop his lower ground and continue up to the higher ridge (Trails West Village), he had all sorts of roadblocks placed in his way for "aesthetic" reasons. He had addressed the unsafe slope problem already.

This is an example of making development of marginal lands so expensive and unrealistic that it drives developers to the flat, agriculture property first.

The inferred priorities of the new master plan seem to be to encourage development FIRST in existing subdivions, SECOND near existing roads and utilities and THIRD to preserve our agricultural lands . There is also a statement about incentives to cause these things to happen.

The Hillside and Ridgeline development ordinances will stop development on the marginal lands in the valley. It will be much easier for a developer to subdivide a flat orchard which is 100% useable and easier to put in roads and utilities than to develop the marginal lands on the hillsides and ridges. Unstable slopes can be easily identified by engineering studies but so called "aesthetic" reasons seem to rest in the eye of the planners.

The West Ridges area is a large area and access should be planned from all four directions and, hopefully, direct as much traffic as possible away from Highway 340 which is already overloaded. There seems to be concerns about roads going up these hillsides and again the word " aesthetic" reasons are a concern. We have many roads into the Ridges now that probably would fall into this area of concern by the planners but we have not seen any that are objectionable "aesthetically".

In summation---the words" aesthetic" and "inappropriate" need to be better defined and the priority should be placed on encouraging development in marginal land areas such as ridgetops rather than in orchard/farm land.

Sincerely,

Edward Lippoth

Peggy Lippoth