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File **FPP-1996-110**

Name: Trails West Filing 1 & 2 – South Camp Road – Final Plat Plan

**P** **S** 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, items are found on the list but are not present in the scanned electronic development file because they are already scanned elsewhere on the system. These scanned documents are denoted with (\*\*) and will be found on the ISYS query system in their designated categories.  
**r** **e** Documents specific to certain files, not found in the standard checklist materials, are listed at the bottom of the page.  
**s** **e** Remaining items, (not selected for scanning), will be listed and marked present. This index can serve as a quick guide for the contents of each file.  
**n** **e**  
**d** **t**

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		<b>*City Council staff report and exhibits</b>
		<b>*Summary sheet of final conditions</b>

### DOCUMENT DESCRIPTION:

X	X	Correspondence	X	American Arbitration Assoc. - Construction Industry Arbitration Tribunal – 10/28/98
X	X	Hydrology of Unnamed Major Basin – 12/9/98	X	X Drainage Easement – Bk 2567 / Pg 721 - **
X	X	Statement of No change to Names and Addresses from Adjacent Property Notification	X	Consent of Easement – Bk 2567 / Pg 720
X	X	Final Drainage Report – 4/96	X	X Final Approval Checklist
X	X	Storm Sewer Flow Report – 5/96	X	X Final Plat – Filing 1 & 2 – GIS Historical Maps - **
X	X	Planning Commission Minutes – 6/4/96		Utility Composite
X	X	City Council Minutes – 8/7/96 - **	X	Split Rail Fence Detail
X		Articles of Incorporation – 9/1/396	X	Planning Commission Notice of Public Hearing – sent 5/13/97
X	X	Declaration of Covenants	X	X Group letter from concerned neighborhood – Biggs, Gale, Atchley, Hahn, Minelli – ( Only Biggs letter scanned)
X	X	Charge sheet	X	First Supplemental Declaration of Covenants – 6/24/97 – Bk 2335 / Pg 893





# DEVELOPMENT APPLICATION

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

Receipt \_\_\_\_\_

Date \_\_\_\_\_

Rec'd By \_\_\_\_\_

File No. \_\_\_\_\_

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
<input checked="" type="checkbox"/> Subdivision Plat/Plan	<input type="checkbox"/> Minor <input checked="" type="checkbox"/> Major <input type="checkbox"/> Resub	n/18 acres	5. Camp Rd	RSF-4	Residential
<input type="checkbox"/> Rezone				From: To:	
<input type="checkbox"/> Planned Development	<input type="checkbox"/> ODP <input type="checkbox"/> Prelim <input type="checkbox"/> Final				
<input type="checkbox"/> Conditional Use					
<input type="checkbox"/> Zone of Annex					
<input type="checkbox"/> Variance					
<input type="checkbox"/> Special Use					
<input type="checkbox"/> Vacation					<input type="checkbox"/> Right-of Way <input type="checkbox"/> Easement
<input type="checkbox"/> Revocable Permit					

PROPERTY OWNER

DEVELOPER

REPRESENTATIVE

Camelot Investments, LLC

Camelot Investments, LLC

Jeff Cranc / LANDesign

Name

Name

Name

0090 Caballo Rd.

0090 Caballo Rd.

259 Grand Ave.

Address

Address

Address

Carbondale, CO 81623

Carbondale, CO 81623

Grand Junction CO 81501

City/State/Zip

City/State/Zip

City/State/Zip

970-963-0627

970-963-0627

970-245-4099

Business Phone No.

Business Phone No.

Business Phone No.

970/920-1028

925-6847 FAX

970/920-1028 (work)

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.

Brian L Howell / Camelot Investments LLC

4/28/96

Signature of Person Completing Application

Date

Brian L Howell / Camelot Investments LLC

4/28/96

Signature of Property Owner(s) - attach additional sheets if necessary

Date



# DEVELOPMENT APPLICATION

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

Receipt \_\_\_\_\_  
 Date \_\_\_\_\_  
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PETITION	PHASE	SIZE	LOCATION	ZONE	LAND USE
<input checked="" type="checkbox"/> Subdivision Plat/Plan	<input type="checkbox"/> Minor <input checked="" type="checkbox"/> Major <input type="checkbox"/> Resub	<i>~18 acres</i>	<i>5. Camp Rd</i>	<i>R5F-4</i>	<i>Residential</i>
<input type="checkbox"/> Rezone				From: To:	
<input type="checkbox"/> Planned Development	<input type="checkbox"/> ODP <input type="checkbox"/> Prelim <input type="checkbox"/> Final				
<input type="checkbox"/> Conditional Use					
<input type="checkbox"/> Zone of Annex					
<input type="checkbox"/> Variance					
<input type="checkbox"/> Special Use					
<input type="checkbox"/> Vacation					<input type="checkbox"/> Right-of Way <input type="checkbox"/> Easement
<input type="checkbox"/> Revocable Permit					

PROPERTY OWNER

DEVELOPER

REPRESENTATIVE

*Camelot Investments, LLC*  
Name

*Camelot Investments, LLC*  
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*Jeff Cranc / LANDesign*  
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*0090 Caballo Rd.*  
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*970-963-0627*  
Business Phone No.

*970-963-0627*  
Business Phone No.

*970-245-4099*  
Business Phone No.

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*Brian L Stowell / Camelot Investments LLC*  
Signature of Person Completing Application

*4/28/96*  
Date

*Brian L Stowell / Camelot Investments LLC*  
Signature of Property Owner(s) - attach additional sheets if necessary

*4/28/96*  
Date

2945-183-00-002

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

2945-183-00-009

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

2945-183-00-062

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

2945-192-00-115

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

2947-264-02-007

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

2947-264-03-002

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

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

2945-183-00-005

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

2945-183-00-041

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

2945-192-00-086

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

2947-264-00-030

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

2947-264-02-008

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

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

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

2945-183-00-006

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

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

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

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

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

2947-264-00-058

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

2947-264-03-001

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

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



**PRE-APPLICATION CONFERENCE**

Date: 3/8/196  
Conference Attendance: Kathy P., Jeff Crane, Brian L. Stowell  
Proposal: Final Plat  
Location: S. Camp Rd

Tax Parcel Number: 2945-183-00-039  
Review Fee: \$720 plus \$15/acre  
(Fee is due at the time of submittal. Make check payable to the City of Grand Junction.)

Additional ROW required? \_\_\_\_\_  
Adjacent road improvements required? \_\_\_\_\_  
Area identified as a need in the Master Plan of Parks and Recreation? \_\_\_\_\_  
Parks and Open Space fees required? \_\_\_\_\_ Estimated Amount: \_\_\_\_\_  
Recording fees required? \_\_\_\_\_ Estimated Amount: \_\_\_\_\_  
Half street improvement fees/TCP required? \_\_\_\_\_ Estimated Amount: \_\_\_\_\_  
Revocable Permit required? \_\_\_\_\_  
State Highway Access Permit required? \_\_\_\_\_  
On-site detention/retention or Drainage fee required? \_\_\_\_\_

Applicable Plans, Policies and Guidelines \_\_\_\_\_

Located in identified floodplain? FIRM panel # \_\_\_\_\_

Located in other geohazard area? \_\_\_\_\_

Located in established Airport Zone? Clear Zone, Critical Zone, Area of Influence? \_\_\_\_\_

Avigation Easement required? \_\_\_\_\_

While all factors in a development proposal require careful thought, preparation and design, the following "checked" items are brought to the petitioner's attention as needing special attention or consideration. Other items of special concern may be identified during the review process.

- Access/Parking
- Drainage
- Floodplain/Wetlands Mitigation
- Other \_\_\_\_\_
- Screening/Buffering
- Landscaping
- Availability of Utilities
- Land Use Compatibility
- Traffic Generation
- Geologic Hazards/Soils

Related Files: \_\_\_\_\_

It is recommended that the applicant inform the neighboring property owners and tenants of the proposal prior to the public hearing and preferably prior to submittal to the City.

**PRE-APPLICATION CONFERENCE**

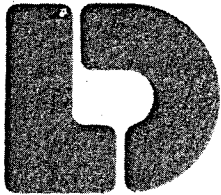
WE RECOGNIZE that we, ourselves, or our representative(s) must be present at all hearings relative to this proposal and it is our responsibility to know when and where those hearings are.

In the event that the petitioner is not represented, the proposed item will be dropped from the agenda, and an additional fee shall be charged to cover rescheduling expenses. Such fee must be paid before the proposed item can again be placed on the agenda. Any changes to the approved plan will require a re-review and approval by the Community Development Department prior to those changes being accepted.

WE UNDERSTAND that incomplete submittals will not be accepted and submittals with insufficient information, identified in the review process, which has not been addressed by the applicant, may be withdrawn from the agenda.

WE FURTHER UNDERSTAND that failure to meet any deadlines as identified by the Community Development Department for the review process may result in the project not being scheduled for hearing or being pulled from the agenda.

X Camelot Investments LLC  
Signature(s) of Petitioner(s) By: Brian L. Stowell Signature(s) of Representative(s)



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

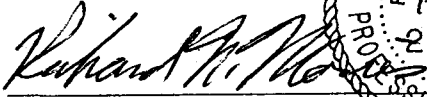
Dear Sir:

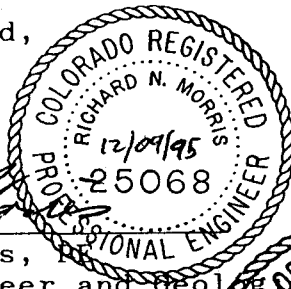
Transmitted herein are the results of a Hydrologic Study of the Unnamed Major Basin which contains the proposed TRAILS WEST VILLAGE SUBDIVISION, in the Redlands Area of Grand Junction, CO.. This study was prepared by the undersigned.


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.

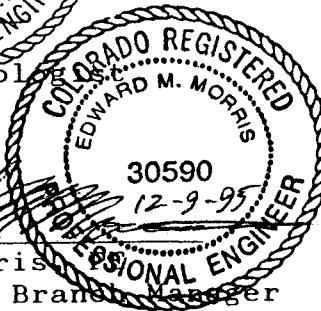
Respectfully submitted,

LINCOLN-DEVORE, INC.

By:   
 Richard N. Morris, PROFESSIONAL ENGINEER  
 Consulting Engineer and Geologist  
 Grand Junction, Colorado



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



LDTL Job No. 84157-J  
 RNM/



# **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).

256 277  
257 278

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		Slope 1/1	Av. CN	S	Tc Hrs	Hrs	Flow in.		Hours
		Ac	Sq. Mi.								
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		SLOPE							
		H	L	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

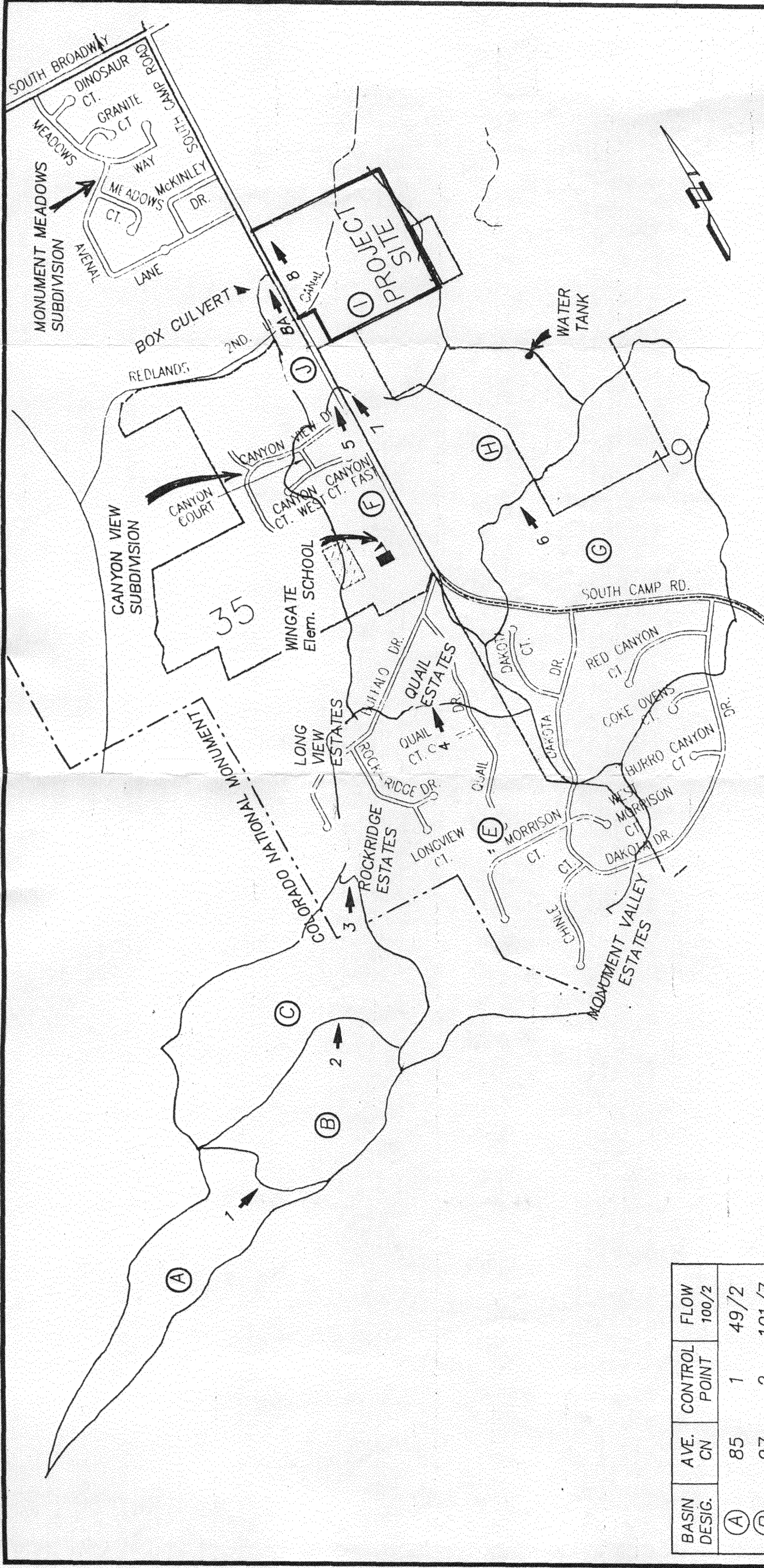
TRAILS WEST VILLAGE SUB.

DATE  
12-8-95

JOB NO.  
84157-J

DRAWN





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

PROJECT NO. 84157-J SHEET 3 OF 3  
 DRAWN BY E.M. MORRIS SCALE 1"=1000 DATE 12-8-95  
 CHECKED BY CONT. INT. 20' REV.

LINCOLN-DeVORE, INC.

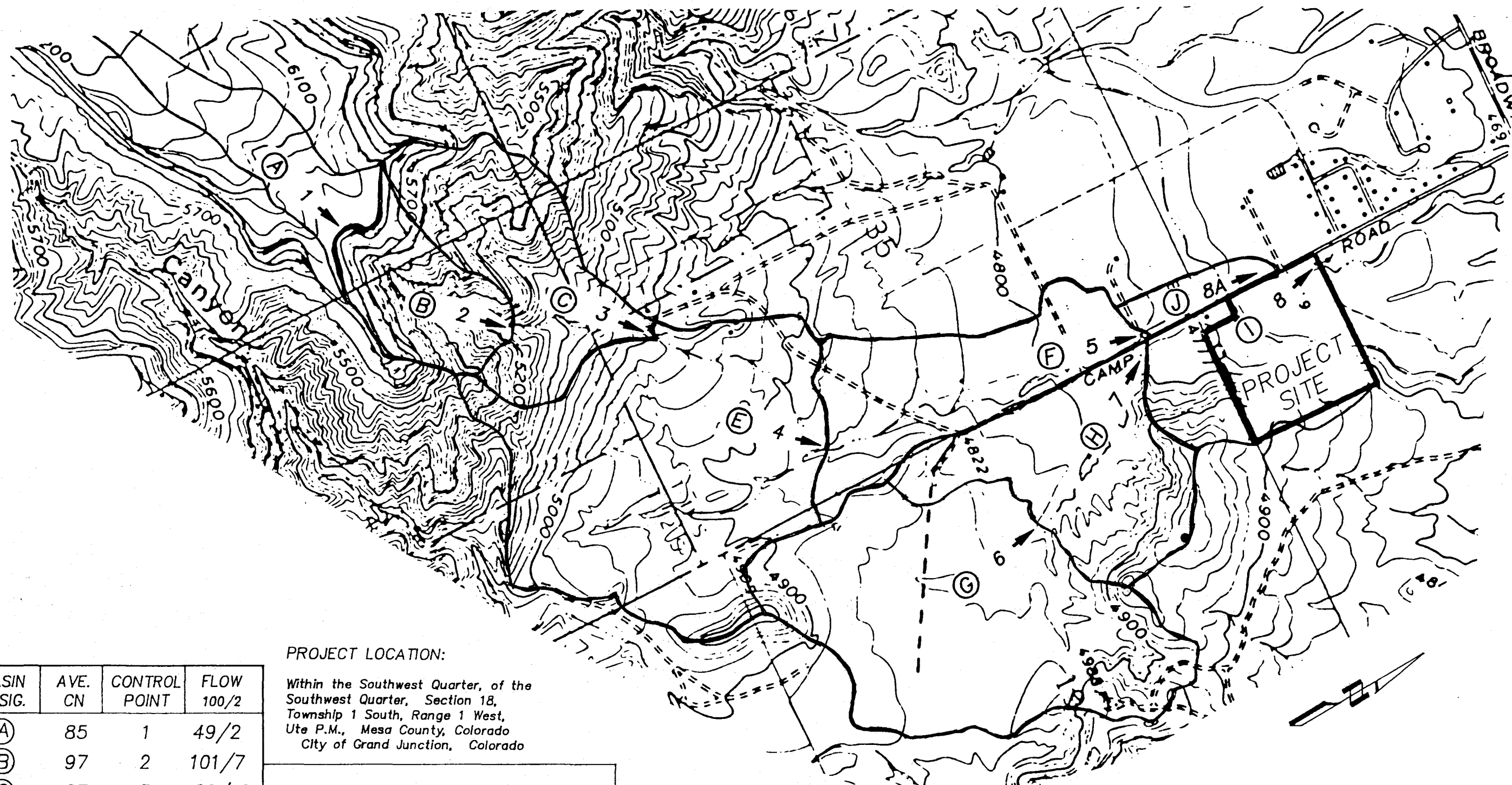
By:

State of Colorado  
 Designed by: RICHARD N. MORRIS, PE

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.
(1)	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



**PROJECT LOCATION:**

Within the Southwest Quarter, of the Southwest Quarter, Section 18, Township 1 South, Range 1 West, Ute P.M., Mesa County, Colorado City of Grand Junction, Colorado

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.

<b>D</b> LINCOLN DeVORE ENGINEERS-GEOLOGISTS	1441 MOTOR STREET GRAND JCT. COLORADO COLO. SPRINGS-PUEBLO
	LD # 84157-J
DRAWN BY: E.M. MORRIS	SCALE: 1"=1000
CHECKED BY:	CONT. INT. 20'
	DATE: 12-8-95
	REV.

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

Prepared For:

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

*Jodie Kliska*

Prepared By:

LINCOLN-DEVORE, INC.  
1441 Motor Street  
Grand Junction, CO 81505

December 9, 1995

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*****  
*  
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *  
*        MAY 1991                    *  
*        VERSION 4.0.1E             *  
*  
* RUN DATE 03/20/1996 TIME 17:58:05 *  
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*  
* U.S. ARMY CORPS OF ENGINEERS    *  
* HYDROLOGIC ENGINEERING CENTER   *  
*        609 SECOND STREET        *  
*        DAVIS, CALIFORNIA 95616   *  
*        (916) 756-1104           *  
*  
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  X   X   XXXXXXX   XXXX       X  
  X   X   X       X   X       XX  
  X   X   X       X           X  
  XXXXXXX   XXXX   X       XXXXX   X  
  X   X   X       X           X  
  X   X   X       X   X       X  
  X   X   XXXXXXX   XXXX       XXX
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:::                               :::  
::: Full Microcomputer Implementation   :::  
:::                                by       :::  
:::                               Haestad Methods, Inc.   :::  
:::                               :::  
.....  
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37 Brookside Road \* Waterbury, Connecticut 06708 \* (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.  
THE DEFINITION OF -AMSK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION  
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,  
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL    LOSS RATE:GREEN AND AMPT INFILTRATION  
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1 ID TRAILS WEST VILLAGE SUBDIVISION, GRAND JUNCTION, COLORADO

2 ID 100 YEAR, 24 HOUR STORM

\*DIAGRAM

3 IT 15 22OCT95 0930 60

4 IO 2

5 IN 15 22OCT95 0930

6 KK SUBA

7 KM SUBBASIN A, MESA, NAT. MONUMENT & OUTFALL

8 KO 3

9 BA .077

10 PB 2.01

11 PC .000 .002 .005 .008 .011 .014 .017 .020 .023 .026

12 PC .029 .032 .035 .038 .041 .044 .048 .052 .056 .060

13 PC .064 .068 .072 .076 .080 .085 .090 .095 .100 .105

14 PC .110 .115 .120 .126 .133 .140 .147 .155 .163 .172

15 PC .181 .191 .203 .218 .236 .257 .283 .387 .663 .707

16 PC .735 .758 .776 .791 .804 .815 .825 .834 .842 .849

17 PC .856 .863 .869 .875 .881 .887 .893 .898 .903 .908

18 PC .913 .918 .922 .926 .930 .934 .938 .942 .946 .950

19 PC .953 .956 .959 .962 .965 .968 .971 .974 .977 .980

20 PC .983 .986 .989 .992 .995 .998 1.00

21 LS 0 85

22 UD .202

23 KK 1T02

24 KM ROUTE FLOW, POINT 1 TO POINT 2 (32+20 TO 49+70)

25 KO 3

26 RS 4 FLOW -1

27 RC .073 .042 .073 1920 .4360

28 RX 0 25 48 70 90 105 120 140

29 RY 5200 5170 5153 5150 5154 5164 5174 5190

30 KK SUBB

31 KM SUB BASIN B, PARK SLOPE

32 BA .067

33 LS 0 87

34 UD .050

35 KK PT2

36 KM COMBINE HYDROGRAPHS A & B AT PT 2

37 HC 2

38 KK 2T03

39 KM ROUTE FLOW, POINT 2 TO POINT 3

40 KO 3

41 RS 3 FLOW -1

42 RC .065 .036 .065 1400 .1146

43 RX 0 40 70 82 100 110 130 140

44 RY 5005 5000 4995 4992 4990 4996 5002 5006

HEC-1 INPUT

LINE	ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
45	KK SUBC
46	KM SUBBASIN C, SLOPE AT MONUMENT
47	BA .116
48	LS 0 87
49	UD .089
50	KK PT3
51	KM COMBINE HYDROGRAPHS A,B & C AT POINT 3
52	HC 2
53	KK 3T04
54	KM ROUTE FLOW FROM PT 3 TO PT 4
55	KO 3
56	RS 4 FLOW -1
57	RC .074 .036 .074 2300 .0560
58	RX 0 50 100 150 200 280 320 400
59	RY 4880 4877 4875 4867 4861 4870 4875 4878
60	KK SUBE
61	KM SUBBASIN E, COLLECTED ON FAN
62	BA .270
63	LS 0 76
64	UD .170
65	KK PT4
66	KM COMBINE HYDROGRAPHS AT POINT 4 A,B,C +E
67	HC 2
68	KK 4T04A
69	KM ROUTE FLOW FROM POINT 4 TO POINT 4A
70	KO 3
71	RS 3 FLOW -1
72	RC .064 .035 .064 2230 .0274
73	RX 0 80 110 170 200 260 300 400
74	RY 4851 4847 4845 4840 4838 4840 4845 4851
75	KK SUBF
76	KM SUBBASIN F SOUTH OF SUBDIVISION PRIOR TO ENTRY
77	BA .084
78	LS 0 75 12.5
79	UD .279
80	KK PT4A
81	KM COMBINE HYDROGRAPHS ABCE & F AT POINT 4A
82	HC 2
83	KK 4AT05
84	KM ROUTE HYDROGRAPHS FROM POINT 4A TO POINT 5
85	KO 3
86	RS 3 FLOW -1

87	RC	.060	.035	.060	1250	.0160			
88	RX	0	80	110	170	200	260	300	400
89	RY	4831	4827	4825	4820	4818	4820	4825	4831

HEC-1 INPUT

PAGE 3

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

90 KK SUBFA  
 91 KM CALCULATE HYDROGRAPH FROM FA (CANYON VIEW SUB.)  
 92 BA .027  
 93 LS 0 84  
 94 UD .185

95 KK CVPOND  
 96 KM ROUTE SUBDIV. FA THROUGH DETENTION POND  
 97 KO 3 2  
 98 RS 1 ELEV 4780  
 99 SV 0 .24 .36  
 100 SE 4779.8 4782.59 4784  
 101 SQ 0 1.9 6.0 8.0  
 102 SE 4779.8 4780.35 4782.59 4784

103 KK PT5  
 104 KM COMBINE HYDROGRAPHS ABCE&FA AT POINT 5  
 105 HC 2

106 KK 5T08A  
 107 KM ROUTE HYDROGRAPHS FROM POINT 5 TO POINT 8A  
 108 KO 3  
 109 RS 3 FLOW -1  
 110 RC .058 .035 .054 1450 .0276  
 111 RX 0 125 220 230 250 260 270 300  
 112 RY 4733 4782 4781 4780 4780 4781 4782 4783

113 KK SUBJ  
 114 KM ROADWAY SUBBASIN J (S. CAMP RD.)  
 115 BA .017  
 116 LS 0 78  
 117 UD .124

118 KK PT8A  
 119 KM COMBINE HYDROGRAPHS AT POINT 8A (ABCEFFA & J)  
 120 HC 2

121 KK SUBG  
 122 KM SUBBASIN G START 2ND LINE  
 123 BA .243  
 124 LS 0 75  
 125 UD .215

126 KK 6T07  
 127 KM ROUTE BASIN G FLOW FROM POINT 6 TO POINT 7  
 128 KO 3  
 129 RS 4 FLOW -1

130	RC	.056	.034	.054	2080	.0184			
131	RX	0	80	110	170	200	260	300	400
132	RY	4891	4827	4825	4820	4818	4820	4825	4831

HEC-1 INPUT

LINE ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

133	KK	SUBH							
134	KM	SUBBASIN H LOWER PLAIN SOUTH OF SUBDIVISION							
135	BA	.121							
136	LS	0	76						
137	UD	.200							
138	KK	PT7							
139	KM	COMBINE BASIN HYDROGRAPHS G & H AT POINT 7							
140	HC	2							
141	KK	7T08							
142	KM	ROUTE BASINS G & H FROM POINT 7 TO POINT 8							
143	KO	3							
144	RS	3	FLOW	-1					
145	RC	.054	.034	.054	1850	.0216			
146	RX	0	40	50	70	120	150	220	270
147	RY	4783	4782	4781	4780	4780	4782	4783	4785
148	KK	SUBI							
149	KM	SUBBASIN I THE BASIC SUBDIVISION							
150	BA	.099							
151	LS	0	77						
152	UD	.154							
153	KK	PT8B							
154	KM	COMBINE EAST GROUP, BASINS G,H & I AT POINT 8							
155	HC	2							
156	KK	PT8							
157	KM	COMBINE EAST GROUP WITH WEST GROUP AT COLLECTION BASIN							
158	HC	2							
159	ZZ								



SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE	(V) ROUTING	(--->) DIVERSION OR PUMP FLOW
NO.	(.) CONNECTOR	(<---) RETURN OF DIVERTED OR PUMPED FLOW
6	SUBA	
	V	
	V	
23	1T02	
	.	
30	SUBB	
	.	
35	PT2.....	
	V	
	V	
38	2T03	
	.	
45	SUBC	
	.	
50	PT3.....	
	V	
	V	
53	3T04	
	.	
60	SUBE	
	.	
65	PT4.....	
	V	
	V	
68	4T04A	
	.	
75	SUBF	
	.	
80	PT4A.....	
	V	
	V	
83	4AT05	
	.	
90	SUBFA	
	V	
	V	
95	CVPOND	
	.	
	.	

103	PT5.....		
	V		
	V		
106	5T08A		
	.		
113	.	SUBJ	
	.		
118	PT8A.....		
	.		
121	.	SUBG	
	.	V	
	.	V	
126	.	6T07	
	.		
133	.		SUBH
	.		.
138	.	PT7.....	
	.	V	
	.	V	
141	.	7T08	
	.		
148	.		SUBI
	.		.
153	.	PT8B.....	
	.		
156	PT8.....		

RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****  
*  
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *  
*        MAY    1991               *  
*        VERSION 4.0.1E           *  
*  
* RUN DATE 03/20/1996 TIME 17:58:05 *  
*  
*****
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*****  
*  
* U.S. ARMY CORPS OF ENGINEERS    *  
* HYDROLOGIC ENGINEERING CENTER   *  
*        609 SECOND STREET        *  
*        DAVIS, CALIFORNIA 95616   *  
*        (916) 756-1104           *  
*  
*****
```

TRAILS WEST VILLAGE SUBDIVISION, GRAND JUNCTION, COLORADO  
100 YEAR, 24 HOUR STORM

4 IO      OUTPUT CONTROL VARIABLES

IPRNT	2	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT        HYDROGRAPH TIME DATA

NMIN	15	MINUTES IN COMPUTATION INTERVAL
IDATE	22OCT95	STARTING DATE
ITIME	0930	STARTING TIME
NQ	60	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	23OCT95	ENDING DATE
NDTIME	0015	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL    0.25 HOURS  
TOTAL TIME BASE        14.75 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

\*\*\*\*\*  
 6 KK \* SUBA \*  
 \*\*\*\*\*

SUBBASIN A, MESA, NAT. MONUMENT & OUTFALL

8 KO OUTPUT CONTROL VARIABLES  
 IPRNT 3 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

5 IN TIME DATA FOR INPUT TIME SERIES  
 JXMIN 15 TIME INTERVAL IN MINUTES  
 JXDATE 22OCT95 STARTING DATE  
 JXTIME 930 STARTING TIME

9 BA SUBBASIN RUNOFF DATA  
 SUBBASIN CHARACTERISTICS  
 TAREA 0.08 SUBBASIN AREA

10 PB PRECIPITATION DATA  
 STORM 2.01 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	

21 LS SCS LOSS RATE  
 STRTL 0.35 INITIAL ABSTRACTION  
 CRVNR 85.00 CURVE NUMBER  
 RTIMP 0.00 PERCENT IMPERVIOUS AREA

22 UD SCS DIMENSIONLESS UNITGRAPH  
 TLAG 0.20 LAG

UNIT HYDROGRAPH  
 6 END-OF-PERIOD ORDINATES  
 99. 72. 20. 6. 2. 0.

HYDROGRAPH AT STATION SUBA

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.21, TOTAL EXCESS = 0.80

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
42.	12.00	(CFS) 7.	3.	3.	3.
		(INCHES) 0.787	0.787	0.787	0.787
		(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = 0.08 SQ MI

\*\*\*\*\*  
 23 KK \* 1T02 \*  
 \*\*\*\*\*

ROUTE FLOW. POINT 1 TO POINT 2 (32+20 TO 49+70)

25 KG OUTPUT CONTROL VARIABLES  
 IPRNT 3 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

26 RS STORAGE ROUTING  
 NSTPS 4 NUMBER OF SUBREACHES  
 ITYP FLOW TYPE OF INITIAL CONDITION  
 RSVRIC -1.00 INITIAL CONDITION  
 X 0.00 WORKING R AND D COEFFICIENT

27 RC NORMAL DEPTH CHANNEL  
 ANL 0.073 LEFT OVERBANK N-VALUE  
 ANCH 0.042 MAIN CHANNEL N-VALUE  
 ANR 0.073 RIGHT OVERBANK N-VALUE  
 RLNTH 1920. REACH LENGTH  
 SEL 0.4360 ENERGY SLOPE  
 ELMAX 0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

	--- LEFT OVERBANK ---		+ ----- MAIN CHANNEL -----				+ --- RIGHT OVERBANK ---	
29 RY ELEVATION	5200.00	5170.00	5153.00	5150.00	5154.00	5164.00	5174.00	5190.00
28 RX DISTANCE	0.00	25.00	48.00	70.00	90.00	105.00	120.00	140.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	1.88	6.73	12.61	19.36	26.99	35.48	44.84	55.07	66.03
OUTFLOW	0.00	1190.22	7831.83	19900.21	36674.91	58105.62	86628.45	121551.59	161982.00	207870.42
ELEVATION	5150.00	5152.63	5155.26	5157.89	5160.53	5163.16	5165.79	5168.42	5171.05	5173.68
STORAGE	77.67	89.96	102.87	116.43	130.62	145.44	160.78	176.38	192.24	208.35
OUTFLOW	259078.23	315525.72	377208.19	444141.97	516354.09	593879.06	678368.63	768568.13	863980.00	964529.19
ELEVATION	5176.31	5178.94	5181.58	5184.21	5186.84	5189.47	5192.10	5194.73	5197.36	5200.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 964529. THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS. THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 1702

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
39.	12.00	(CFS) 7.	3.	3.	3.
		(INCHES) 0.786	0.786	0.786	0.786
		(AC-FT) 3.	3.	3.	3.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.00	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
5150.09	12.00	5150.01	5150.01	5150.01	5150.00

CUMULATIVE AREA = 0.08 SQ MI

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*           *
30 KK *   SUBB *
*           *
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SUB BASIN B, PARK SLOPE

SUBBASIN RUNOFF DATA

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32 BA SUBBASIN CHARACTERISTICS
      TAREA  0.07 SUBBASIN AREA

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PRECIPITATION DATA

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10 PB STORM  2.01 BASIN TOTAL PRECIPITATION

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11 PI INCREMENTAL PRECIPITATION PATTERN

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0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

```

33 LS SCS LOSS RATE
      STRTL  0.30 INITIAL ABSTRACTION
      CRVNBR 87.00 CURVE NUMBER
      RTIMP  0.00 PERCENT IMPERVIOUS AREA

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34 UD SCS DIMENSIONLESS UNITGRAPH
      TLAG  0.05 LAG

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UNIT HYDROGRAPH  
5 END-OF-PERIOD ORDINATES

128.    36.    7.    1.    0.

HYDROGRAPH AT STATION    SUBB

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q		DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	1.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.02	0.01	1.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.03	0.01	1.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.03	0.01	2.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.04	0.01	2.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.04	0.02	3.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.14	0.11	15.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.25	0.40	56.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.03	0.07	25.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.02	0.05	12.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.01	0.04	8.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.01	0.03	6.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.01	0.03	5.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.01	0.02	4.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.02	4.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.02	3.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.00	0.02	3.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.00	0.01	3.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.00	0.01	2.

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.10, TOTAL EXCESS = 0.91

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
56.	12.00	(CFS) 7.	3.	3.	3.
		(INCHES) 0.902	0.903	0.903	0.903
		(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = 0.07 SQ MI



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 \* \*  
 35 KK \* PT2 \*  
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COMBINE HYDROGRAPHS A & B AT PT 2

37 HC HYDROGRAPH COMBINATION  
 ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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\*\*\*\*\*  
 HYDROGRAPH AT STATION PT2  
 SUM OF 2 HYDROGRAPHS  
 \*\*\*\*\*

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	0.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	4.
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	6.
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	24.
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	95.
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	64.
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	28.
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*	22	OCT	2215	52	20.
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	0.	*	22	OCT	2230	53	13.
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	0.	*	22	OCT	2245	54	12.
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*	22	OCT	2300	55	9.
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	1.	*	22	OCT	2315	56	8.
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	1.	*	22	OCT	2330	57	7.
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	1.	*	22	OCT	2345	58	6.
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	2.	*	23	OCT	0000	59	6.
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	3.	*	23	OCT	0015	60	5.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW					
		6-HR	24-HR	72-HR	14.75-HR		
		95.	12.00	(CFS) 13.	5.	5.	5.
				(INCHES) 0.840	0.840	0.840	0.840
		(AC-FT) 6.	6.	6.	6.		

CUMULATIVE AREA = 0.14 SQ MI

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 \* \*  
 38 KK \* 2703 \*  
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ROUTE FLOW, POINT 2 TO POINT 3

40 KO OUTPUT CONTROL VARIABLES  
 IPRNT 3 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

41 RS STORAGE ROUTING  
 NSTPS 3 NUMBER OF SUBREACHES  
 ITYP FLOW TYPE OF INITIAL CONDITION  
 RSVRIC -1.00 INITIAL CONDITION  
 X 0.00 WORKING R AND D COEFFICIENT

42 RC NORMAL DEPTH CHANNEL  
 ANL 0.065 LEFT OVERBANK N-VALUE  
 ANCH 0.036 MAIN CHANNEL N-VALUE  
 ANR 0.065 RIGHT OVERBANK N-VALUE  
 RLNTH 1400. REACH LENGTH  
 SEL 0.1146 ENERGY SLOPE  
 ELMAX 0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

	--- LEFT OVERBANK ---		+ ----- MAIN CHANNEL ----- +				--- RIGHT OVERBANK ---	
44 RY ELEVATION	5005.00	5000.00	4995.00	4992.00	4990.00	4996.00	5002.00	5006.00
43 RX DISTANCE	0.00	40.00	70.00	82.00	100.00	110.00	130.00	140.00

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.12	0.49	1.07	1.80	2.65	3.63	4.76	6.09	7.63
OUTFLOW	0.00	29.18	185.30	563.60	1176.38	2025.86	3143.23	4701.46	6677.48	9013.75
ELEVATION	4990.00	4990.84	4991.68	4992.53	4993.37	4994.21	4995.05	4995.90	4996.74	4997.58
STORAGE	9.38	11.34	13.52	15.94	18.62	21.54	24.71	28.12	31.77	35.53
OUTFLOW	11714.23	14796.34	18271.95	22138.82	26457.27	31261.80	36557.43	42356.54	48761.70	56054.70
ELEVATION	4998.42	4999.27	5000.11	5000.95	5001.79	5002.63	5003.48	5004.32	5005.16	5006.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 56055.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 2T03

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
83.	12.00	(CFS) 13.	5.	5.	5.
		(INCHES) 0.837	0.838	0.838	0.838
		(AC-FT) 6.	6.	6.	6.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.00	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4991.13	12.00	4990.27	4990.11	4990.11	4990.11

CUMULATIVE AREA = 0.14 SQ MI

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*           *
45 KK *   SUBC *
*           *
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SUBBASIN C, SLOPE AT MONUMENT

SUBBASIN RUNOFF DATA

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47 BA SUBBASIN CHARACTERISTICS
      TAREA  0.12 SUBBASIN AREA

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PRECIPITATION DATA

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10 PB STORM  2.01 BASIN TOTAL PRECIPITATION

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11 PI INCREMENTAL PRECIPITATION PATTERN

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0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	

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48 LS SCS LOSS RATE
      STRTL  0.30 INITIAL ABSTRACTION
      CRVNBR 87.00 CURVE NUMBER
      RTIMP  0.00 PERCENT IMPERVIOUS AREA

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49 UD SCS DIMENSIONLESS UNITGRAPH
      TLAG  0.09 LAG

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UNIT HYDROGRAPH  
5 END-OF-PERIOD ORDINATES

222.      62.      12.      2.      0.

HYDROGRAPH AT STATION      SUBC

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	1.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	1.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	1.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	1.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.02	0.01	1.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.03	0.01	2.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.03	0.01	3.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.04	0.01	4.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.04	0.02	6.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.14	0.11	25.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.25	0.40	97.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.03	0.07	43.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.02	0.05	21.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.01	0.04	14.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.01	0.03	10.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.01	0.03	9.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.01	0.02	7.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.02	6.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.02	6.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.00	0.02	5.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.00	0.01	5.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.00	0.01	4.

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.10, TOTAL EXCESS = 0.91

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
97.	12.00	(CFS) 11.	5.	5.	5.
		(INCHES) 0.902	0.903	0.903	0.903
		(AC-FT) 6.	6.	6.	6.

CUMULATIVE AREA = 0.12 SQ MI

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*           *
50 KK *     PT3 *
*           *
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COMBINE HYDROGRAPHS A, B & C AT POINT 3

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52 HC      HYDROGRAPH COMBINATION
          ICOMP      2  NUMBER OF HYDROGRAPHS TO COMBINE

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*****
HYDROGRAPH AT STATION   PT3
SUM OF 2 HYDROGRAPHS
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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	0.	22	OCT	1315	16	0.	22	OCT	1700	31	0.	22	OCT	2045	46	8.
22	OCT	0945	2	0.	22	OCT	1330	17	0.	22	OCT	1715	32	0.	22	OCT	2100	47	11.
22	OCT	1000	3	0.	22	OCT	1345	18	0.	22	OCT	1730	33	0.	22	OCT	2115	48	44.
22	OCT	1015	4	0.	22	OCT	1400	19	0.	22	OCT	1745	34	0.	22	OCT	2130	49	180.
22	OCT	1030	5	0.	22	OCT	1415	20	0.	22	OCT	1800	35	0.	22	OCT	2145	50	121.
22	OCT	1045	6	0.	22	OCT	1430	21	0.	22	OCT	1815	36	0.	22	OCT	2200	51	46.
22	OCT	1100	7	0.	22	OCT	1445	22	0.	22	OCT	1830	37	0.	22	OCT	2215	52	38.
22	OCT	1115	8	0.	22	OCT	1500	23	0.	22	OCT	1845	38	1.	22	OCT	2230	53	24.
22	OCT	1130	9	0.	22	OCT	1515	24	0.	22	OCT	1900	39	1.	22	OCT	2245	54	20.
22	OCT	1145	10	0.	22	OCT	1530	25	0.	22	OCT	1915	40	1.	22	OCT	2300	55	18.
22	OCT	1200	11	0.	22	OCT	1545	26	0.	22	OCT	1930	41	2.	22	OCT	2315	56	14.
22	OCT	1215	12	0.	22	OCT	1600	27	0.	22	OCT	1945	42	2.	22	OCT	2330	57	14.
22	OCT	1230	13	0.	22	OCT	1615	28	0.	22	OCT	2000	43	3.	22	OCT	2345	58	11.
22	OCT	1245	14	0.	22	OCT	1630	29	0.	22	OCT	2015	44	4.	23	OCT	0000	59	11.
22	OCT	1300	15	0.	22	OCT	1645	30	0.	22	OCT	2030	45	6.	23	OCT	0015	60	9.

```

*****
PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
(CFS)          (HR)
180.          12.00
(CFS)         24.         10.         10.         10.
(INCHES)      0.866        0.867        0.867        0.867
(AC-FT)       12.          12.          12.          12.

```

CUMULATIVE AREA = 0.26 SQ MI

```
*****
*           *
* 3T04     *
*           *
*****
```

53 KK

ROUTE FLOW FROM PT 3 TO PT 4

55 KO

OUTPUT CONTROL VARIABLES

```
IPRNT      3  PRINT CONTROL
IPLOT      0  PLOT CONTROL
QSCAL     0.  HYDROGRAPH PLOT SCALE
```

HYDROGRAPH ROUTING DATA

56 RS

STORAGE ROUTING

```
NSTPS      4  NUMBER OF SUBREACHES
ITYP       FLOW TYPE OF INITIAL CONDITION
RSYRIC     -1.00 INITIAL CONDITION
X          0.00 WORKING R AND D COEFFICIENT
```

57 RC

NORMAL DEPTH CHANNEL

```
ANL        0.074 LEFT OVERBANK N-VALUE
ANCH       0.036 MAIN CHANNEL N-VALUE
ANR        0.074 RIGHT OVERBANK N-VALUE
RLNTH     2300. REACH LENGTH
SEL        0.0560 ENERGY SLOPE
ELMAX      0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION
```

CROSS-SECTION DATA

	--- LEFT OVERBANK ---		+ ----- MAIN CHANNEL -----				+ --- RIGHT OVERBANK ---		
59 RY	ELEVATION	4880.00	4877.00	4875.00	4867.00	4861.00	4870.00	4875.00	4878.00
58 RX	DISTANCE	0.00	50.00	100.00	150.00	200.00	280.00	320.00	400.00

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.45	1.82	4.09	7.27	11.37	16.37	22.22	28.88	36.33
OUTFLOW	0.00	52.89	335.86	990.22	2132.57	3866.60	6287.52	9553.88	13642.74	18620.10
ELEVATION	4861.00	4862.00	4863.00	4864.00	4865.00	4866.00	4867.00	4868.00	4869.00	4870.00
STORAGE	44.56	53.55	63.28	73.77	85.01	97.99	113.70	131.91	151.71	172.39
OUTFLOW	25267.51	32862.55	41431.66	51000.78	61596.56	74567.25	89003.20	105026.88	123131.28	142813.77
ELEVATION	4871.00	4872.00	4873.00	4874.00	4875.00	4876.00	4877.00	4878.00	4879.00	4880.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 142814.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 3T04

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
167.	12.25	(CFS) 24.	10.	10.	10.
		(INCHES) 0.860	0.861	0.861	0.861
		(AC-FT) 12.	12.	12.	12.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.25	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4862.40	12.25	4861.33	4861.13	4861.13	4861.14

CUMULATIVE AREA = 0.26 SQ MI



```

*****
*           *
*   SUBE   *
*           *
*****

```

SUBBASIN E, COLLECTED ON FAN

SUBBASIN RUNOFF DATA

```

62 BA   SUBBASIN CHARACTERISTICS
        TAREA   0.27  SUBBASIN AREA

```

PRECIPITATION DATA

```

10 PB   STORM   2.01  BASIN TOTAL PRECIPITATION

```

```

11 PI   INCREMENTAL PRECIPITATION PATTERN

```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

```

63 LS   SCS LOSS RATE
        STRTL   0.63  INITIAL ABSTRACTION
        CRVNBR  76.00 CURVE NUMBER
        RTIMP   0.00  PERCENT IMPERVIOUS AREA

```

```

64 UD   SCS DIMENSIONLESS UNITGRAPH
        TLAG    0.17  LAG

```

UNIT HYDROGRAPH  
5 END-OF-PERIOD ORDINATES

423.      205.      52.      13.      4.

HYDROGRAPH AT STATION      SUBE

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.04	0.00	0.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.00	0.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.05	0.00	0.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.06	0.00	0.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.22	0.02	10.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.46	0.19	86.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.04	59.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.04	0.03	32.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.02	21.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	16.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	13.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.02	0.02	11.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	10.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	9.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	8.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	7.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	6.

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.59, TOTAL EXCESS = 0.42

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
86.	12.00	(CFS) 12.	5.	5.	5.
		(INCHES) 0.410	0.410	0.410	0.410
		(AC-FT) 6.	6.	6.	6.

CUMULATIVE AREA = 0.27 SQ MI

65 KK

\*\*\*\*\*  
\* \*  
\* PT4 \*  
\* \*  
\*\*\*\*\*

COMBINE HYDROGRAPHS AT POINT 4 A,B,C +E

67 HC

HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

\*\*\*

\*\*\*\*\*  
HYDROGRAPH AT STATION PT4  
SUM OF 2 HYDROGRAPHS  
\*\*\*\*\*

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	0.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	7.
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	10.
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	36.
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	219.
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	226.
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	84.
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*	22	OCT	2215	52	58.
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	0.	*	22	OCT	2230	53	50.
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	1.	*	22	OCT	2245	54	31.
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*	22	OCT	2300	55	31.
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	1.	*	22	OCT	2315	56	25.
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	2.	*	22	OCT	2330	57	21.
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	2.	*	22	OCT	2345	58	21.
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	3.	*	23	OCT	0000	59	17.
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	5.	*	23	OCT	0015	60	16.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
226.	12.25	(CFS) 36.	15.	15.	15.
		(INCHES) 0.631	0.631	0.631	0.631
		(AC-FT) 18.	18.	18.	18.

CUMULATIVE AREA = 0.53 SQ MI

```

*****
*
*
68 KK * 4T04A *
*
*
*****

```

ROUTE FLOW FROM POINT 4 TO POINT 4A

```

70 KO OUTPUT CONTROL VARIABLES
      IPRNT      3 PRINT CONTROL
      IPLOT      0 PLOT CONTROL
      QSCAL      0. HYDROGRAPH PLOT SCALE

```

HYDROGRAPH ROUTING DATA

```

71 RS STORAGE ROUTING
      NSTPS      3 NUMBER OF SUBREACHES
      ITYP       FLOW TYPE OF INITIAL CONDITION
      RSVRIC     -1.00 INITIAL CONDITION
      X          0.00 WORKING R AND D COEFFICIENT

```

```

72 RC NORMAL DEPTH CHANNEL
      ANL        0.064 LEFT OVERBANK N-VALUE
      ANCH       0.035 MAIN CHANNEL N-VALUE
      ANR        0.064 RIGHT OVERBANK N-VALUE
      RLNTH     2230. REACH LENGTH
      SEL        0.0274 ENERGY SLOPE
      ELMAX      0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

```

CROSS-SECTION DATA

```

      --- LEFT OVERBANK --- + ----- MAIN CHANNEL ----- + --- RIGHT OVERBANK ---
74 RY ELEVATION 4851.00 4847.00 4845.00 4840.00 4838.00 4840.00 4845.00 4851.00
73 RX DISTANCE  0.00   80.00  110.00  170.00  200.00  260.00  300.00  400.00

```

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.54	2.16	4.85	8.28	12.18	16.57	21.44	26.78	32.60
OUTFLOW	0.00	36.26	230.25	686.89	1549.66	2719.58	4199.81	5998.84	8127.80	10599.19
ELEVATION	4838.00	4838.68	4839.37	4840.05	4840.74	4841.42	4842.10	4842.79	4843.47	4844.16
STORAGE	38.91	45.77	53.39	61.76	70.94	80.99	91.92	103.73	116.42	129.98
OUTFLOW	13426.26	16961.87	21030.88	25550.21	30529.13	35995.54	41969.82	48470.55	55515.80	63123.25
ELEVATION	4844.84	4845.52	4846.21	4846.89	4847.58	4848.26	4848.95	4849.63	4850.31	4851.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 63123.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 4T04A

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	6-HR	24-HR	72-HR	14.75-HR
248.	12.25	(CFS) 35.	14.	14.	14.
		(INCHES) 0.622	0.622	0.622	0.622
		(AC-FT) 18.	18.	18.	18.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)	6-HR	24-HR	72-HR	14.75-HR
1.	12.25	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
(FEET)	(HR)	6-HR	24-HR	72-HR	14.75-HR
4839.40	12.25	4838.38	4838.15	4838.15	4838.15

CUMULATIVE AREA = 0.53 SQ MI

```

*****
*           *
75 KK *   SUBF *
*           *
*****

```

SUBBASIN F SOUTH OF SUBDIVISION PRIOR TO ENTRY

SUBBASIN RUNOFF DATA

```

77 BA SUBBASIN CHARACTERISTICS
      TAREA      0.08 SUBBASIN AREA

```

PRECIPITATION DATA

```

10 PB STORM      2.01 BASIN TOTAL PRECIPITATION

```

```

11 PI INCREMENTAL PRECIPITATION PATTERN
      0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
      0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
      0.00  0.00  0.00  0.00  0.01  0.01  0.00  0.01  0.00  0.01
      0.01  0.00  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
      0.01  0.01  0.02  0.02  0.02  0.03  0.10  0.28  0.04  0.03
      0.02  0.02  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01

```

```

78 LS SCS LOSS RATE
      STRTL      0.67 INITIAL ABSTRACTION
      CRVNBR     75.00 CURVE NUMBER
      RTIMP      12.50 PERCENT IMPERVIOUS AREA

```

```

79 UD SCS DIMENSIONLESS UNITGRAPH
      TLAG       0.28 LAG

```

UNIT HYDROGRAPH  
8 END-OF-PERIOD ORDINATES

69.      91.      36.      13.      5.      2.      1.      0.

\*\*\*\*\*  
HYDROGRAPH AT STATION      SUBF  
\*\*\*\*\*

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.01	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.01	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.01	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	1.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	1.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	1.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.02	0.00	1.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.03	0.00	1.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.01	1.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.04	0.01	1.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.05	0.01	1.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.20	0.05	4.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.42	0.23	21.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.05	27.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.03	0.03	16.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.03	10.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	7.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	5.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.01	0.02	4.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	4.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	3.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	3.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	3.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	2.

\*\*\*\*\*  
TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.42, TOTAL EXCESS = 0.59

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
27.	12.25	(CFS) 5.	2.	2.	2.
		(INCHES) 0.535	0.573	0.573	0.573
		(AC-FT) 2.	3.	3.	3.

CUMULATIVE AREA = 0.08 SQ MI

```

*****
*           *
80 KK *   PT4A *
*           *
*****

```

COMBINE HYDROGRAPHS ABCE & F AT POINT 4A

```

82 HC      HYDROGRAPH COMBINATION
          ICOMP      2 NUMBER OF HYDROGRAPHS TO COMBINE

```

\*\*\*

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*****
HYDROGRAPH AT STATION  PT4A
SUM OF 2 HYDROGRAPHS
*****

```

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*
22	OCT	0930	1	0.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	1.	*
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	1.	*
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	1.	*
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	2.	*
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	2.	*
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	3.	*
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	3.	*
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	5.	*

```

*****
PEAK FLOW      TIME      MAXIMUM AVERAGE FLOW
(CFS)          (HR)
275.          12.25
(CFS)          6-HR      24-HR      72-HR      14.75-HR
(INCHES)       40.         17.         17.         17.
(AC-FT)       0.610      0.615      0.615      0.615
              20.         20.         20.         20.

```

CUMULATIVE AREA = 0.61 SQ MI



```

*****
*           *
* 83 KK    *
* 4AT05   *
*           *
*****

```

ROUTE HYDROGRAPHS FROM POINT 4A TO POINT 5

```

85 KO      OUTPUT CONTROL VARIABLES
          IPRNT      3  PRINT CONTROL
          IPLOT      0  PLOT CONTROL
          QSCAL      0.  HYDROGRAPH PLOT SCALE

```

HYDROGRAPH ROUTING DATA

```

86 RS      STORAGE ROUTING
          NSTPS      3  NUMBER OF SUBREACHES
          ITYP       FLOW TYPE OF INITIAL CONDITION
          RSVRIC     -1.00 INITIAL CONDITION
          X          0.00 WORKING R AND D COEFFICIENT

```

```

87 RC      NORMAL DEPTH CHANNEL
          ANL        0.060 LEFT OVERBANK N-VALUE
          ANCH       0.035 MAIN CHANNEL N-VALUE
          ANR        0.060 RIGHT OVERBANK N-VALUE
          RLNTH     1250. REACH LENGTH
          SEL        0.0160 ENERGY SLOPE
          ELMAX     0.0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

```

CROSS-SECTION DATA

```

          --- LEFT OVERBANK --- + ----- MAIN CHANNEL ----- + --- RIGHT OVERBANK ---
89 RY    ELEVATION  4831.00  4827.00  4825.00  4820.00  4818.00  4820.00  4825.00  4831.00
88 RX    DISTANCE   0.00    80.00   110.00   170.00   200.00   260.00   300.00   400.00

```

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.30	1.21	2.72	4.64	6.83	9.29	12.02	15.01	18.28
OUTFLOW	0.00	27.71	175.95	524.90	1184.41	2079.45	3212.91	4591.66	6224.55	8121.47
ELEVATION	4818.00	4818.68	4819.37	4820.05	4820.74	4821.42	4822.10	4822.79	4823.47	4824.16
STORAGE	21.81	25.66	29.93	34.62	39.76	45.40	51.52	58.14	65.26	72.86
OUTFLOW	10292.82	13006.49	16132.92	19610.85	23448.39	27668.78	32289.08	37324.81	42791.04	48702.52
ELEVATION	4824.84	4825.52	4826.21	4826.89	4827.58	4828.26	4828.95	4829.63	4830.31	4831.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 48703.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 4AT05

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	14.75-HR	
251.	12.25	40.	16.	16.	16.	
		(INCHES)	0.603	0.608	0.608	0.608
		(AC-FT)	20.	20.	20.	20.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
1.	12.25	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4819.52	12.25	4818.46	4818.19	4818.19	4818.19

CUMULATIVE AREA = 0.61 SQ MI

```

*****
*           *
90 KK *   SUBFA *
*           *
*****

```

CALCULATE HYDROGRAPH FROM FA (CANYON VIEW SUB.)

SUBBASIN RUNOFF DATA

```

92 BA   SUBBASIN CHARACTERISTICS
        TAREA      0.03 SUBBASIN AREA

```

PRECIPITATION DATA

```

10 PB   STORM      2.01 BASIN TOTAL PRECIPITATION

```

```

11 PI   INCREMENTAL PRECIPITATION PATTERN
        0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
        0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
        0.00  0.00  0.00  0.00  0.01  0.01  0.00  0.01  0.00  0.01
        0.01  0.00  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
        0.01  0.01  0.02  0.02  0.02  0.03  0.10  0.28  0.04  0.03
        0.02  0.02  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01

```

```

93 LS   SCS LOSS RATE
        STRTL      0.38 INITIAL ABSTRACTION
        CRVNBR     84.00 CURVE NUMBER
        RTIMP      0.00 PERCENT IMPERVIOUS AREA

```

```

94 UD   SCS DIMENSIONLESS UNITGRAPH
        TLAG      0.19 LAG

```

UNIT HYDROGRAPH  
6 END-OF-PERIOD ORDINATES

39.      23.      6.      2.      0.      0.

\*\*\*\*\*  
HYDROGRAPH AT STATION    SUBFA  
\*\*\*\*\*

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.03	0.00	0.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.01	0.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.04	0.01	1.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.05	0.01	1.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.17	0.08	3.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.31	0.34	15.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.04	0.07	11.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.02	0.04	5.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.02	0.04	3.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.01	0.03	2.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.01	0.02	2.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.01	0.02	2.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.02	1.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.02	1.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	1.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	1.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.00	0.01	1.

\*\*\*\*\*  
TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.26, TOTAL EXCESS = 0.75

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
15.	12.00	(CFS) 2.	1.	1.	1.
		(INCHES) 0.737	0.737	0.737	0.737
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.03 SQ MI

\*\*\*\*\*  
 95 KK \* CVPOND \*  
 \*\*\*\*\*

ROUTE SUBDIV. FA THROUGH DETENTION POND

97 KO OUTPUT CONTROL VARIABLES  
 IPRNT 3 PRINT CONTROL  
 IPLOT 2 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

98 RS STORAGE ROUTING  
 NSTPS 1 NUMBER OF SUBREACHES  
 ITYP ELEV TYPE OF INITIAL CONDITION  
 RSVRIC 4780.00 INITIAL CONDITION  
 X 0.00 WORKING R AND D COEFFICIENT

99 SV STORAGE 0.0 0.2 0.4  
 100 SE ELEVATION 4779.80 4782.59 4784.00  
 101 SQ DISCHARGE 0. 2. 6. 8.  
 102 SE ELEVATION 4779.80 4780.35 4782.59 4784.00

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.05	0.24	0.36
OUTFLOW	0.00	1.90	6.00	8.00
ELEVATION	4779.80	4780.35	4782.59	4784.00

\*\*\*      \*\*\*      \*\*\*      \*\*\*      \*\*\*

HYDROGRAPH AT STATION CVPOND

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
7.	12.50	(CFS) 2.	1.	1.	1.
		(INCHES) 0.718	0.730	0.730	0.730
		(AC-FT) 1.	1.	1.	1.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.50	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4783.63	12.50	4780.71	4780.17	4780.17	4780.17

CUMULATIVE AREA = 0.03 SQ MI

STATION CVPOND

DAHRM PER	(I) INFLOW, (O) OUTFLOW		(S) STORAGE										
	0.	2.	4.	6.	8.	10.	12.	14.	16.	0.	0.	0.	0.
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.0	0.0
220930 1I--0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
220945 2IO	.	.	.	.	.	.	S	.	.	.	.	.	.
221000 3IO	.	.	.	.	.	.	S	.	.	.	.	.	.
221015 4I	.	.	.	.	.	.	S	.	.	.	.	.	.
221030 5I	.	.	.	.	.	.	S	.	.	.	.	.	.
221045 6I	.	.	.	.	.	.	S	.	.	.	.	.	.
221100 7I	.	.	.	.	.	.	S	.	.	.	.	.	.
221115 8I	.	.	.	.	.	.	S	.	.	.	.	.	.
221130 9I	.	.	.	.	.	.	S	.	.	.	.	.	.
221145 10I	.	.	.	.	.	.	S	.	.	.	.	.	.
221200 11I	.....	.....	.....	.....	.....	.....	S	.....	.....	.....	.....	.....	.....
221215 12I	.	.	.	.	.	.	S	.	.	.	.	.	.
221230 13I	.	.	.	.	.	.	S	.	.	.	.	.	.
221245 14I	.	.	.	.	.	.	S	.	.	.	.	.	.
221300 15I	.	.	.	.	.	.	S	.	.	.	.	.	.
221315 16I	.	.	.	.	.	.	S	.	.	.	.	.	.
221330 17I	.	.	.	.	.	.	S	.	.	.	.	.	.
221345 18I	.	.	.	.	.	.	S	.	.	.	.	.	.
221400 19I	.	.	.	.	.	.	S	.	.	.	.	.	.
221415 20I	.	.	.	.	.	.	S	.	.	.	.	.	.
221430 21I	.....	.....	.....	.....	.....	.....	S	.....	.....	.....	.....	.....	.....
221445 22I	.	.	.	.	.	.	S	.	.	.	.	.	.
221500 23I	.	.	.	.	.	.	S	.	.	.	.	.	.
221515 24I	.	.	.	.	.	.	S	.	.	.	.	.	.
221530 25I	.	.	.	.	.	.	S	.	.	.	.	.	.
221545 26I	.	.	.	.	.	.	S	.	.	.	.	.	.
221600 27I	.	.	.	.	.	.	S	.	.	.	.	.	.
221615 28I	.	.	.	.	.	.	S	.	.	.	.	.	.
221630 29I	.	.	.	.	.	.	S	.	.	.	.	.	.
221645 30I	.	.	.	.	.	.	S	.	.	.	.	.	.
221700 31I	.....	.....	.....	.....	.....	.....	S	.....	.....	.....	.....	.....	.....
221715 32I	.	.	.	.	.	.	S	.	.	.	.	.	.
221730 33I	.	.	.	.	.	.	S	.	.	.	.	.	.
221745 34I	.	.	.	.	.	.	S	.	.	.	.	.	.
221800 35I	.	.	.	.	.	.	S	.	.	.	.	.	.



103 KK

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\* \*  
\* PT5 \*  
\* \*  
\*\*\*\*\*

COMBINE HYDROGRAPHS ABCEFA AT POINT 5

105 HC

HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

\*\*\*

\*\*\*\*\*  
HYDROGRAPH AT STATION PT5  
SUM OF 2 HYDROGRAPHS  
\*\*\*\*\*

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	1.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	6.
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	8.
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	16.
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	97.
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	259.
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	226.
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	1.	*	22	OCT	2215	52	89.
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	1.	*	22	OCT	2230	53	57.
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	1.	*	22	OCT	2245	54	61.
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*	22	OCT	2300	55	40.
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	2.	*	22	OCT	2315	56	34.
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	2.	*	22	OCT	2330	57	34.
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	2.	*	22	OCT	2345	58	26.
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	3.	*	23	OCT	0000	59	25.
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	4.	*	23	OCT	0015	60	22.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
259.	12.25	(CFS) 42.	17.	17.	17.
		(INCHES) 0.608	0.614	0.614	0.614
		(AC-FT) 21.	21.	21.	21.

CUMULATIVE AREA = 0.64 SQ MI



```

*****
*           *
106 KK * 5T08A *
*           *
*****

```

ROUTE HYDROGRAPHS FROM POINT 5 TO POINT 8A

```

108 KO OUTPUT CONTROL VARIABLES
      IPRNT      3 PRINT CONTROL
      IPLOT      0 PLOT CONTROL
      QSCAL      0. HYDROGRAPH PLOT SCALE

```

HYDROGRAPH ROUTING DATA

```

109 RS STORAGE ROUTING
      NSTPS      3 NUMBER OF SUBREACHES
      ITYP       FLOW TYPE OF INITIAL CONDITION
      RSVRIC     -1.00 INITIAL CONDITION
      X          0.00 WORKING R AND D COEFFICIENT

```

```

110 RC NORMAL DEPTH CHANNEL
      ANL        0.058 LEFT OVERBANK N-VALUE
      ANCH       0.035 MAIN CHANNEL N-VALUE
      ANR        0.054 RIGHT OVERBANK N-VALUE
      RLNTH      1450. REACH LENGTH
      SEL        0.0276 ENERGY SLOPE
      ELMAX      0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

```

CROSS-SECTION DATA

```

      --- LEFT OVERBANK --- + ----- MAIN CHANNEL ----- + --- RIGHT OVERBANK ---
112 RY ELEVATION 4783.00 4782.00 4781.00 4780.00 4780.00 4781.00 4782.00 4783.00
111 RX DISTANCE  0.00  125.00  220.00  230.00  250.00  260.00  270.00  300.00

```

\*\*\*

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.11	0.24	0.39	0.55	0.73	0.93	1.16	1.47	1.86
OUTFLOW	0.00	6.70	21.96	44.67	74.72	112.28	157.60	217.45	291.95	380.62
ELEVATION	4780.00	4780.16	4780.32	4780.47	4780.63	4780.79	4780.95	4781.10	4781.26	4781.42
STORAGE	2.35	2.92	3.58	4.33	5.19	6.19	7.31	8.56	9.94	11.45
OUTFLOW	485.48	608.32	750.78	912.30	1094.29	1304.20	1544.07	1816.05	2122.25	2464.73
ELEVATION	4781.58	4781.73	4781.89	4782.05	4782.21	4782.37	4782.52	4782.68	4782.84	4783.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 2465.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 5T08A

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
256.	12.50	(CFS) 41.	17.	17.	17.
		(INCHES) 0.601	0.607	0.607	0.607
		(AC-FT) 21.	21.	21.	21.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.50	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4781.19	12.50	4780.32	4780.13	4780.13	4780.13

CUMULATIVE AREA = 0.64 SQ MI

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*****
*           *
*   SUBJ   *
*           *
*****

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ROADWAY SUBBASIN J (S. CAMP RD.)

SUBBASIN RUNOFF DATA

115 BA SUBBASIN CHARACTERISTICS  
TAREA 0.02 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 2.01 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

116 LS SCS LOSS RATE  
STRTL 0.56 INITIAL ABSTRACTION  
CRVNBR 78.00 CURVE NUMBER  
RTIMP 0.00 PERCENT IMPERVIOUS AREA

117 UD SCS DIMENSIONLESS UNITGRAPH  
TLAG 0.12 LAG

UNIT HYDROGRAPH  
5 END-OF-PERIOD ORDINATES

33.      9.      2.      0.      0.

\*\*\*\*\*  
HYDROGRAPH AT STATION    SUBJ  
\*\*\*\*\*

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.04	0.00	0.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.00	0.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.05	0.00	0.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.06	0.00	0.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.21	0.04	1.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.43	0.23	8.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.05	4.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.03	0.03	2.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.03	1.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	1.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	1.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.01	0.02	1.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	1.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	1.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	1.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	0.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	0.

\*\*\*\*\*  
TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.52, TOTAL EXCESS = 0.49

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
8.	12.00	(CFS) 1.	0.	0.	0.
		(INCHES) 0.482	0.482	0.482	0.482
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.02 SQ MI

118 KK

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\* PT8A \*  
\*\*\*\*\*

COMBINE HYDROGRAPHS AT POINT 8A (ABCEFFA & J)

120 HC

HYDROGRAPH COMBINATION  
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION PT8A  
SUM OF 2 HYDROGRAPHS

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	1.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	5.
22	OCT	0945	2	1.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	7.
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	14.
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	72.
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	229.
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	258.
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*	22	OCT	2215	52	117.
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	1.	*	22	OCT	2230	53	56.
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	1.	*	22	OCT	2245	54	61.
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*	22	OCT	2300	55	50.
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	1.	*	22	OCT	2315	56	34.
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	2.	*	22	OCT	2330	57	34.
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	2.	*	22	OCT	2345	58	31.
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	3.	*	23	OCT	0000	59	24.
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	3.	*	23	OCT	0015	60	24.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
258.	12.50	(CFS) 42.	17.	17.	17.
		(INCHES) 0.598	0.603	0.603	0.603
		(AC-FT) 21.	21.	21.	21.

CUMULATIVE AREA = 0.66 SQ MI

\*\*\*\*\*  
 \* \*  
 121 KK \* SUBG \*  
 \* \*  
 \*\*\*\*\*

SUBBASIN G START 2ND LINE

SUBBASIN RUNOFF DATA

123 BA SUBBASIN CHARACTERISTICS  
 TAREA 0.24 SUBBASIN AREA

PRECIPITATION DATA

10 PB STORM 2.01 BASIN TOTAL PRECIPITATION

11 PI INCREMENTAL PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

124 LS SCS LOSS RATE  
 STRL 0.67 INITIAL ABSTRACTION  
 CRVNR 75.00 CURVE NUMBER  
 RTIMP 0.00 PERCENT IMPERVIOUS AREA

125 UD SCS DIMENSIONLESS UNITGRAPH  
 TLAG 0.22 LAG

UNIT HYDROGRAPH  
6 END-OF-PERIOD ORDINATES

290.      239.      69.      21.      6.      2.

\*\*\*\*\*  
HYDROGRAPH AT STATION      SUBG  
\*\*\*\*\*

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.04	0.00	0.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.00	0.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.05	0.00	0.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.06	0.00	0.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.23	0.02	5.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.48	0.18	55.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.04	55.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.04	0.03	30.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.02	20.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	15.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	12.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.02	0.01	10.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	9.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	8.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	7.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	6.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	6.

\*\*\*\*\*  
TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.62, TOTAL EXCESS = 0.39

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
55.	12.25	(CFS) 10.	4.	4.	4.
		(INCHES) 0.375	0.375	0.375	0.375
		(AC-FT) 5.	5.	5.	5.

CUMULATIVE AREA = 0.24 SQ MI

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*****
*           *
126 KK *   6T07 *
*           *
*****

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ROUTE BASIN G FLOW FROM POINT 6 TO POINT 7

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128 KO OUTPUT CONTROL VARIABLES
      IPRNT      3 PRINT CONTROL
      IPLOT      0 PLOT CONTROL
      QSCAL      0. HYDROGRAPH PLOT SCALE

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HYDROGRAPH ROUTING DATA

```

129 RS STORAGE ROUTING
      NSTPS      4 NUMBER OF SUBREACHES
      ITYP       FLOW TYPE OF INITIAL CONDITION
      RSVRIC     -1.00 INITIAL CONDITION
      X          0.00 WORKING R AND D COEFFICIENT

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130 RC NORMAL DEPTH CHANNEL
      ANL        0.056 LEFT OVERBANK N-VALUE
      ANCH       0.034 MAIN CHANNEL N-VALUE
      ANR        0.054 RIGHT OVERBANK N-VALUE
      RLNTH     2080. REACH LENGTH
      SEL        0.0184 ENERGY SLOPE
      ELMAX      0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

```

CROSS-SECTION DATA

```

      --- LEFT OVERBANK --- + ----- MAIN CHANNEL ----- + --- RIGHT OVERBANK ---
132 RY ELEVATION 4891.00 4827.00 4825.00 4820.00 4818.00 4820.00 4825.00 4831.00
131 RX DISTANCE  0.00  80.00  110.00  170.00  200.00  260.00  300.00  400.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

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STORAGE  0.00  13.84  44.29  92.19  151.06  211.67  273.16  335.54  398.79  462.93
OUTFLOW  0.00  3039.19 15197.12 40546.70 79925.88 131859.78 194397.66 266788.50 348502.97 439142.38
ELEVATION 4818.00 4821.84 4825.68 4829.53 4833.37 4837.21 4841.05 4844.90 4848.74 4852.58

STORAGE  527.94  593.84  660.62  728.28  796.83  866.25  936.55  1007.74  1079.81  1152.76
OUTFLOW  538393.75 646004.06 761764.31 885499.001017058.941156315.501303157.881457489.131619224.251788293.00
ELEVATION 4856.42 4860.27 4864.11 4867.95 4871.79 4875.63 4879.48 4883.32 4887.16 4891.00

```

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 1788293.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)



HYDROGRAPH AT STATION 6T07

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
(CFS)	(HR)	6-HR	24-HR	72-HR	14.75-HR
64.	12.25	(CFS) 10.	4.	4.	4.
		(INCHES) 0.373	0.373	0.373	0.373
		(AC-FT) 5.	5.	5.	5.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
(AC-FT)	(HR)	6-HR	24-HR	72-HR	14.75-HR
0.	12.25	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
(FEET)	(HR)	6-HR	24-HR	72-HR	14.75-HR
4818.08	12.25	4818.01	4818.00	4818.00	4818.00

CUMULATIVE AREA = 0.24 SQ MI

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*           *
133 KK    * SUBH *
*           *
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SUBBASIN H LOWER PLAIN SOUTH OF SUBDIVISION

SUBBASIN RUNOFF DATA

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135 BA    SUBBASIN CHARACTERISTICS
          TAREA    0.12 SUBBASIN AREA

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PRECIPITATION DATA

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10 PB    STORM    2.01 BASIN TOTAL PRECIPITATION

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11 PI    INCREMENTAL PRECIPITATION PATTERN
          0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
          0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
          0.00    0.00    0.00    0.00    0.01    0.01    0.00    0.01    0.00    0.01
          0.01    0.00    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01
          0.01    0.01    0.02    0.02    0.02    0.03    0.10    0.28    0.04    0.03
          0.02    0.02    0.01    0.01    0.01    0.01    0.01    0.01    0.01    0.01

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136 LS    SCS LOSS RATE
          STRTL    0.63 INITIAL ABSTRACTION
          CRYNBR   76.00 CURVE NUMBER
          RTIMP    0.00 PERCENT IMPERVIOUS AREA

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137 UD    SCS DIMENSIONLESS UNITGRAPH
          TLAG    0.20 LAG

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UNIT HYDROGRAPH  
6 END-OF-PERIOD ORDINATES

158.      112.      31.      9.      2.      1.

HYDROGRAPH AT STATION      SUBH

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.	*
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.	*
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.	*
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.	*
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.	*
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.	*
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.	*
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.	*
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.	*
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.	*
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.	*
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.	*
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.	*
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.04	0.00	0.	*
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.00	0.	*
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.05	0.00	0.	*
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.06	0.00	0.	*
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.22	0.02	4.	*
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.46	0.19	33.	*
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.04	29.	*
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.04	0.03	16.	*
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.02	10.	*
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	8.	*
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	6.	*
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.02	0.02	5.	*
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	4.	*
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	4.	*
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	4.	*
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	3.	*
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	3.	*

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.59, TOTAL EXCESS = 0.42

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
33.	12.00	(CFS) 5.	2.	2.	2.
		(INCHES) 0.408	0.408	0.408	0.408
		(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = 0.12 SQ MI

138 KK

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\* \*  
\* PT7 \*  
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COMBINE BASIN HYDROGRAPHS G & H AT POINT 7

140 HC

HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION PT7  
SUM OF 2 HYDROGRAPHS  
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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*
22	OCT	0930	1	0.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	0.	*
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	0.	*
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	7.	*
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	72.	*
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	93.	*
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	50.	*
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*	22	OCT	2215	52	31.	*
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	0.	*	22	OCT	2230	53	25.	*
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	0.	*	22	OCT	2245	54	18.	*
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	0.	*	22	OCT	2300	55	17.	*
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	0.	*	22	OCT	2315	56	13.	*
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	0.	*	22	OCT	2330	57	12.	*
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	0.	*	22	OCT	2345	58	10.	*
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	0.	*	23	OCT	0000	59	10.	*
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	0.	*	23	OCT	0015	60	9.	*

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
93.	12.25	(CFS) 15.	6.	6.	6.
		(INCHES) 0.385	0.385	0.385	0.385
		(AC-FT) 7.	7.	7.	7.

CUMULATIVE AREA = 0.36 SQ MI

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 \* \*  
 \* 7708 \*  
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ROUTE BASINS G & H FROM POINT 7 TO POINT 8

143 KO OUTPUT CONTROL VARIABLES  
 IPRNT 3 PRINT CONTROL  
 IPLOT 0 PLOT CONTROL  
 QSCAL 0. HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

144 RS STORAGE ROUTING  
 NSTPS 3 NUMBER OF SUBREACHES  
 ITYP FLOW TYPE OF INITIAL CONDITION  
 RSVRIC -1.00 INITIAL CONDITION  
 X 0.00 WORKING R AND D COEFFICIENT

145 RC NORMAL DEPTH CHANNEL  
 ANL 0.054 LEFT OVERBANK N-VALUE  
 ANCH 0.034 MAIN CHANNEL N-VALUE  
 ANR 0.054 RIGHT OVERBANK N-VALUE  
 RLNTH 1850. REACH LENGTH  
 SEL 0.0216 ENERGY SLOPE  
 ELMAX 0.0 MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

CROSS-SECTION DATA

	--- LEFT OVERBANK ---		+ ----- MAIN CHANNEL -----				+ --- RIGHT OVERBANK ---	
147 RY ELEVATION	4783.00	4782.00	4781.00	4780.00	4780.00	4782.00	4783.00	4785.00
146 RX DISTANCE	0.00	40.00	50.00	70.00	120.00	150.00	220.00	270.00

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COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	0.00	0.61	1.32	2.14	3.06	4.06	5.14	6.28	7.53	9.05
OUTFLOW	0.00	36.01	118.80	243.18	412.44	636.95	904.41	1214.84	1581.97	2024.25
ELEVATION	4780.00	4780.26	4780.53	4780.79	4781.05	4781.32	4781.58	4781.84	4782.11	4782.37
STORAGE	10.89	13.06	15.51	18.05	20.66	23.35	26.11	28.94	31.85	34.83
OUTFLOW	2532.02	3112.38	3786.62	4548.39	5384.60	6293.54	7274.11	8325.59	9447.51	10639.70
ELEVATION	4782.63	4782.90	4783.16	4783.42	4783.68	4783.95	4784.21	4784.47	4784.74	4785.00

\*\*\* WARNING \*\*\* MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 0. TO 10640.  
 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.  
 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

HYDROGRAPH AT STATION 7T08

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
88.	12.25	(CFS) 15.	6.	6.	6.
		(INCHES) 0.377	0.377	0.377	0.377
		(AC-FT) 7.	7.	7.	7.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	14.75-HR
0.	12.25	0.	0.	0.	0.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	14.75-HR
4780.43	12.25	4780.09	4780.04	4780.04	4780.04

CUMULATIVE AREA = 0.36 SQ MI

148 KK

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*   SUBI   *
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SUBBASIN I THE BASIC SUBDIVISION

SUBBASIN RUNOFF DATA

150 BA

SUBBASIN CHARACTERISTICS

TAREA 0.10 SUBBASIN AREA

PRECIPITATION DATA

10 PB

STORM 2.01 BASIN TOTAL PRECIPITATION

11 PI

INCREMENTAL PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.01
0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.02	0.02	0.02	0.03	0.10	0.28	0.04	0.04	0.03
0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

151 LS

SCS LOSS RATE

STRTL 0.60 INITIAL ABSTRACTION

CRVNBR 77.00 CURVE NUMBER

RTIMP 0.00 PERCENT IMPERVIOUS AREA

152 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG 0.15 LAG

UNIT HYDROGRAPH  
5 END-OF-PERIOD ORDINATES

168.      67.      16.      4.      1.

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HYDROGRAPH AT STATION      SUBI  
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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
22	OCT	0930	1	0.00	0.00	0.00	0.	*	22	OCT	1700	31	0.01	0.01	0.00	0.
22	OCT	0945	2	0.00	0.00	0.00	0.	*	22	OCT	1715	32	0.01	0.01	0.00	0.
22	OCT	1000	3	0.01	0.01	0.00	0.	*	22	OCT	1730	33	0.01	0.01	0.00	0.
22	OCT	1015	4	0.01	0.01	0.00	0.	*	22	OCT	1745	34	0.01	0.01	0.00	0.
22	OCT	1030	5	0.01	0.01	0.00	0.	*	22	OCT	1800	35	0.02	0.02	0.00	0.
22	OCT	1045	6	0.01	0.01	0.00	0.	*	22	OCT	1815	36	0.02	0.02	0.00	0.
22	OCT	1100	7	0.01	0.01	0.00	0.	*	22	OCT	1830	37	0.02	0.02	0.00	0.
22	OCT	1115	8	0.01	0.01	0.00	0.	*	22	OCT	1845	38	0.02	0.02	0.00	0.
22	OCT	1130	9	0.01	0.01	0.00	0.	*	22	OCT	1900	39	0.02	0.02	0.00	0.
22	OCT	1145	10	0.01	0.01	0.00	0.	*	22	OCT	1915	40	0.02	0.02	0.00	0.
22	OCT	1200	11	0.01	0.01	0.00	0.	*	22	OCT	1930	41	0.02	0.02	0.00	0.
22	OCT	1215	12	0.01	0.01	0.00	0.	*	22	OCT	1945	42	0.02	0.02	0.00	0.
22	OCT	1230	13	0.01	0.01	0.00	0.	*	22	OCT	2000	43	0.03	0.03	0.00	0.
22	OCT	1245	14	0.01	0.01	0.00	0.	*	22	OCT	2015	44	0.04	0.04	0.00	0.
22	OCT	1300	15	0.01	0.01	0.00	0.	*	22	OCT	2030	45	0.04	0.04	0.00	0.
22	OCT	1315	16	0.01	0.01	0.00	0.	*	22	OCT	2045	46	0.05	0.05	0.00	0.
22	OCT	1330	17	0.01	0.01	0.00	0.	*	22	OCT	2100	47	0.06	0.06	0.00	0.
22	OCT	1345	18	0.01	0.01	0.00	0.	*	22	OCT	2115	48	0.25	0.22	0.03	5.
22	OCT	1400	19	0.01	0.01	0.00	0.	*	22	OCT	2130	49	0.65	0.45	0.21	37.
22	OCT	1415	20	0.01	0.01	0.00	0.	*	22	OCT	2145	50	0.10	0.06	0.05	22.
22	OCT	1430	21	0.01	0.01	0.00	0.	*	22	OCT	2200	51	0.07	0.04	0.03	12.
22	OCT	1445	22	0.01	0.01	0.00	0.	*	22	OCT	2215	52	0.05	0.03	0.03	8.
22	OCT	1500	23	0.01	0.01	0.00	0.	*	22	OCT	2230	53	0.04	0.02	0.02	6.
22	OCT	1515	24	0.01	0.01	0.00	0.	*	22	OCT	2245	54	0.04	0.02	0.02	5.
22	OCT	1530	25	0.01	0.01	0.00	0.	*	22	OCT	2300	55	0.03	0.02	0.02	4.
22	OCT	1545	26	0.01	0.01	0.00	0.	*	22	OCT	2315	56	0.03	0.01	0.01	4.
22	OCT	1600	27	0.01	0.01	0.00	0.	*	22	OCT	2330	57	0.02	0.01	0.01	3.
22	OCT	1615	28	0.01	0.01	0.00	0.	*	22	OCT	2345	58	0.02	0.01	0.01	3.
22	OCT	1630	29	0.01	0.01	0.00	0.	*	23	OCT	0000	59	0.02	0.01	0.01	3.
22	OCT	1645	30	0.01	0.01	0.00	0.	*	23	OCT	0015	60	0.02	0.01	0.01	2.

TOTAL RAINFALL = 2.01, TOTAL LOSS = 1.56, TOTAL EXCESS = 0.45

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
37.	12.00	(CFS) 5.	2.	2.	2.
		(INCHES) 0.445	0.445	0.445	0.445
		(AC-FT) 2.	2.	2.	2.

CUMULATIVE AREA = 0.10 SQ MI



153 KK

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\* PT88 \*  
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COMBINE EAST GROUP, BASINS G.H & I AT POINT B

155 HC

HYDROGRAPH COMBINATION  
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION PT88  
SUM OF 2 HYDROGRAPHS  
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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
22	OCT	0930	1	0.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*	22	OCT	2045	46	0.
22	OCT	0945	2	0.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*	22	OCT	2100	47	0.
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*	22	OCT	2115	48	7.
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*	22	OCT	2130	49	61.
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*	22	OCT	2145	50	111.
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*	22	OCT	2200	51	90.
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*	22	OCT	2215	52	42.
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	0.	*	22	OCT	2230	53	36.
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	0.	*	22	OCT	2245	54	29.
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	0.	*	22	OCT	2300	55	22.
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	0.	*	22	OCT	2315	56	19.
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	0.	*	22	OCT	2330	57	17.
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	0.	*	22	OCT	2345	58	15.
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	0.	*	23	OCT	0000	59	13.
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	0.	*	23	OCT	0015	60	12.

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW					
		6-HR	24-HR	72-HR	14.75-HR		
		111.	12.25	(CFS) 19.	8.	8.	8.
				(INCHES) 0.391	0.391	0.391	0.391
		(AC-FT) 10.	10.	10.	10.		

CUMULATIVE AREA = 0.46 SQ MI

156 KK

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\* \*  
\* PT8 \*  
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COMBINE EAST GROUP WITH WEST GROUP AT COLLECTION BASIN

158 HC

HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION PT8  
SUM OF 2 HYDROGRAPHS  
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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*
22	OCT	0930	1	1.	*	22	OCT	1315	16	0.	*	22	OCT	1700	31	0.	*
22	OCT	0945	2	1.	*	22	OCT	1330	17	0.	*	22	OCT	1715	32	0.	*
22	OCT	1000	3	0.	*	22	OCT	1345	18	0.	*	22	OCT	1730	33	0.	*
22	OCT	1015	4	0.	*	22	OCT	1400	19	0.	*	22	OCT	1745	34	0.	*
22	OCT	1030	5	0.	*	22	OCT	1415	20	0.	*	22	OCT	1800	35	0.	*
22	OCT	1045	6	0.	*	22	OCT	1430	21	0.	*	22	OCT	1815	36	0.	*
22	OCT	1100	7	0.	*	22	OCT	1445	22	0.	*	22	OCT	1830	37	0.	*
22	OCT	1115	8	0.	*	22	OCT	1500	23	0.	*	22	OCT	1845	38	1.	*
22	OCT	1130	9	0.	*	22	OCT	1515	24	0.	*	22	OCT	1900	39	1.	*
22	OCT	1145	10	0.	*	22	OCT	1530	25	0.	*	22	OCT	1915	40	1.	*
22	OCT	1200	11	0.	*	22	OCT	1545	26	0.	*	22	OCT	1930	41	1.	*
22	OCT	1215	12	0.	*	22	OCT	1600	27	0.	*	22	OCT	1945	42	2.	*
22	OCT	1230	13	0.	*	22	OCT	1615	28	0.	*	22	OCT	2000	43	2.	*
22	OCT	1245	14	0.	*	22	OCT	1630	29	0.	*	22	OCT	2015	44	3.	*
22	OCT	1300	15	0.	*	22	OCT	1645	30	0.	*	22	OCT	2030	45	3.	*

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	14.75-HR
348.	12.50	(CFS) 62.	25.	25.	25.
		(INCHES) 0.513	0.516	0.516	0.516
		(AC-FT) 31.	31.	31.	31.

CUMULATIVE AREA = 1.12 SQ MI

RUNOFF SUMMARY  
 FLOW IN CUBIC FEET PER SECOND  
 TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUBA	42.	12.00	7.	3.	3.	0.08		
ROUTED TO	1T02	39.	12.00	7.	3.	3.	0.08	5150.09 12.00	
HYDROGRAPH AT	SUBB	56.	12.00	7.	3.	3.	0.07		
2 COMBINED AT	PT2	95.	12.00	13.	5.	5.	0.14		
ROUTED TO	2T03	83.	12.00	13.	5.	5.	0.14	4991.13 12.00	
HYDROGRAPH AT	SUBC	97.	12.00	11.	5.	5.	0.12		
2 COMBINED AT	PT3	180.	12.00	24.	10.	10.	0.26		
ROUTED TO	3T04	167.	12.25	24.	10.	10.	0.26	4862.40 12.25	
HYDROGRAPH AT	SUBE	86.	12.00	12.	5.	5.	0.27		
2 COMBINED AT	PT4	226.	12.25	36.	15.	15.	0.53		
ROUTED TO	4T04A	248.	12.25	35.	14.	14.	0.53	4839.40 12.25	
HYDROGRAPH AT	SUBF	27.	12.25	5.	2.	2.	0.08		
2 COMBINED AT	PT4A	275.	12.25	40.	17.	17.	0.61		
ROUTED TO	4AT05	251.	12.25	40.	16.	16.	0.61	4819.52 12.25	
HYDROGRAPH AT	SUBFA	15.	12.00	2.	1.	1.	0.03		
ROUTED TO	CVPOND	7.	12.50	2.	1.	1.	0.03	4783.63 12.50	
2 COMBINED AT	PT5	259.	12.25	42.	17.	17.	0.64		
ROUTED TO	5T08A	256.	12.50	41.	17.	17.	0.64	4781.19 12.50	
HYDROGRAPH AT	SUBJ	8.	12.00	1.	0.	0.	0.02		
2 COMBINED AT	PT8A	258.	12.50	42.	17.	17.	0.66		
HYDROGRAPH AT	SUBG	55.	12.25	10.	4.	4.	0.24		
ROUTED TO	6T07	64.	12.25	10.	4.	4.	0.24	4818.08 12.25	

OPERATIONED)	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	SUBH	33.	12.00	5.	2.	2.	0.12		
2 COMBINED AT	PT7	93.	12.25	15.	6.	6.	0.36		
ROUTED TO	TT08	88.	12.25	15.	6.	6.	0.36	4780.43 12.25	
HYDROGRAPH AT	SUBI	37.	12.00	5.	2.	2.	0.10		
2 COMBINED AT	PT86	111.	12.25	19.	8.	8.	0.46		
2 COMBINED AT	PT8	348.	12.50	62.	25.	25.	1.12		

\*\*\* NORMAL END OF HEC-1 \*\*\*

## PROJECT NARRATIVE FOR TRAILS WEST VILLAGE FILINGS I & II

Filings I & II of Trails West Village consist of 42 single family residential lots, 28 in Filing I and 14 in Filing II.<sup>1</sup> Developer seeks to create a high quality, covenant controlled community which is integrated with the natural surroundings, including an extensive trails system and scenic vistas.

The preliminary plan for Filings I & II was approved by City Council on February 21, 1996 subject to 8 conditions. Each of the conditions are restated herein along with the Developer's response.<sup>2</sup>

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.

**Response:** In the rare event of a breach of the Ute Water 24" line along the steep grade to the east of the property, the resulting flow would head downhill toward the southeast corner of the property. The majority of the water will be picked up as surface flow by the Redlands Water & Power Company 2nd Lift Canal. The water which crossed the canal would run northerly down Montero Ave. to Montero Ct. Once it enters Montero Ct. the water will be picked up by a storm drain and transported by pipeline between Lots 6&7 and 9&10, Block 2, Filing I to a designed low point on Mescalero Dr. The low point will carry the water to another underground storm drain passing between Lots 3&4, Block 1, Filing I into the detention facility located in the northwest corner of the property.

If the break occurs south of, or within, Altamira Dr. it will run down to a low point on Altamira Ct. where it will be carried by underground storm drain between Lots 1&2, Block 2, Filing I and Lots 4&5, Block 1, Filing II. The water will daylight to the low point on Mescalero Dr. to the underground storm sewer between Lots 3&4, Block 1, Filing I and into the detention facility.

**At no point will any lot be subject to flows from a line break.**

2. Petitioner must dedicate public use easements along both the inactive 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.

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<sup>1</sup> Preliminary Plan approval was granted for 39 lots. However, in adjusting lot lines and sizes, an additional 3 lots were created in Filing I which do not materially affect the approval given.

<sup>2</sup> The 8 conditions described in this narrative are taken from Katherine M. Portner's March 12, 1996 letter to Brian Stowell.

**Response: Petitioner has platted a 20' trail along the alignment of the abandoned Redlands 3rd Lift Canal and identified a 40' easement for the present 2nd Lift Canal, both of which are to be dedicated as a public use easement. Petitioner intends to convey fee title underlying both canals to the City of Grand Junction, provided the City consents. If not, fee ownership will be transferred to the Trails West Village Homeowners Association.**

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[now Lots 1-42]); such stub shall be constructed at the same time as the improvements for the filing in which it is contained are constructed.

**Response: Construction drawings have been prepared reflecting this requirement which Petitioner shall comply with.**

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.

**Response: Building envelopes based on required setbacks are shown on the final plat only for unusually shaped Lots. The minimum square footage for a residential dwelling unit is 1600 s.f.**

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 (now Altamira) Drive, and a detached 10 foot wide concrete bicycle/pedestrian path.

**Response: The plans submitted show the required road widening. Per conversations with Ms. Portner, construction of the turn lane past Mescalero Dr. to Altamira Dr. will not occur until the improvements for Filing II are constructed. In addition, the bicycle/pedestrian path will be attached, rather than detached, due to the size of the required drainage easement carrying basin wide flows which pass under South Camp Road, west to east, and into the detention facility.**

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

**Response: The plans have been changed to incorporate this condition.**

7. All required drainage improvements will be determined with the final submittal, including the enlargement of the culvert under South Camp Road if necessary.

**Response: The plans submitted identify all required drainage improvements.**

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 the 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.

**Response: The plans and CCR's submitted incorporate these conditions.**

The final plat also contains the language regarding Outlots A & B discussed as part of the City Council's approval of the preliminary plan on February 21, 1996. The minutes from that City Council meeting provided that, with respect to Outlot B, the language on the plat would read:

"This outlot may not be developed until acceptable access is provided from Outlot A or an alternative access is provided from the north and/or east. Access must be safe, pleasing and of minimum visibility.<sup>3</sup> If this outlot, or any portion, is to be developed, Staff recommends that access be from the north or east, which would be from the top of the mesa. Single family homes, if approved, must be situated and constructed so that only a minimal portion of the roof lines will be visible to a person standing at any point on that portion of South Camp Road."

The above language was inserted on the plat rather than the recommended language contained in Katherine M. Portner's March 12, 1996 letter to Brian Stowell, since that is what City Council approved.

Petitioner seeks vested rights with this submittal pursuant to Section 2-3 of the Code.

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<sup>3</sup> This sentence was approved by City Council although not originally contained in Staff's paragraph "c" addressing Outlot B.

**STATEMENT OF NO CHANGE TO NAMES AND ADDRESSES FOR ADJACENT  
PROPERTY NOTIFICATION**

The names and addresses of the property owners adjacent to the Trails West Village parcel have not changed since submission of the preliminary plat application. The information provided for preliminary plat will suffice in providing adjacent property notification.

CAMELOT INVESTMENTS, LLC

By: Brian L. Stowell  
Brian L. Stowell



**FINAL  
DRAINAGE REPORT**

FOR

**TRAILS WEST VILLAGE  
FILING No. 1 & 2**

Prepared For:

Camelot Investments, LLC  
0090 Caballo Road  
Carbondale, Colorado 81623  
(970) 963-0627

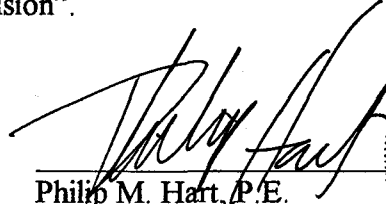
PREPARED BY:

**LANDesign, LLC**  
PLANNING ENGINEERING SURVEYING  
259 Grand Avenue  
Grand Junction, CO 81501  
(970) 245-4099

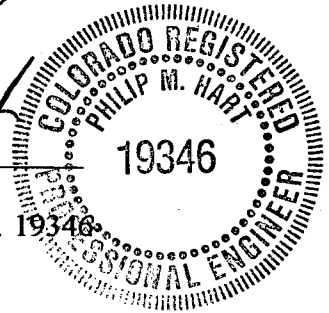
JOB No. 95182

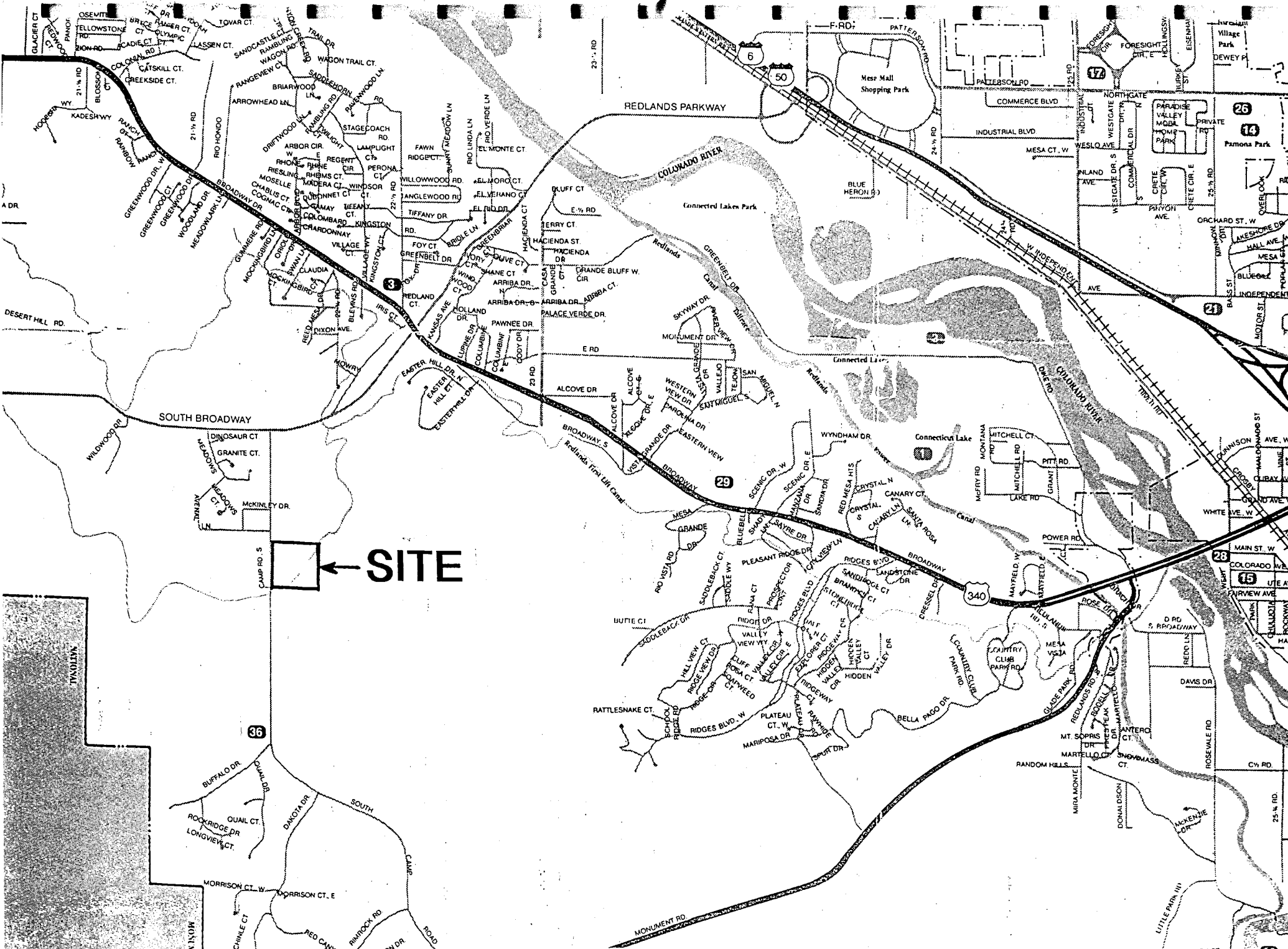
April, 1996

"I hereby certify that this report for the drainage design of Trails West Village was prepared by me or under my direct supervision".



Philip M. Hart, P.E.  
Colorado Registration No. 19346





# LOCATION MAP

# NARRATIVE

## INTRODUCTION

The purpose of this drainage report is to provide a stormwater management plan that will improve the quality of life for the public and protect them from adverse stormwater effects that could potentially occur due to development. Sound drainage practices will be implemented in this study to identify, investigate and differentiate the changes in the historic drainage patterns due to the construction of this proposed subdivision as well as locating, quantifying and diverting stormwater flows from offsite areas directly affecting this site. This report will concentrate on the quantity quality and discharge of stormwater runoff from the site before and after development for the 2 and 100 year storm events and the detention required to restrict stormwater flows to historic rates.

## LOCATION & DESCRIPTION

The proposed Trails West Village Subdivision occupies a 40 acre tract located in the SW Quarter of the SW Quarter of Section 18, Township 1 South, Range 1 West of the Ute Principal Meridian in Mesa County, Colorado. More specifically the site is situated on the east side of South Camp Road approximately ½ mile south of South Broadway. See the accompanying Location Map.

The site is currently surrounded by agricultural land although the only parcel still being actively farmed is the land directly to the west across South Camp Road. A small 2 acre parcel with an existing single family residence owned by Elmer Schneider is located along the north property line at the northwest corner of the site. Canyon View Subdivision is located approximately ¼ mile south of the site on the west side of South Camp Road and Monument Meadows Subdivision is located approximately ½ mile north also on the west side of the road.

The site is presently undeveloped. Plans call for 42 single family residential lots to be developed in the west portion of the site west of the existing Redlands Second Lift Canal on approximately 16.5 acres. This portion of the site will be developed as Filings 1 and 2. The remaining portion the the site will be developed at a later date. The abandoned Redlands First Lift Canal traverses a steep rocky hillside in the east and south portion of the property and will be designated as a trail and dedicated to the City.

The proposed subdivision lies in the unnamed ephemeral stream that drains an area between the much larger Ute Canyon and Red Canyon watersheds. This unnamed stream heads in the Colorado National Monument, about 2 miles to the southwest, and crosses the northwest corner of the subdivision on its way to the Colorado River via Goats Draw north of the site. This 715 acre upstream watershed has been analyzed by a previously submitted study titled Hydrology of Unnamed Major Basin, Trails West Village Subdivision, Grand Junction, Colorado by Lincoln-DeVore, Inc. of Grand Junction. This study has referenced the findings of the major watershed study for the drainage design of the proposed subdivision.

## **HISTORIC HYDROLOGIC CONDITIONS**

The topography of the property is variable. The northwest portion of the site, which is the location of the proposed Filings 1 and 2 west of the Redlands Second Lift Canal, slopes moderately to the northwest between 1.5 and 3.5%. This area is sparsely vegetated with native grasses, weeds, sagebrush and a few scattered Cottonwood, Russian Olive and Black Elm trees. A thick stand of young Black Elm trees occupy the northwest corner of the site. The soil is classified as Glenberg sandy loam with a hydrologic soil classification of "C".

The southeast portion of the site, which is to be developed at a later time, consists of steep rocky terrain with slopes of up to 35% which terminates at a mesa landform in the southeast corner. The ground cover is sparsely vegetated with natural grasses, weeds and sagebrush where it is covered at all. The soil is classified as Badlands with a hydrologic classification of "D".

All surface drainage from this property as well as from off-site sources to the south of the site and east of South Camp Road, currently sheet flows to a point on the north property line approximately 200' from South Camp Road. From there it continues north through a natural broad, shallow swale and enters a series of wetlands and natural detention features before entering Goats Draw at South Broadway and traveling east to the Colorado River.

The off-site areas west of South Camp Road converge at the existing 4' X 6' box culvert located approximately 300' north of the southwest property corner which diverts stormwater under the road and north to the previously described exit point on the north property line. The previously submitted drainage study of the 580 acre off-site watershed indicates 235 cfs at the existing box culvert. Calculations show that the box culvert can handle 222 cfs, 95% of the calculated flow at that point during the 100 year event. However, the major basin drainage study assumes that the off-site basin is fully developed and point discharges the historic flow rate to the culvert. Presently this is not the case. Off-site flows from this watershed are currently diverted to other locations throughout the basin. For instance, eyewitness reports from the flood in 1983 indicates that half of the flows at the box culvert continued on past the entrance to the culvert and traveled north along the west side of South Camp Road and some stormwater sheetflowed across the agricultural land directly to the west of the site. Furthermore, the study does not account for debris flows at the foot of the Colorado National Monument which could detain water naturally and reduce the peak flow rate. See the previous major basin study for further details.

## **HYDROLOGIC PROCEDURE**

The Rational Method has been used to calculate storm runoff for the 2 and the 100 year storm event. Rainfall intensities, runoff coefficients, average flow velocities and required detention pond volumes were obtained from the Grand Junction Stormwater Management Manual.

## **DEVELOPED HYDROLOGIC CONDITIONS**

This stormwater management plan has been developed to not only detain the difference between the developed and the historic peak flow rates but also to safely divert the possible large peak flow rates from the major basin watershed upstream from this site during the 100 year event. The proposed development has been graded to allow off-site surface flows to pass safely between lots and along the right-of-ways of the interior streets to a detention facility in the northwest corner of the development.

Surface flows from outside the development east of the Redlands Second Lift Canal and east of South Camp Road will sheet flow to the north and eventually cross the canal at the southern end of the development. Minor sheet flows will develop along the east portion of the property and cross the canal along the back of the lots in Block 3 of Filing 1 and Block 2 of Filing 2. The lots will be graded to allow these dispersed flows to pass safely between the individual residences and collect in Montero Avenue. However, the majority of the calculated 100 cfs from off-site flows east of South Camp Road will enter the site at the southwest corner near the proposed intersection of Montero Avenue and Altamira Drive. This location is defined as design point No. 7 in the major basin drainage study. This study assumes half of that off-site flow will travel west along Altamira Drive and the other half north along Montero Avenue.

The travel path for the west flows will be along the south flowline to the low point in Altamira Drive then pass across the proposed 10' wide cross pan to the west flowline of Altamira Court. From there the overland surface flows will pass through a swale between Lots 4 & 5 of Block 1, Filing 2 and Lots 1 & 2 of Block 2, Filing 1 to the south flowline of Mescalero Street. The runoff will pass to a swale between Lots 3 & 4 of Block 1, Filing 1 through a 10' wide cross pan at the low point in Mescalero Street and on to the detention facility in the northwest corner of the site.

The travel path for the north flows will be along the east flow line of Montero Avenue to the 10' wide cross pan at the low point across from Montero Court. It will then travel to a swale between Lots 6 & 7 and Lots 9 & 10 of Block 2, Filing 1 and on to the south flowline of Mescalero Street. It will pass to the detention facility through the swale between Lots 3 & 4 of Block 1, Filing 1. The drainage swale to the detention facility has been designed to accommodate 100 cfs. The other swales between lots will be designed to handle 50 cfs. These swales are designed conservatively and do not take into account the amount of stormwater the storm sewers will divert from overland flows during the 100 year event.

The off-site flows from the unnamed major basin watershed west of South Camp Road heading in the Colorado National Monument is assumed to point discharge its peak flow rate of 235 cfs at the existing 4' X 6' box culvert under South Camp Road approximately 300' north of the southwest corner of the property. This assumes fully developed conditions with point discharges at historic rates throughout the lower reaches of the

basin. This design point is defined as control point 8A in the major basin drainage map. The existing box culvert, which is calculated to handle 222 cfs, will be extended 5' on the west and 20' on the east to accommodate improvements on South Camp Road. New headwalls will be constructed to divert these off-site flows through a 9' wide, 2' deep trapezoidal channel to the detention facility. The channel crossing under Mescalero Street will be facilitated by a 9' wide, 2' deep concrete box culvert. Side slopes along South Camp Road will be constructed at a 2:1 slope while the east side will be 4:1.

Nuisance flows and the 2 year event flows will be channeled into storm sewers and diverted to the detention facility. Single combination inlets will be installed at the sump locations in Altamira and Montero Courts as well as the sump location in Mescalero Drive. Additional single combination inlets will be installed in Mescalero Street at the angle points where the sewer diverts flows from the cul-de-sacs to the low point in the street. The proposed inlets are designed to allow well in excess of the 2 year developed flows. See the the Inlet & Street Capacity Table in the appendix.

The storm sewer will channel all its flows to an outlet structure at the east side of the detention facility. The outlet structure will consist of a 4' X 4' bottomless concrete box with 2' of washed 1 1/2" gravel in the bottom of the box for percolation of nuisance flows for prevention of mosquito breeding. The heavier flows of the 2 year event will discharge through twin 12" RCP's to the historic drainage swale on the north property line.

The detention facility has been sized to detain the volume difference between the 100 year historic and the 100 year developed peak discharge using the formula obtained in the City of Grand Junction's Stormwater Management Manual. Additional Filings within this development will have their own detention facilities which will release their historic discharges to the proposed facility in the northwest corner. The 100 year storm release will be controlled by a 65' long weir designed to simulate the natural historic release to the drainage swale to the north. The 100 year release rate of 365 cfs, defined as control point 8 of the major basin drainage study, will be spread out over 65' to minimize the depth to 1.5'. 18" average diameter rip-rap 3' deep will line the spillway structure as well as the subsequent 20' long stilling basin to reduce the velocity to non-erosive rates.

Site erosion and sediment control will be implemented by installing a straw bale barrier along the north property line during construction and until vegetation is firmly established. All storm sewer inlets will be surrounded by straw bale barriers during construction and straw bale barriers will be placed in the drainage swales every 100' until the vegetation is established. The site will be seeded and mulched prior to overlot grading.

## CONCLUSIONS

The implementation of this plan will meet all current applicable regulations of the City of Grand Junction's Stormwater Management Manual.



**CALCULATIONS  
&  
DETAILS**

## BASIN FLOW SUMMARY

<b>Basin</b>	<b>2 Yr Historic</b>	<b>2 Yr Developed</b>	<b>100 Yr Historic</b>	<b>100 Yr Developed</b>
1	1.52 cfs	2.17 cfs	4.84 cfs	6.80 cfs
2	1.33 cfs	1.68 cfs	4.21 cfs	5.29 cfs
3	1.66 cfs	2.28 cfs	5.27 cfs	7.18 cfs
4	1.94 cfs	1.71 cfs	5.85 cfs	5.16 cfs
<b>Total</b>	<b>6.45 cfs</b>	<b>7.84 cfs</b>	<b>20.17 cfs</b>	<b>24.43 cfs</b>

## INLET & STREET CAPACITY TABLE

<b>Inlet Location</b>	<b>Capacity (cfs)</b>	<b>2 year Developed Peak Flow (cfs)</b>	<b>Street Capacity (cfs)</b>
Altamira Ct. - 1 sump inlet	6.4	2.2	17.7
Montero Ct. - 1 sump inlet	6.4	2.3	17.5
Mescalero St. (east) - 2 inlets on grade	5.2	0.8	15.3
Mescalero St. (west) - 2 inlets on grade	6	0.5	19
Mescalero St. (sump) - 2 sump inlets	12.8	2.3	9

## FLOW CALCULATION WORKSHEET

**JOB NAME:** Trails West Village  
**JOB NUMBER:** 95182  
**DATE:** 04/15/96  
**BASIN DESIGNATION:** Historic Basin No. 1  
**FLOWING TO:** Mescalero Drive

1. Basin Area	<u>4.27</u>	acres
2. Longest Runoff Distance	<u>650</u>	feet
3. Overland Runoff Distance	<u>300</u>	feet
Avg. Slope	<u>2.70%</u>	
4. Concentrated Flow Distance	<u>350</u>	feet
Avg. Slope	<u>2.30%</u>	
velocity	<u>1.1</u>	fps
5. Runoff Coefficients	c(2)= <u>0.34</u>	
	c(100)= <u>0.42</u>	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) < L(i) >^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{17.02}{(s)^{1/3}} + 5.30$$

= 22.32 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.34	x	1.05	x	4.27	=	1.52 cfs
Q(100)=	0.42	x	2.7	x	4.27	=	4.84 cfs

## FLOW CALCULATION WORKSHEET

**JOB NAME:** Trails West Village  
**JOB NUMBER:** 95182  
**DATE:** 04/15/96  
**BASIN DESIGNATION:** Developed Basin No. 1  
**FLOWING TO:** Mescalero Drive

1. Basin Area	4.27	acres
2. Longest Runoff Distance	650	feet
3. Overland Runoff Distance	75	feet
Avg. Slope	4.00%	
4. Concentrated Flow Distance	680	feet
Avg. Slope	1.70%	
velocity	2.6	fps
5. Runoff Coefficients	c(2)= 0.36	
	c(100)= 0.45	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) < L(i) >^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{7.27}{(s)^{1/3}} + 4.36$$

= 11.63 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.36	x	1.41	x	4.27	=	2.17 cfs
Q(100)=	0.45	x	3.54	x	4.27	=	6.80 cfs

FLOW CALCULATION WORKSHEET

JOB NAME: Trails West Village  
 JOB NUMBER: 95182  
 DATE: 04/15/96

BASIN DESIGNATION: Historic Basin No. 2  
 FLOWING TO: Detention Facility

1. Basin Area	<u>3.53</u>	acres
2. Longest Runoff Distance	<u>400</u>	feet
3. Overland Runoff Distance	<u>300</u>	feet
Avg. Slope	<u>2.00%</u>	
4. Concentrated Flow Distance	<u>100</u>	feet
Avg. Slope	<u>2.50%</u>	
velocity	<u>1.2</u>	fps
5. Runoff Coefficients	<u>c(2)= 0.34</u>	
	<u>c(100)= 0.42</u>	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) <L(i)>^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{\phantom{t(i) + t(t)}}{(s)^{1/3}} \quad 18.81 + \quad 1.39$$

20.20 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.34	x	1.11	x	3.53	=	1.33 cfs
Q(100)=	0.42	x	2.84	x	3.53	=	4.21 cfs

## FLOW CALCULATION WORKSHEET

**JOB NAME:** Trails West Village  
**JOB NUMBER:** 95182  
**DATE:** 04/15/96  
**BASIN DESIGNATION:** Developed Basin No. 2  
**FLOWING TO:** Detention Facility

1. Basin Area		3.53	acres
2. Longest Runoff Distance		710	feet
3. Overland Runoff Distance		75	feet
Avg. Slope		2.00%	
4. Concentrated Flow Distance		635	feet
Avg. Slope		1.00%	
velocity		2	fps
5. Runoff Coefficients			
	c(2)=	0.36	
	c(100)=	0.45	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) <L(i)>^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{\quad}{(s)^{1/3}} \quad 9.16 + \quad 5.29$$

= 14.45 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.36	x	1.32	x	3.53	=	1.68 cfs
Q(100)=	0.45	x	3.33	x	3.53	=	5.29 cfs

## FLOW CALCULATION WORKSHEET

**JOB NAME:** Trails West Village  
**JOB NUMBER:** 95182  
**DATE:** 04/15/96  
**BASIN DESIGNATION:** Developed Basin No. 3  
**FLOWING TO:** Mescalero Drive

1. Basin Area	4.65	acres
2. Longest Runoff Distance	970	feet
3. Overland Runoff Distance	65	feet
Avg. Slope	3.00%	
4. Concentrated Flow Distance	905	feet
Avg. Slope	1.50%	
velocity	2.5	fps

5. Runoff Coefficients		c(2)= 0.36	
		c(100)= 0.45	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) < L(i) >^{1/2}} + \frac{L(t)}{60(V)}$$

= 7.45 + 6.03

= 13.48 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.36	x	1.36	x	4.65	=	2.28 cfs
Q(100)=	0.45	x	3.43	x	4.65	=	7.18 cfs

FLOW CALCULATION WORKSHEET

JOB NAME: Trails West Village  
 JOB NUMBER: 95182  
 DATE: 04/15/96

BASIN DESIGNATION: Historic Basin No. 4  
 FLOWING TO: Montero Avenue

1. Basin Area	2.66	acres
2. Longest Runoff Distance	150	feet
3. Overland Runoff Distance	150	feet
Avg. Slope	8.60%	
4. Concentrated Flow Distance	1	feet
Avg. Slope	3.00%	
velocity	1.8	fps
5. Runoff Coefficients	c(2)= 0.42	
	c(100)= 0.50	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) < L(i) >^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{\phantom{t(i) + t(t)}}{(s)^{1/3}} \quad 7.32 + \quad 0.01$$

= 7.33 min.

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.42	x	1.74	x	2.66	=	1.94 cfs
Q(100)=	0.50	x	4.4	x	2.66	=	5.85 cfs



**FLOW CALCULATION WORKSHEET**

JOB NAME: Trails West Village  
 JOB NUMBER: 95182  
 DATE: 04/15/96

BASIN DESIGNATION: Developed Basin No. 4  
 FLOWING TO: Montero Avenue

1. Basin Area		<u>2.66</u>	acres
2. Longest Runoff Distance		<u>605</u>	feet
3. Overland Runoff Distance		<u>145</u>	feet
Avg. Slope		<u>4.80%</u>	
4. Concentrated Flow Distance		<u>460</u>	feet
Avg. Slope		<u>2.00%</u>	
velocity		<u>2.8</u>	fps
5. Runoff Coefficients			
	c(2)=	<u>0.44</u>	
	c(100)=	<u>0.53</u>	

6. Time of Concentration - t(c) =

$$= \frac{t(i) + t(t)}{1.8(1.1 - c(2)) < L(i) >^{1/2}} + \frac{L(t)}{60(V)}$$

$$= \frac{\quad}{(s)^{1/3}} \quad 8.48 + \quad 2.74$$

= **11.22 min.**

Intensity obtained from Table A-1 (SWMI)

7. Q = CIA

Q(2)=	0.44	x	1.46	x	2.66	=	1.71 cfs
Q(100)=	0.53	x	3.66	x	2.66	=	5.16 cfs

PROJECT: TRAILS WEST VILLAGE  
 LOCATION: CITY OF GRAND JUNCTION, COLORADO  
 SUBJECT: REQUIRED DETENTION POND VOLUME

BASINS: 1 - 4

DATE: 25-Apr-96  
 CALC. BY: JPC

FORMULAS PER CITY OF GRAND JUNCTION

Davg. = 0.67Dmax  
 2 YEAR RELEASE (ORIFICE & WEIR COMBINATION)

Qr = 0.65 Qmax.  
 Qmax. = 6.45 CFS  
 Qr = 4.52 CFS

100 YEAR RELEASE (ORIFICE & WEIR COMBINATION)

Qr = 0.65 Qmax.  
 Qmax. = 20.17 CFS  
 Qr = 14.12 CFS

DETENTION FORMULAS

$$T_d = \frac{(633.4 C_d A / (Q_r - (Q_r T_{cd} / (81.2 C_d A))))^{0.5}}{2} - 15.6$$

$$T_d = \frac{(1832 C_d A / (Q_r - (Q_r T_{cd} / (213 C_d A))))^{0.5}}{100} - 17.2$$

$$I_d = \text{Intensity at } T_d = \frac{40.6}{(T_d + 15.6)^2}$$

$$I_d = \text{Intensity at } T_d = \frac{106.5}{(T_d + 17.2)^2}$$

$$Q_d = C_d A I_d$$

$$K = T_{ch} / T_{cd}$$

$$V = 60(Q_d T_d - Q_r T_d - Q_r T_{cd} + K Q_r T_{cd} / 2 + Q_r T_{cd} / (2 Q_d))$$

WHERE:

Td = Time of Critical Storm Duration,  
 C = Weir Coefficient; OR  
 C = Runoff Coefficient;  
 A = Area in Acres;  
 Qr = Detention Pond Average Release  
 Tc = Time of Concentration, Minutes;  
 Id = Intensity at Td, Inches Per Hour;  
 Qd = Runoff Rate at Td, CFS;  
 K = Ratio of Pre and Post- Developme  
 V = Storage Volume in CF;

SUBSCRIPTS:

2 = 2 - Year Storm  
 100 = 100 - Year Storm  
 h = Historic Condition  
 d = Developed Condition

REQUIRED 2 YEAR STORAGE VOLUME

Td <sub>2</sub>	Cd	A	Qr	Tc <sub>h</sub>	Tc <sub>d</sub>	Id <sub>2</sub>	Qd <sub>2</sub>	K	V <sub>2</sub>
14.46	0.36	15.11	4.5200	19.50	15.30	1.35	7.35	1.2745	2,224

REQUIRED 100 YEAR STORAGE VOLUME

Td <sub>100</sub>	Cd	A	Qr	Tc <sub>h</sub>	Tc <sub>d</sub>	Id <sub>100</sub>	Qd <sub>100</sub>	K	V <sub>100</sub>
14.84	0.45	15.11	14.1200	17.30	14.40	3.32	22.60	1.2014	7,140

=====  
 HYDRO POND  
 RESERVOIR FLOOD ROUTING AND FLOW ANALYSIS  
 12-06-1993  
 DEVELOPED BY  
 JAMES C.Y. GUO, PHD, P.E.  
 DEPARTMENT OF CIVIL ENGINEERING  
 UNIVERSITY OF COLORADO AT DENVER  
 =====

EXECUTED BY Jeff Crane.....  
 ON DATE 04-25-1996 AT TIME 17:39:34  
 =====

\*\*\* PROJECT TITLE: TRAILS WEST VILLAGE

\*\*\* LAYOUT OF OUTLET WORKS:

THERE ARE 2 ORIFICE(S)

CENTER ELEV FEET	ORIFICE AREA SQUARE FEET	ORIFICE COEFF	DIAMETER/HEIGHT FEET
4743.00	0.79	0.61	4.50
4743.00	0.79	0.61	4.50

THERE ARE 1 WEIR(S)

CREST ELEV FEET	CREST LENGTH FEET	WEIR COEFF	SIDE SLOPE Z 1V:ZH FT/FT
4745.57	65.00	3.37	4.00

\*\*\* STAGE-AREA-STORAGE CURVE FOR THE RESERVOIR:

ELEVATION (STAGE) FEET	CONTOUR AREA ACRES	EQUIVALENT DIAMETER FEET	POND BANK SIDE SLOPE FEET/FEET	CUMULATED STORAGE ACRE-FT
4744.00	0.01	23.55	0.00	0.00
4744.50	0.07	62.31	38.76	0.02
4745.00	0.05	55.13	-7.18	0.05
4745.50	0.32	132.97	77.84	0.14
4746.00	0.21	107.10	-25.88	0.28
4746.50	0.33	135.12	28.03	0.41
4747.00	0.91	224.76	89.63	0.72

\*\*\* THE GIVEN INFLOW AND COMPUTED OUTFLOW HYDROGRAPHS ARE TABULATED AS FOLLOWS:

TIME MINUTE	INFLOW RATE CFS	STAGE FEET	RESERVOIR STORAGE ACRE-FT	STAGE AND ORIFICE CFS	WEIR CFS	OUTFLOW CFS
0.00	0.00	4744.00	0.00	5.14	0.00	5.14
15.00	1.00	4744.00	0.00	5.14	0.00	5.14
30.00	1.00	4744.00	0.00	5.14	0.00	5.14
45.00	1.00	4744.00	0.00	5.14	0.00	5.14
60.00	2.00	4744.00	0.00	5.14	0.00	5.14
75.00	3.00	4744.00	0.00	5.14	0.00	5.14
90.00	4.00	4744.00	0.00	5.14	0.00	5.14
105.00	6.00	4744.00	0.00	5.14	0.00	5.14
120.00	20.00	4745.13	0.10	10.81	0.00	10.81
135.00	162.00	4746.27	0.35	13.99	133.22	147.21
150.00	364.00	4746.84	0.66	15.16	333.62	348.78
165.00	310.00	4746.80	0.60	15.07	315.64	330.71
180.00	135.00	4746.25	0.33	13.94	127.02	140.96
195.00	84.00	4746.04	0.25	13.48	71.97	85.46
210.00	80.00	4746.01	0.26	13.41	64.70	78.11
225.00	64.00	4745.94	0.27	13.27	51.08	64.36
240.00	51.00	4745.88	0.26	13.13	39.10	52.23
255.00	40.00	4745.83	0.23	13.00	28.60	41.60
270.00	38.00	4745.80	0.22	12.93	23.94	36.88
285.00	34.00	4745.77	0.25	12.87	19.58	32.45
300.00	25.00	4745.74	0.23	12.81	15.66	28.46
315.00	20.00	4745.69	0.18	12.68	8.77	21.45
330.00	15.00	4745.58	0.19	12.43	0.26	12.69
345.00	10.00	4745.48	0.19	12.19	0.00	12.19
360.00	5.00	4745.11	0.11	10.73	0.00	10.73
375.00	0.00	4744.00	0.00	5.14	0.00	5.14
390.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: OUTFLOW WAS DETERMINED BY POND OUTLETS

OUTFLOW = ORIFICE FLOW + WEIR FLOW

ORIFICE FLOW = TOTAL FLOW RATE THROUGH THE ORIFICES

WEIR FLOW = TOTAL FLOW RATE THROUGH THE WEIRS

\*\*\* DISTRIBUTION OF ORIFICE FLOW AMONG ORIFICES IS LISTED BELOW

ORIFICE FLOW FOR THE ORIFICE AT ELEVATION OF 4743 FEET

TIME	FLOW RATE	TIME	FLOW RATE	TIME	FLOW RATE
MINUTE	CFS	MINUTE	CFS	MINUTE	CFS
0.00	2.57	15.00	2.57	30.00	2.57
45.00	2.57	60.00	2.57	75.00	2.57
90.00	2.57	105.00	2.57	120.00	5.41
135.00	7.00	150.00	7.58	165.00	7.54
180.00	6.97	195.00	6.74	210.00	6.71
225.00	6.64	240.00	6.57	255.00	6.50
270.00	6.47	285.00	6.43	300.00	6.40
315.00	6.34	330.00	6.21	345.00	6.09
360.00	5.37	375.00	2.57	390.00	0.00

ORIFICE FLOW FOR THE ORIFICE AT ELEVATION OF 4743 FEET

TIME	FLOW RATE	TIME	FLOW RATE	TIME	FLOW RATE
MINUTE	CFS	MINUTE	CFS	MINUTE	CFS
0.00	2.57	15.00	2.57	30.00	2.57
45.00	2.57	60.00	2.57	75.00	2.57
90.00	2.57	105.00	2.57	120.00	5.41
135.00	7.00	150.00	7.58	165.00	7.54
180.00	6.97	195.00	6.74	210.00	6.71
225.00	6.64	240.00	6.57	255.00	6.50
270.00	6.47	285.00	6.43	300.00	6.40
315.00	6.34	330.00	6.21	345.00	6.09
360.00	5.37	375.00	2.57	390.00	0.00

\*\*\* DISTRIBUTION OF WEIR FLOW AMONG WEIRS IS LISTED BELOW

\*\*\* WEIR FLOW FOR THE WEIR AT ELEVATION OF 4745.57 FEET

TIME MINUTE	FLOW RATE CFS	TIME MINUTE	FLOW RATE CFS	TIME MINUTE	FLOW RATE CFS
0.00	0.00	15.00	0.00	30.00	0.00
45.00	0.00	60.00	0.00	75.00	0.00
90.00	0.00	105.00	0.00	120.00	0.00
135.00	133.22	150.00	333.62	165.00	315.64
180.00	127.02	195.00	71.97	210.00	64.70
225.00	51.08	240.00	39.10	255.00	28.60
270.00	23.94	285.00	19.58	300.00	15.66
315.00	8.77	330.00	0.26	345.00	0.00
360.00	0.00	375.00	0.00	390.00	0.00

\*\*\* COMPARISON BETWEEN PEAK RELEASE RATE AND MAXIMUM ALLOWABLE REALEASE RATE

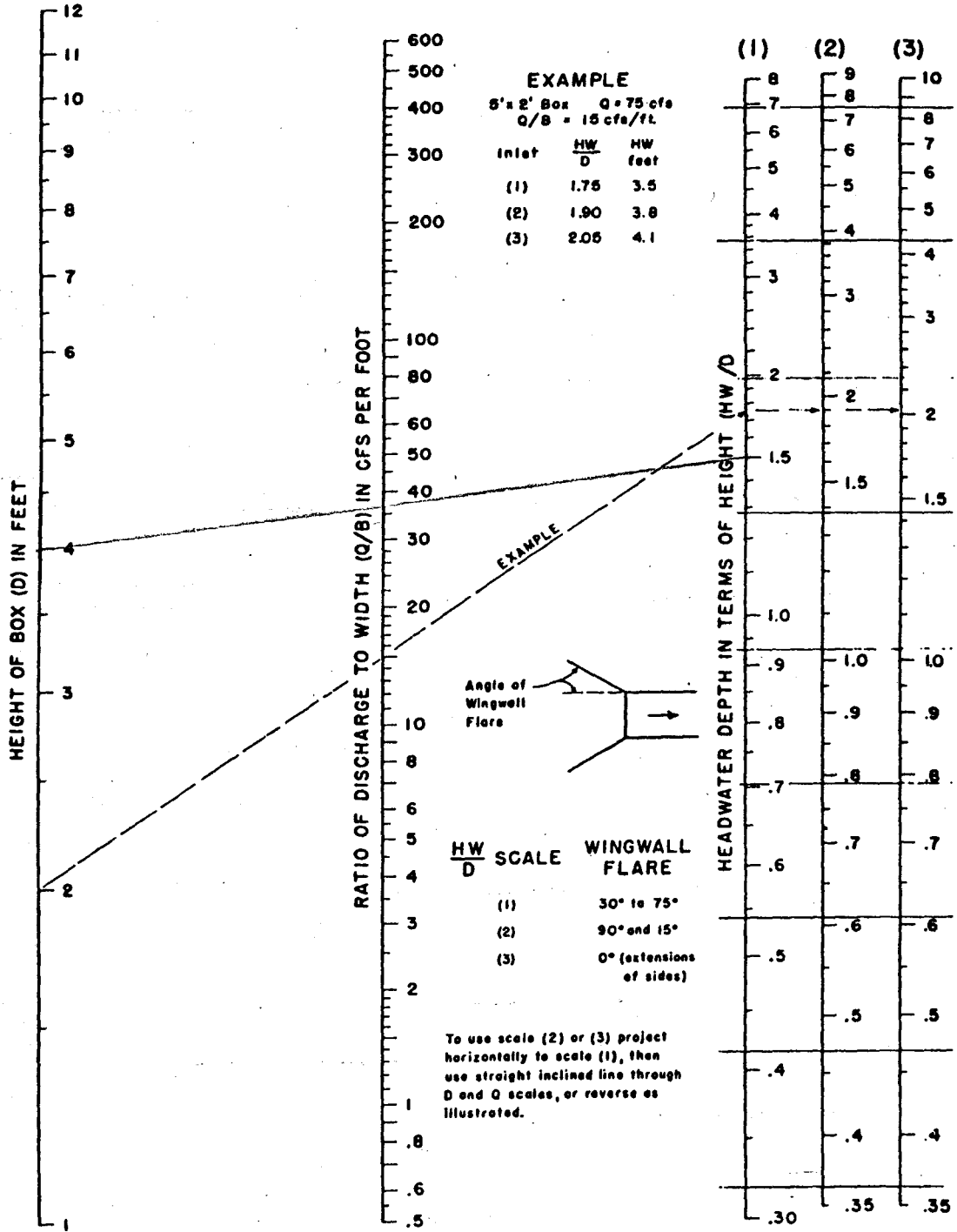
	AT OUTFLOW PEAK RELEASE RATE	AT MAXIMUM ALLOWABLE RATE
THE RELEASE FLOW RATE IN CFS	348.78	364.00
STAGE IN FEET AT EACH RELEASE RATE	4746.84	4746.91
STORAGE AT EACH RELEASE RATE ACRE-FT	0.66	0.66
OUTFLOW DISTRIBUTION AMONG THE ORIFICE(S)		
AT ELEVATION IN FEET OF 4743.00	7.58	7.64
AT ELEVATION IN FEET OF 4743.00	7.58	7.64
OUTFLOW DISTRIBUTION AMONG THE WEIR(S)		
AT ELEVATION IN FEET OF 4745.57	333.62	338.12

# CAPACITY OF EXISTING BOX CULVERT

4'x6' Box = 222 cfs

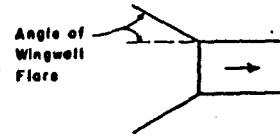


CHART 8



**EXAMPLE**  
 8' x 2' Box Q = 75 cfs  
 Q/B = 15 cfs/ft

Inlet	HW/D	HW feet
(1)	1.75	3.5
(2)	1.90	3.8
(3)	2.05	4.1



**HW/D SCALE WINGWALL FLARE**

(1)	30° to 75°
(2)	90° and 15°
(3)	0° (extensions of sides)

To use scale (2) or (3) project horizontally to scale (1), then use straight inclined line through D and Q scales, or reverse as illustrated.

HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: Trails West Village

Comment: Diversion Channel from Existing Box Culvert

Solve For Depth

Given Input Data:

Bottom Width.....	9.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	4.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0220 ft/ft
Discharge.....	235.00 cfs

Computed Results:

Depth.....	2.00 ft
Velocity.....	7.82 fps
Flow Area.....	30.06 sf
Flow Top Width...	21.02 ft
Wetted Perimeter.	21.74 ft
Critical Depth...	2.16 ft
Critical Slope...	0.0163 ft/ft
Froude Number....	1.15 (flow is Supercritical)



Rectangular Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: Trails West Village

Comment: 9'X 2' Concrete Box Culvert under Mescalero

Solve For Depth

Given Input Data:

Bottom Width.....	9.00 ft
Manning's n.....	0.015
Channel Slope....	0.0100 ft/ft
Discharge.....	235.00 cfs

Computed Results:

Depth.....	2.08 ft
Velocity.....	12.54 fps
Flow Area.....	18.74 sf
Flow Top Width...	9.00 ft
Wetted Perimeter.	13.17 ft
Critical Depth...	2.77 ft
Critical Slope...	0.0044 ft/ft
Froude Number....	1.53 (flow is Supercritical)

Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: Trails West Village

Comment: Channel between Lots @ to Detention Pond

Solve For Depth

Given Input Data:

Bottom Width.....	1.00 ft
Left Side Slope..	4.00:1 (H:V)
Right Side Slope.	4.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0075 ft/ft
Discharge.....	100.00 cfs

Computed Results:

Depth.....	2.34 ft
Velocity.....	4.14 fps
Flow Area.....	24.18 sf
Flow Top Width...	19.69 ft
Wetted Perimeter.	20.27 ft
Critical Depth...	1.96 ft
Critical Slope...	0.0183 ft/ft
Froude Number....	0.66 (flow is Subcritical)

Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: Trails West Village

Comment: Channel between Lots @ Altamira Court

Solve For Depth

Given Input Data:

Bottom Width.....	1.00 ft
Left Side Slope..	4.00:1 (H:V)
Right Side Slope.	4.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0230 ft/ft
Discharge.....	50.00 cfs

Computed Results:

Depth.....	1.42 ft
Velocity.....	5.29 fps
Flow Area.....	9.45 sf
Flow Top Width...	12.34 ft
Wetted Perimeter.	12.69 ft
Critical Depth...	1.46 ft
Critical Slope...	0.0201 ft/ft
Froude Number....	1.07 (flow is Supercritical)

Trapezoidal Channel Analysis & Design  
Open Channel - Uniform flow

Worksheet Name: Trails West Village

Comment: Channel between Lots @ Montero Court

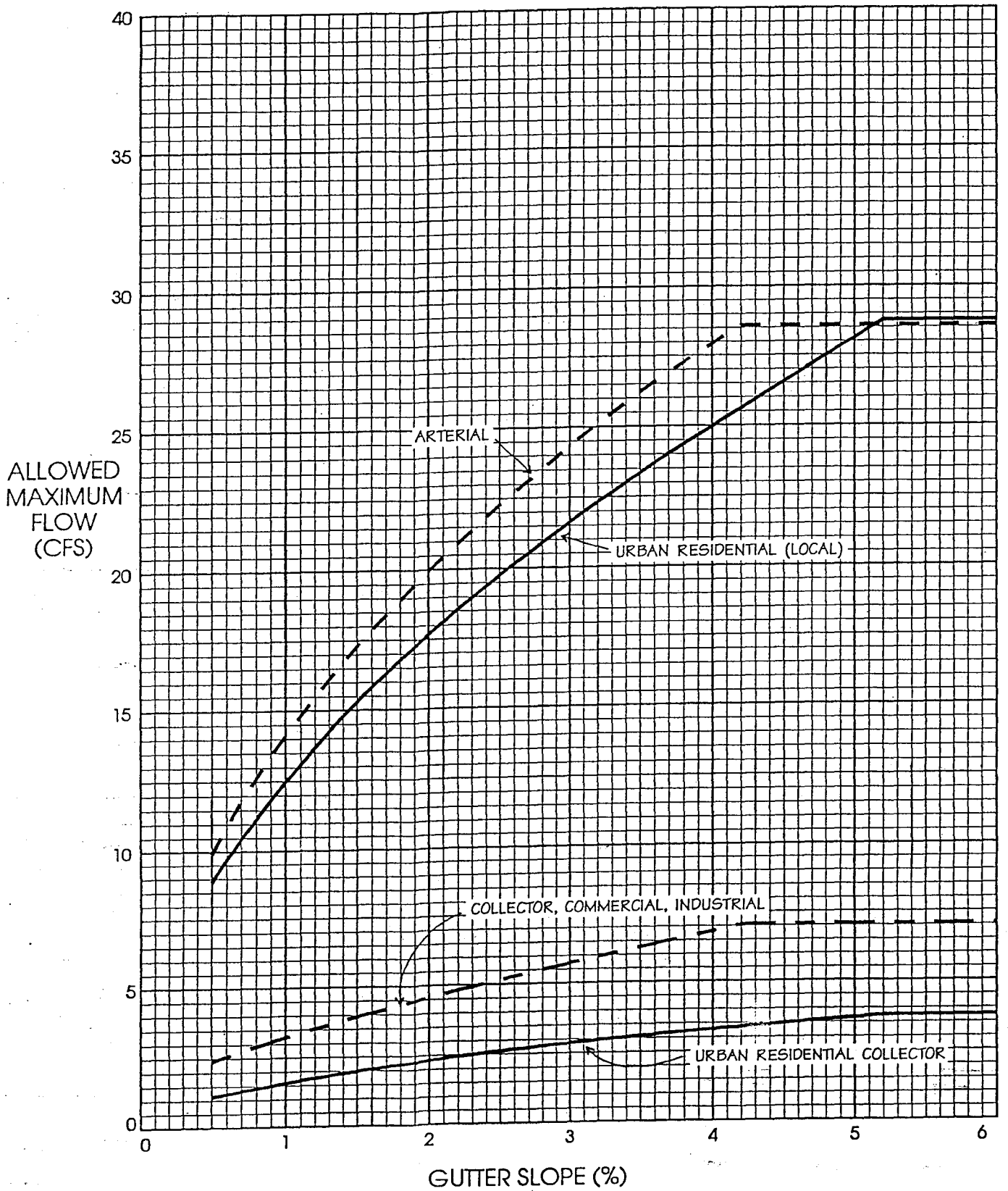
Solve For Depth

Given Input Data:

Bottom Width.....	1.00 ft
Left Side Slope..	4.00:1 (H:V)
Right Side Slope.	4.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0152 ft/ft
Discharge.....	50.00 cfs

Computed Results:

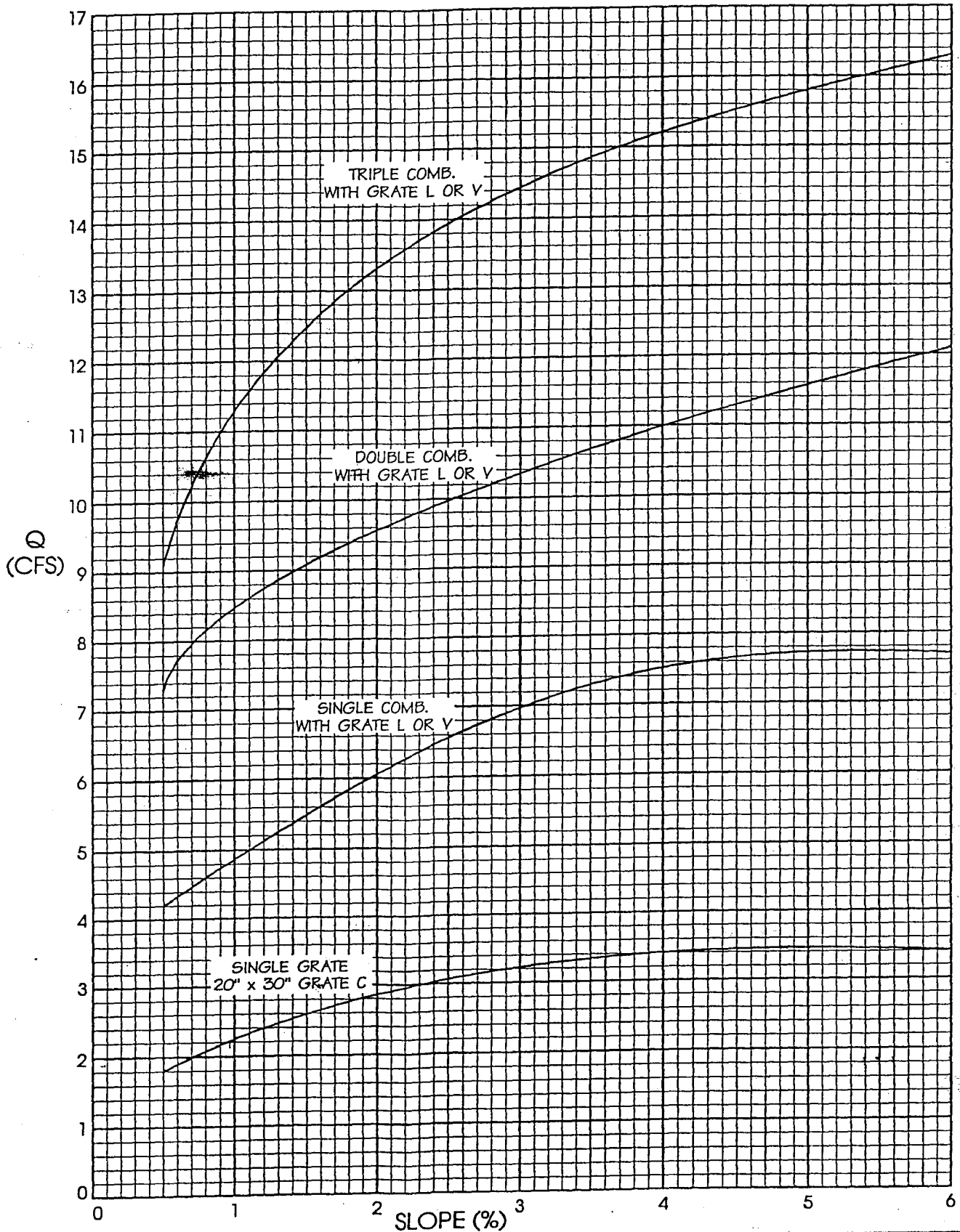
Depth.....	1.54 ft
Velocity.....	4.53 fps
Flow Area.....	11.04 sf
Flow Top Width...	13.33 ft
Wetted Perimeter.	13.71 ft
Critical Depth...	1.46 ft
Critical Slope...	0.0201 ft/ft
Froude Number....	0.88 (flow is Subcritical)



**MAXIMUM HALF STREET FLOWS ( $S_x=2\%$ ,  $n=0.016$ )**  
 (Based upon Figures G-3 and G-4)

**FIGURE "G-5"**

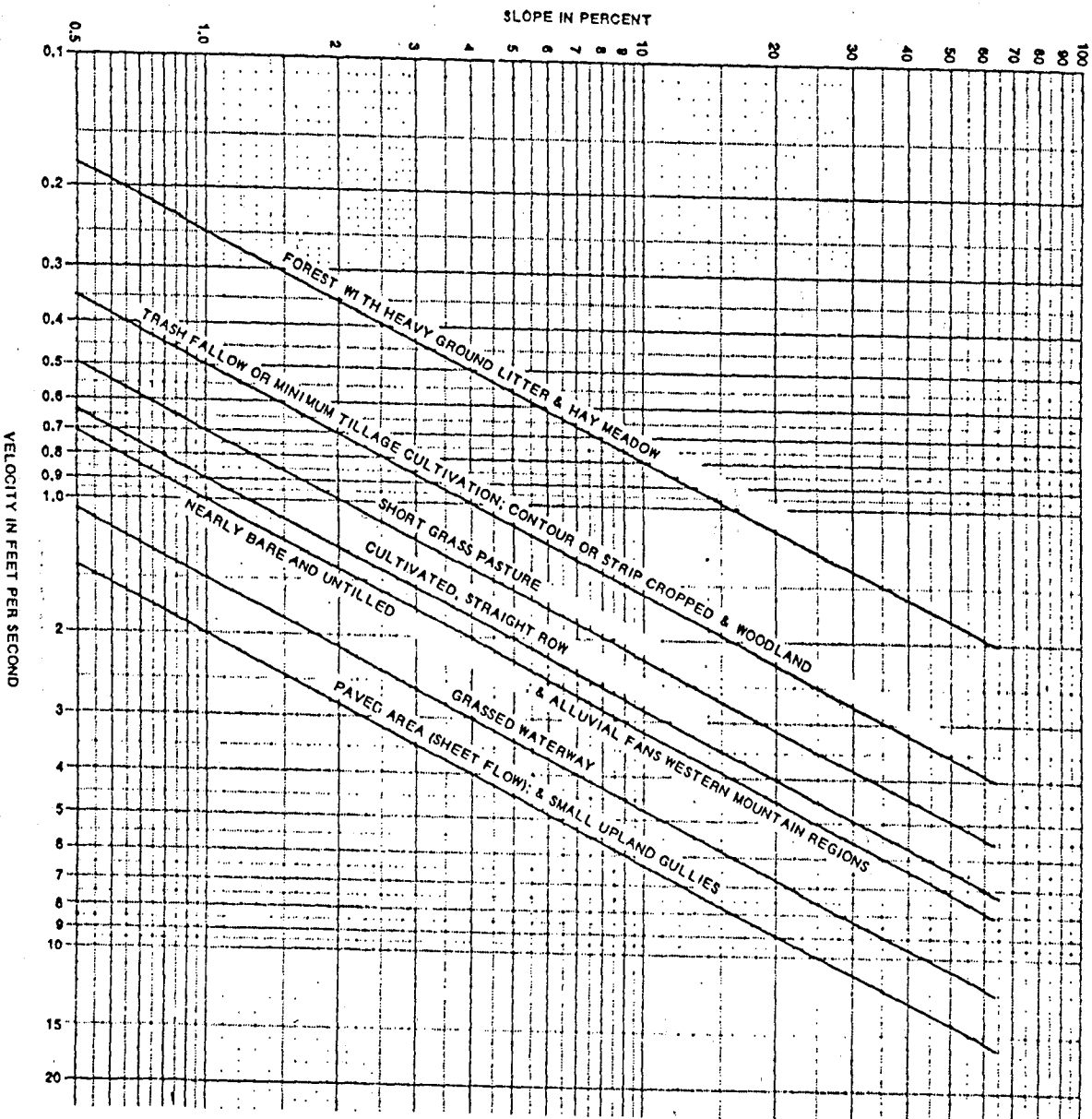
INLET CAPACITIES PROVIDED ARE BASED UPON FIGURE "G-4" MAXIMUM ALLOWED FLOW CONDITIONS, SMF ENGINEERING CORP.'S HEC-12 SOFTWARE, CLOGGING FACTORS PRESENTED IN SECTION VI, AND CITY/COUNTY STANDARD INLETS.



MAXIMUM INLET CAPACITIES: ON-GRADE  
URBAN RESIDENTIAL (LOCAL)

FIGURE "G-7a"

ROAD TYPE	COMBINATION INLET CAPACITY (CFS)					
	SINGLE		DOUBLE		TRIPLE	
	2-YR	100-YR	2-YR	100-YR	2-YR	100-YR
Urban Residential (local)	6.4	13	9.5	22	12.7	31
Residential Collector, Commercial and Industrial Streets	3.2	13	4.9	22	6.5	31
Collector Streets (3000 - 8000 ADT)	2.7	13	4.0	22	5.3	31
Principal and Minor Arterials	6.0	13	9.0	22	12.0	31
<p>Inlet capacities shown above are based upon: 1) use of non-curved vane grates (similar to HEC-12 P-17<math>\frac{1}{8}</math>-4 grates; 2) HEC-12 procedures; 3) clogging factors per Section VI; and 4) City/County standard inlets with 2-inch radius on curb face and type C grates. Capacities shown for 2-year storms are based upon depths allowed by maximum street inundation per Figure "G-3". The 100-year capacities are based upon a ponded depth of 1.0 foot. Note that only combination inlets are allowed in sag or sump conditions.</p>						
<p><b>MAXIMUM INLET CAPACITIES: SUMP OR SAG CONDITION</b></p>				<p><b>TABLE "G-1"</b></p>		



DETERMINATION OF "Ts"

FIGURE "E-3"



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	.16-.26	.25-.35	.14-.22	.22-.30	.30-.38	.20-.28	.28-.36	.36-.44	.24-.32	.30-.38	.40-.48
	.14-.24	.22-.32	.30-.40	.20-.28	.28-.36	.37-.45	.26-.34	.35-.43	.40-.48	.30-.38	.40-.48	.50-.58
Cultivated/Agricultural	.08-.18	.13-.23	.16-.26	.11-.19	.15-.23	.21-.29	.14-.22	.19-.27	.26-.34	.18-.26	.23-.31	.31-.39
	.14-.24	.18-.28	.22-.32	.16-.24	.21-.29	.28-.36	.20-.28	.25-.33	.34-.42	.24-.32	.29-.37	.41-.49
Pasture	.12-.22	.20-.30	.30-.40	.18-.26	.28-.36	.37-.45	.24-.32	.34-.42	.44-.52	.30-.38	.40-.48	.50-.58
	.15-.25	.25-.35	.37-.47	.23-.31	.34-.42	.45-.53	.30-.38	.42-.50	.52-.60	.37-.45	.50-.58	.62-.70
Meadow	.10-.20	.16-.26	.25-.35	.14-.22	.22-.30	.30-.38	.20-.28	.28-.36	.36-.44	.24-.32	.30-.38	.40-.48
	.14-.24	.22-.32	.30-.40	.20-.28	.28-.36	.37-.45	.26-.34	.35-.43	.44-.52	.30-.38	.40-.48	.50-.58
Forest	.05-.15	.08-.18	.11-.21	.08-.16	.11-.19	.14-.22	.10-.18	.13-.21	.16-.24	.12-.20	.16-.24	.20-.28
	.08-.18	.11-.21	.14-.24	.10-.18	.14-.22	.18-.26	.12-.20	.16-.24	.20-.28	.15-.23	.20-.28	.25-.33
RESIDENTIAL AREAS 1/8 acre per unit	.40-.50	.43-.53	.46-.56	.42-.50	.45-.53	.50-.58	.45-.53	.48-.56	.53-.61	.48-.56	.51-.59	.57-.65
	.48-.58	.52-.62	.55-.65	.50-.58	.54-.62	.59-.67	.53-.61	.57-.65	.64-.72	.56-.64	.60-.68	.69-.77
1/4 acre per unit	.27-.37	.31-.41	.34-.44	.29-.37	.34-.42	.38-.46	.32-.40	.36-.44	.41-.49	.35-.43	.39-.47	.45-.53
	.35-.45	.39-.49	.42-.52	.38-.46	.42-.50	.47-.55	.41-.49	.45-.53	.52-.60	.43-.51	.47-.55	.57-.65
1/3 acre per unit	.22-.32	.26-.36	.29-.39	.25-.33	.29-.37	.33-.41	.28-.36	.32-.40	.37-.45	.31-.39	.35-.43	.42-.50
	.31-.41	.35-.45	.38-.48	.33-.41	.38-.46	.42-.50	.36-.44	.41-.49	.48-.56	.39-.47	.43-.51	.53-.61
1/2 acre per unit	.16-.26	.20-.30	.24-.34	.19-.27	.23-.31	.28-.36	.22-.30	.27-.35	.32-.40	.26-.34	.30-.38	.37-.45
	.25-.35	.29-.39	.32-.42	.28-.36	.32-.40	.36-.44	.31-.39	.35-.43	.42-.50	.34-.42	.38-.46	.48-.56
1 acre per unit	.14-.24	.19-.29	.22-.32	.17-.25	.21-.29	.26-.34	.20-.28	.25-.33	.31-.39	.24-.32	.29-.37	.35-.43
	.22-.32	.26-.36	.29-.39	.24-.32	.28-.36	.34-.42	.28-.36	.32-.40	.40-.48	.31-.39	.35-.43	.46-.54
MISC. SURFACES Pavement and roofs	.93	.94	.95	.93	.94	.95	.93	.94	.95	.93	.94	.95
	.95	.96	.97	.95	.96	.97	.95	.96	.97	.95	.96	.97
Traffic areas (soil and gravel)	.55-.65	.60-.70	.64-.74	.60-.68	.64-.72	.67-.75	.64-.72	.67-.75	.69-.77	.72-.80	.75-.83	.77-.85
	.65-.70	.70-.75	.74-.79	.68-.76	.72-.80	.75-.83	.72-.80	.75-.83	.77-.85	.79-.87	.82-.90	.84-.92
Green landscaping (lawns, parks)	.10-.20	.16-.26	.25-.35	.14-.22	.22-.30	.30-.38	.20-.28	.28-.36	.36-.44	.24-.32	.30-.38	.40-.48
	.14-.24	.22-.32	.30-.40	.20-.28	.28-.36	.37-.45	.26-.34	.35-.43	.42-.52	.30-.38	.40-.48	.50-.58
Non-green and gravel landscaping	.30-.40	.36-.46	.45-.55	.45-.55	.42-.50	.50-.58	.40-.48	.48-.56	.56-.64	.44-.52	.50-.58	.60-.68
	.34-.44	.42-.52	.50-.60	.50-.60	.48-.56	.57-.65	.46-.54	.55-.63	.64-.72	.50-.58	.60-.68	.70-.78
Cemeteries, playgrounds	.20-.30	.26-.36	.35-.45	.35-.45	.32-.40	.40-.48	.30-.38	.38-.44	.46-.54	.34-.42	.40-.48	.50-.58
	.24-.34	.32-.42	.40-.50	.40-.50	.38-.46	.47-.55	.36-.44	.45-.53	.54-.62	.40-.48	.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 judgment of site conditions such as basic shape, homogeneity of surface type, surface depression storage, and storm duration. In general, during shorter duration storms ( $T_c \leq 10$  minutes), infiltration capacity is higher, allowing use of a "C" value in the low range. Conversely, for longer duration storms ( $T_c > 30$  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.

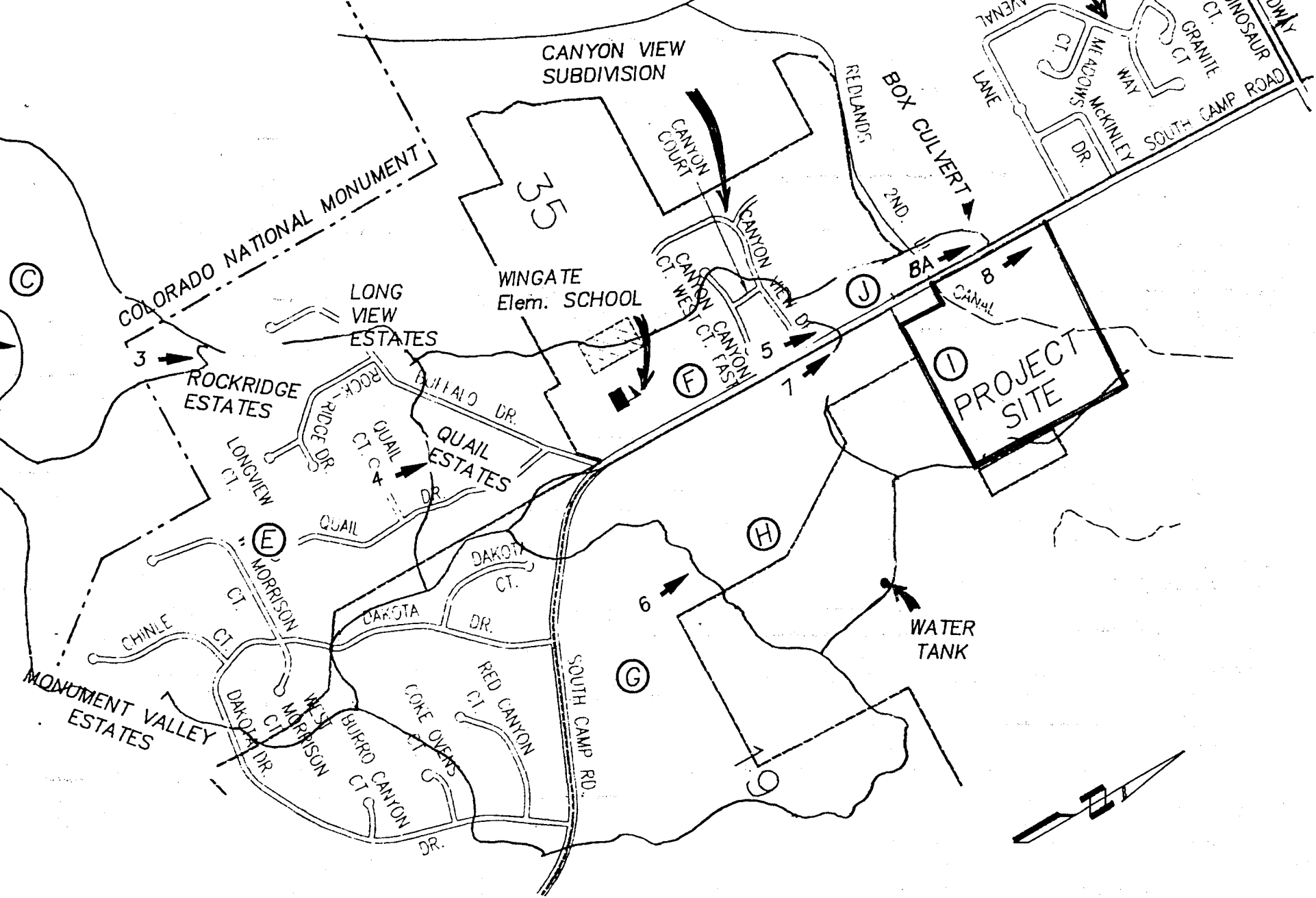
RATIONAL METHOD RUNOFF COEFFICIENTS  
 (Modified from Table 4, UC-Davis, which appears to be a modification of work done by Rawls)

TABLE "B-1"

**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



FLOW (cfs)  
100yr./2yr.  
364/10 →

LOAM  
Redlands Alluvium

LINCOLN-DeVORE, INC.

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

**LINCOLN  
DeVORE**  
ENGINEERS

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



LETTER OF TRANSMITTAL

P.O. BOX 4506 • GRAND JUNCTION, CO 81502  
(970) 245-4099 • FAX: (970) 245-3076

TO ~~Asst. City~~ CITY OF G.J.

DATE	5/2/96	JOB NO.	95182
ATTENTION	JODY KLISKA		
RE:	TRAILS WEST		

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT  
MAY 02 1996

> WE ARE SENDING YOU  Attached via \_\_\_\_\_ the following items:  
 Pjt. Submittal     Prints     Plans     Samples     Specifications  
 Copy of letter     Change order     \_\_\_\_\_

COPIES	DATE	NO.	DESCRIPTION
1	5/2	1	PAVEMENT DESIGN

THESE ARE TRANSMITTED as checked below:  
 For Approval  
 For your use  
 As requested     PRINTS RETURNED AFTER LOAN TO US  
 For review and comment     \_\_\_\_\_  
 FOR BIDS DUE \_\_\_\_\_ 19 \_\_\_\_\_

REMARKS  
 THE PAVEMENT SECTIONS FOR FILINGS 1 AND 2 HAVE AN R VALUE OF 14. THE R VALUES OF 8 ARE LOCATED ON THE SIDE AND TOP OF THE MESA AND NOT WITHIN THE PRESENT DEVELOPMENT. ED MORRIS DOES NOT HAVE A BORING MAP IN HIS REPORT BUT HAS VERBALLY VERIFIED THESE R-VALUES.

COPY TO \_\_\_\_\_

SIGNED:

IF ENCLOSURES ARE NOT NOTED, KINDLY NOTIFY US AT ONCE.

Based upon the existing topography, the anticipated final road grades and subsurface soils conditions encountered during the drilling program, a Drainage Factor of 0.9 (1986 AASHTO procedure) and a mean average annual air temperature (MAAT) of 60° Fahrenheit (Asphalt Institute Method) has been utilized for the section analysis.

Calculated Pavement Sections

18K EAL = 5		Soil "R" Value = 14	
1986 AASHTO Drainage Coefficient = 0.9		Asphalt Institute MAAT = 60° F	
AC	3"	3"	AC
ABC	6"	6"	ABC
Subbase	0"	0"	Subbase
FULL DEPTH AC      4		4"	

18K EAL = 5		Soil "R" Value = 8	
1986 AASHTO Drainage Coefficient = 0.9		Asphalt Institute MAAT = 60° F	
AC	3" or 4"	4"	AC
ABC	10" or 6"	6"	ABC
Subbase	0" or 5"	0"	Subbase
FULL DEPTH AC      5"		5"	

Due to the possibility of very high soil moisture in the subgrade soils near the canal, the use of a Geotextile Fabric for separation and minor reinforcement ( such as Mirafi 500-X or 140-N), placed beneath the Structural Section, may be required in some areas along this road alignment.

# REVIEW COMMENTS

Page 1 of 5

FILE #FPP-96-110

TITLE HEADING: Trails West Village, Filings 1 & 2

LOCATION: E side of South Camp Road; S of South Broadway

PETITIONER: Camelot Investments

PETITIONER'S ADDRESS/TELEPHONE: 0090 Caballo Road  
Carbondale, CO 81623  
963-0627

PETITIONER'S REPRESENTATIVE: Jeff Crane, LANDesign LLC

STAFF REPRESENTATIVE: Kathy Portner

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**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., MAY 23, 1996.**

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**PUBLIC SERVICE COMPANY**

5/8/96

**Gary Lewis**

244-2698

utility easements / multi-purpose easements as shown on the proposed subdivision plat should be sufficient for installation of gas and electric facilities to these lots.

**UTE WATER**

5/8/96

**Gary R. Mathews**

242-7491

1. Ute Water wants a meeting with developers at the Ute office, to discuss water line sizes, valve locations, etc. A review of the past comments are also a necessity.
2. 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.
3. Developer will install the meter pits and yokes. Ute Water will furnish the meter pits and yokes.
4. Construction plans required before development begins.
5. Policies and fees in effect at the time of application will apply.

**U.S. WEST**

5/8/96

**Max Ward**

244-4721

For timely telephone service, as soon as you have a plat and power drawing for your housing development, please.....

MAIL COPY TO:

AND

CALL THE TOLL-FREE NUMBER FOR:

U.S. West Communications

Developer Contact Group

Developer Contact Group

1-800-526-3557

P.O. Box 1720

Denver, CO 80201

We need to hear from you at least 60 days prior to trenching.

**CITY FIRE DEPARTMENT**

5/13/96

**Hank Masterson**

244-1414

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The looped 8" fire line shown on the reduced utility composite is acceptable. However, locations of fire hydrants are not shown. Petitioner must submit a full size utility composite of Filing I and II showing locations of all fire hydrants and line sizes for our review.

**T C I CABLEVISION**

5/13/96

**Glen Vancil**

245-8777

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See attached comments.

**CITY PROPERTY AGENT**

5/14/96

**Steve Pace**

256-4003

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**TRAILS WEST VILLAGE**

1. Lien Holder Certificate?
2. Where is the boundary line between Outlot A & Outlot B?
3. In the dedication, only address the easements that are shown on the plat.
4. Should the pedestrian easement shown in the dedication, be a trail easement?
5. The Ute Water easements should be dimensioned.
6. Need to address the canal easement in the dedication.
7. Pursuant is misspelled in the statement referring to C.R.S. 24-68-01; also on sheet 2 and sheet 3.

**FILING NO. 1**

1. What type of monument is going to be set for centerline points?
2. The bearing and distance of S00°22'00"E, 472.60' should read N00°22'00"W to match description.
3. The tie bearing to the P.O.B. is platted N89°34'47"E; the description reads N89°34'47"W, also the distance of 40.00 feet is missing in the description.
4. The bearing and distance of N00°21'42"W, 67.89' is platted, the description reads N00°22'00"W, 67.89'.
5. Need to address canal, landscape and signage easements in the dedication.

**FILING NO. 2**

1. Need to address canal easement in the dedication.
2. There is a missing monument along the southerly line of Tract B.

**REDLANDS WATER & POWER**

5/15/96

**Gregg Strong**

243-2173

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1. Camelot Investments LLC currently owns 23 shares of water. Due to that fact, Redlands very much recommends that 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 an 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 ADAMANTLY 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 that developer and landowner will 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.

**CITY POLICE DEPARTMENT**

5/16/96

**Dave Stassen**

244-3587

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No comments.

**CITY DEVELOPMENT ENGINEER**

5/17/96

**Jody Kliska**

244-1591

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See attached comments.

**CITY COMMUNITY DEVELOPMENT**

5/16/96

**Kathy Portner**

244-1446

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1. Final language for plat dedications will need to be reviewed by our legal staff. The following dedications will need to be modified:
  - a. All Tracts must be dedicated, Tract A, Filing #1 to the HOA and Tracts B and C to the City; Tracts A and B, Filing 2 to the City.
  - b. Tracts B and C should also be labeled as trail easements dedicated to the City for the public for non-motorized recreation. The Canal, Utility Easement and Open Space shown on the first sheet of the plats should also be labeled as trail easements.
  - c. The pedestrian easements and ROW designation should be eliminated. I don't think we want to restrict it to pedestrians. I assume mountain bikes and perhaps even horse use is O.K.?
  - d. The canal easements need to be dedicated.
  - e. "pursuant" is misspelled in the vested property right statement on the plats. I will ask for input from our attorneys on that statement.



**CITY COMMUNITY DEVELOPMENT**

5/16/96

**Ronnie Edwards**

244-1430

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1. Montero should be designated as a street in lieu of avenue as it is running north and south.
2. Altamira should be designated as an avenue in lieu of drive as it is running east and west.

**CITY UTILITY ENGINEER**

5/15/96

**Trent Prall**

244-1590

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WATER: Ute

Please provide a signoff block for Ute on all water related plans.

SEWER: City

1. Plans were not signed and stamped by a professional civil engineer as required.
2. Sht 6 of 22 (Sanitary Sewer Plan and Profile Line C):
  - A. Waterline crossing is shown incorrectly in profile for Sewer Line C. Waterline crossing actually occurs closer to MH-A6
3. Sht 7 of 22 (Sanitary Sewer Plan and Profile Line B):
  - A. Sewer service lines should be reconfigured for Filing 2 Block One, Lot 4,5,6, and 9 so that lines intercept sewer mains at 90 degree angles or less.
  - B. Easement should be widened by 5' across Filing 1 Block 2 Lot 1 to accommodate access to MH B2.
4. Sewer line across Filing 1 Tract A lies within an drainage and irrigation easement. Please rename easement to accommodate sewer I,O,M, and R.
5. How is sewer service proposed to eventually service Outlot A?
6. As mentioned in the preliminary submittal, Trunkline Extension Fees apply for this project based on proposed density. Developer's portion of the Trunkline Extension Fee is due prior to the plat recording.
7. City of Grand Junction Standard Drawings were not submitted for review as part of the project set.
8. Please add the following notes to the sewer plan and profile.
  - A. Contractor shall have one signed copy of plans and a copy of the City of Grand Junction's Standard Specifications at the job site at all times.
  - B. All sewer mains shall be PVC SDR 35 (ASTM 3034) unless otherwise noted.
  - C. All sewer mains shall be laid to grade utilizing a pipe laser.
  - D. All service line connections to the new main shall be accomplished with full body wyes or tees. Tapping saddles will not be allowed.
  - E. No 4" services shall be connected directly into manholes.
  - F. The contractor shall notify the City inspection 48 hours prior to commencement of construction.
  - G. The Contractor is responsible for all required sewer line testing to be completed in the presence of the City Inspector. Pressure testing will be performed after all compaction of street subgrade and prior to street paving. Final lamping will also be accomplished after paving is completed. These tests shall be the basis of acceptance of the sewer line extension.
  - H. The Contractor shall obtain City of Grand Junction Street Cut Permit for all work within existing City road right-of-way prior to construction.

- I. A clay cut-off wall shall be placed 10 feet upstream from all new manholes unless otherwise noted. The cut-off wall shall extend from 6 inches below to 6 inches above granular backfill material and shall be 2 feet wide. If native material is not suitable, the contractor shall import material approved by the engineer.
- K. Benchmark \_\_\_\_\_

**CITY PARKS & RECREATION**

5/17/96

**Shawn Cooper**

244-3869

---

Parks & Open Space fees - 42 units @ \$225 = \$9,450.

**TO DATE, COMMENTS NOT RECEIVED FROM:**

City Attorney

Mesa County Planning

Mesa County School District #51

U.S. Postal Service



TCI Cablevision of Western Colorado, Inc.

May 10, 1996

Trails West Village  
Jeff Crane  
% Community Development Department  
250 North 5th Street  
Grand Junction, CO 81501

Ref. No. CON19618

Dear Mr. Crane;

We are in receipt of the plat map for your new subdivision, **Trails West Village**. We will be working with the other utilities to provide service to this subdivision in a timely manner.

I would like to take this opportunity to bring to your attention a few details that will help both of us provide the services you wish available to the new home purchasers. These items are as follows:

1. We require the developers to provide, at no charge to TCI Cablevision, an open trench for cable service where underground service is needed and when a roadbore is required, that too must be provided by the developer. The trench and/or roadbore may be the same one used by other utilities so long as there is enough room to accommodate all necessary lines.
2. We require developers to provide, at no charge to TCI Cablevision, fill-in of the trench once cable has been installed in the trench.
3. We require developers to provide, at no charge to TCI Cablevision, a 4" PVC conduit at all utility road crossings where cable TV will be installed. This 4" conduit will be for the sole use of cable TV.
4. Should your subdivision contain cul-de-sac's the driveways and property lines (pins) must be clearly marked prior to the installation of underground cable. If this is not done, any need to relocate pedestals or lines will be billed directly back to your company.
5. TCI Cablevision will provide service to your subdivision so long as it is within the normal cable TV service area. Any subdivision that is out of the existing cable TV area may require a construction assist charge, paid by the developer, to TCI Cablevision in order to extend the cable TV service to that subdivision.
6. TCI will normally not activate cable service in a new subdivision until it is approximately 30% developed. Should you wish cable TV service to be available for the first home in your subdivision it will, in most cases, be necessary to have you provide a construction assist payment to cover the necessary electronics for that subdivision.

Should you have any other questions or concerns please feel free to contact me at any time. If I am out of the office when you call please leave your name and phone number with our office and I will get back in contact with you as soon as I can.

Sincerely,

A handwritten signature in cursive script that reads "Glen Vancil".

Glen Vancil,  
Construction Supervisor 245-8777

May 17, 1996

**REVIEW COMMENTS FOR:** Trails West Village Filings 1 & 2

**TYPE OF REVIEW:** Final Plans

**REVIEWED BY:** Jody Kliska

1. No calculations were provided for the storm sewer and are required.
2. The improvements agreement does not include items for the following: cost of box culvert extension, outlet structure for the detention pond, rip rap in the pond. It is not clear whether city inspection fees are included in governmental fees, but it needs to be a separate item.
3. Sewer plans need to include the required notes.
4. The street plans need the following: a) show a barricade at Altimara and Mescalero at the canal to deter people from driving onto the canal bank. b) Indicate the size, type and location of storm drain inlets. c) Add a note with the pavement structural section indicating the potential for high ground water near the canal and the possibility of geotextile fabric use. d) Provide a reference for the box culvert detail. e) Include street signs, lights, and end of road markers on the plan. f) Provide a detail for the 12' cross pan at Montero Court.
5. Drainage - provide a detail showing how drainage will be handled at the north end of Montero. Currently it is shown as draining onto the adjacent property.
6. No details were provided for the new box culvert or the proposed box culvert extension. These are required as part of the plans.
7. Storm sewer lines need to have some location reference provided, either distance and bearing, coordinates, or tie to street stationing with offset.
8. No manhole information was provided for MH B2-A such as the invert in, out, rim elevations.
9. It appears there is not adequate cover on some of the storm sewer lines. Provide notes on minimum cover, class of pipe.
10. Signing and striping plan - a redlined plan is being returned with these comments, as well as a copy of ADOT channelization standards. Use the ADOT or CDOT S standards as a reference for detailing striping. The taper appears to start in the wrong location at the south end. Begin taper at the centerline of the intersecting roadway. Use Table 10 in the TEDS manual for the appropriate taper.

11. Is it possible to have the two plan views going in the same direction?
12. Please shade the area of new pavement on the plan.
13. The W6-1, R4-1, R4-7 and W6-2 are not needed and should be deleted from the plan.
14. Is the speed limit sign existing? If so, indicate to remove and relocate.
15. Four inches of asphalt will be required for South Camp paving.
16. Considerable staff discussion took place regarding the attached versus detached path along South Camp Road. To preserve the character of the existing evolving path system in the area, a detached path is required.

May 17, 1996

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T.W.V. - KP

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- K. Benchmark \_\_\_\_\_

**CITY PARKS & RECREATION**

5/17/96

**Shawn Cooper**

244-3869

---

Parks & Open Space fees - 42 units @ \$225 = \$9,450.

**LATE COMMENTS**

**MESA COUNTY SCHOOL DISTRICT #51**

5/20/96

**Lou Grasso**

242-8500

---

**SCHOOL - CURRENT ENROLLMENT / CAPACITY - IMPACT**

Wingate Elementary - 462 / 600 - 10

Redlands Middle School - 552 / 650 - 5

Fruita Monument High School - 1337 / 1100 - 7

**TO DATE, COMMENTS NOT RECEIVED FROM:**

City Attorney

Mesa County Planning

U.S. Postal Service



**FILE # FP-96-115:**                      MAY 13, 1996                      NIAGARA VILLAGE

NO COMMENTS.

**FILE #FP-96-113**                      MAY 13, 1996                      PHEASANT VALLEY

NO COMMENTS.

**FILE #FP-96-114**                      MAY 13, 1996                      GRAND VIEW FIL. #2

1. The name "Grand View Circle" is discouraged. A different prefix is advised due to the proximity in relation to Grand View Drive and its length. It is getting increasingly more difficult for the Postal Service to deliver mail when the same prefix is used over and over in the same subdivision.

**FILE #FPP-96-110**                      MAY 14, 1996                      TRAILS WEST FIL. #1 & #2

1. Montero should be designated as a street in lieu of avenue as it is running north and south.
2. Altamira should be designated as an avenue in lieu of drive as it is running east and west.

**FILE #FP-96-117**                      MAY 14, 1996                      DAWN SUBDIVISION

1. The names "Village", "Park" and "Valley" cannot be used as they are a duplication of names previously used. See Section 5-3-4 -A.13 of the Zoning and Development Code. Also note streets running east and west are "avenues" and those running north and south are "streets" per Section 5-3-4-A.2.

**FILE #PP-96-111**                      MAY 14, 1996                      THE KNOLLS

1. The name "Ridge Court" cannot be used as it is a duplication. See Section 5-3-4-A.13 of the Zoning and Development Code. I would suggest a related name with a new prefix.

Mayor Jim Doody  
City of Grand Junction  
250 N. 5th Street  
Grand Junction, CO 81501

May 15, 2007

RECEIVED  
MAY 21 2007  
COMMUNITY DEVELOPMENT  
DEPT.

Subject: 413 South Camp Rd. – Redlands Place and Trails West Village

Honorable Mayor Doody;

The Trails West Village (TWV) subdivision is located within the City limits and is just to the east of the new Development proposed for the Sutton farm property off South Camp Road. TWV has a combination storm water and irrigation detention pond. This design was approved by the City without due consideration of the ongoing expense to TWV homeowners. I am an impacted resident of TWV.

I believe that the proposed new subdivision provides an opportunity for the City to correct its previously approved design flaw for TWV. The problem being encountered by the Homeowners Association (HOA) is simply that storm drainage from outside our geographic boundaries carries in an excessive quantity of sediment that requires periodic dredging at great expense to our HOA. The latest estimate received for dredging in 2007 was for \$25,000. Compare that to last year's actual HOA total expense of \$11,440 and you can understand our concern and outrage. Many strongly feel that this cost is a stealth tax caused by the City. It is considered "stealth" as no homeowner was aware of this cost prior to purchasing their home.

We were led to believe in the past that when the Sutton property was developed our sediment buildup problem would be eliminated from upstream water flow. Indication is now that this will not happen. Therefore, we recommend that, as previously indicated by the City, the Sutton Property design be modified in one of two ways to correct the City's previous error as follows: (1) Run a storm water ditch parallel and along side Redlands Canal to the west ... or increase the size of the Canal; or (2) Extend the drainage channel on the west side of South Camp Road along the front of the new Development and then connect to the planned ditch/pipe on the north side of the planned development to carry storm water west.

If the above is not acceptable to the City, then we ask that the City reimburse TWV for at least one-half of our recurring actual cost of dredging due to the City's approval of our flawed pond design.

Thank you for your consideration in addressing this issue. We are looking forward to a prompt response.

Sincerely,

*Daren C. + Kristine A. Biggs at 2225 Mescalero Avenue*

Copies: City Council, GJ Community Planning Div.; River City Consultants

Jody Kliska, P.E., Development Engineer  
Trent Prall, P.E., Utility Engineer  
City of Grand Junction  
Engineering Division  
250 North 5th Street  
Grand Junction, CO 81501

**Re: Trails West Village, File #FFP-96-110  
Response to written comments**

Dear Ms. Kliska & Mr. Prall:

The following is an item by item response to the review comments received May 17, 1996 beginning with the comments by Trent Prall.

1. A Ute Water signoff block has been provided on all water related plans.
2. 2 sets of signed construction plans were submitted and will be resubmitted.
3. The waterline crossing has been revised to the correct location.
4. Sewer service lines were reconfigured.
5. The utility easement has been widened by 5' at Lot 1, Block 2, Filing 1.
6. The easement in Tract A has been renamed to include utilities.
7. Sewer service has been stubbed out to the end of pavement for Outlot A.
8. Trunkline extension fees will be paid prior to filing the plat.
9. City of Grand Junction Standard Drawings were submitted and will be resubmitted.
10. All required notes have been added to the sewer plan and profiles.

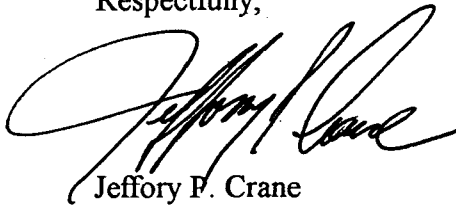
The following are responses to comments by Jody Kliska:

1. Storm sewer calculations have been provided.
2. Improvements Agreement has been revised to include box culverts, outlet structure, rip-rap and City inspection fees.
3. Required notes have been included on the sewer plans.
4. Street plans have been revised to include the following: a) Barricade at Altamira & Mescalero. b) size, type and location of storm sewer inlets. c) pavement structural section note indicating the possible need for 500X Mirifi along Altamira Avenue. d) Reference for box culvert detail. e) Street signs, street lights and end of road markers. f) Cross pan detail.
5. Added a diversion ditch along the north property line.
6. Added box culvert details
7. Added coordinates to storm sewer lines.
8. Removed manholes B2-A and A3-A - not necessary.
9. Provided calculations for required pipe strength and minimum cover.
10. Revised signage and striping plan as per redlines and increased taper south of Altamira.

11. Reversed signage and striping plan.
12. Shaded area of proposed pavement on South Camp Road.
13. Removed unnecessary signs from South Camp Road.
14. Removed proposed speed limit sign.
15. Revised paving section on South Camp Road to provide for 4" of pavement.
16. The detached walk along South Camp Road south of Mescalero Avenue is impracticable due to the box culvert and diversion ditch. The detached walk north of Mescalero is possible, however, the only mature trees on the site are located in the northwest corner of the property and would have to be removed to accommodate this walk. We will request to the Planning Commission to waive this requirement.

If I can be of any further assistance please contact me at your earliest convenience. Until then I remain,

Respectfully,



Jeffery P. Crane  
Project Manager

Trent

MEMORANDUM

TO: Jody Kliska  
Trent Prall  
Hank Masterson

FROM: Kathy Portner *KP*

DATE: May 23, 1996

RE: Trails West Village

Attached is a copy of the response to comments for Trails West Village. Please let me know if your comments have been adequately addressed.

*OK EXCEPT FOR SEWER STUB OUT WORK  
E-MAILED K.P. ON 5/24/96 @ 7:35 A.M.  
w/ RESPONSE. TCP*

**PETITIONER'S WRITTEN RESPONSE TO REVIEW COMMENTS**

Trails West Village Filings 1 &amp; 2

File #FPP-96-110.

May 23 1996

This response is intended to address the review comments collated and generated by staff following the May 1, 1996 final plat submittal for Trails West Village, Filings 1&2.

**PUBLIC SERVICE COMPANY**

No concerns.

**UTE WATER**

Petitioner's representative met with Ute Water on May 20, 1996 and resolved all remaining concerns.

**U.S. WEST**

No concerns.

**CITY FIRE DEPARTMENT**

Locations of fire hydrants are now shown on full size utility composites of Filings 1&2.

**TCI CABLEVISION**

Comments of Glen Vancil were advisory in nature. All terms are acceptable with no concerns.

**CITY PROPERTY AGENT**

1. There are no lien holders on the property.
2. Boundary line between Outlot A & Outlot B are shown.
3. Done.
4. Easement has been changed to a trail easement.
5. Done.
6. Done.
7. Spelling is corrected.

The balance of the monumentation and legal description concerns identified by Steve Pace have been addressed in the revised drawings.

**REDLANDS WATER & POWER**

Petitioner has addresses each of the enumerated concerns many of which are simply advisory in nature. Petitioner met with Gregg Strong to discuss the chief items of concern. At this point, there appears to be only two matters that have not been resolved: (1) the width of the canal easement; and (2) Redlands claim that its roads are strictly for the use of official Redlands business. With regard to item (1), the deed in Petitioner's chain of title reserving an easement for the canal expressly reserves a 40 foot easement rather than a 50 foot easement as Redlands claims. Redlands has failed to produce any

countervailing evidence. Regarding item (2), Redlands has simply asserted a legal position the strength of which cannot be determined at this time. Petitioner has not found any evidence that the easement granted was exclusive or that the recreational uses sought through plat dedication will unreasonably interfere with Redland's ability to fully enjoy its easement rights. Petitioner intends to convey the canal tract to the City for dedication by the City to public recreational use.

**CITY POLICE DEPARTMENT**

No concerns.

**CITY DEVELOPMENT ENGINEER**

As shown in the attached letter from Jeff Crane to Jody Kliska and Trent Prall, attached as Exhibit "A", Petitioner's representative has addressed each of the enumerated concerns raised by Jody Kliska. The revised drawings will contain the requested changes unless otherwise agreed to by Ms. Kliska. The issue of the detached path along South Camp Road remains unresolved. Petitioner maintains that there isn't sufficient room to place a detached path along the desired length of South Camp Rd. Moreover, detached paths tend to be poorly maintained or not maintained at all, leading to weeds and other unsightly situations. Staff agreed that this matter should be left to Planning Commission to decide.

**CITY COMMUNITY DEVELOPMENT-KATHY PORTNER**

1.

- a. All tracts will be dedicated, however, Petitioner wishes to also clarify that Tract B, Filing 1 and Tracts A & B, Filing 2 are being conveyed in fee simple to the City. The dedications for public use should then come from the City. Petitioner is not clear on what language on the plat is necessary to accomplish this and defers to the City Attorney.
- b. See (a) above.
- c. Petitioner agrees that all trails should allow multi-purpose, non-motorized use.
- d. See (a) above.
- e. Spelling has been changed.

**CITY COMMUNITY DEVELOPMENT-RONNIE EDWARDS**

Street designations have been changed per the comments.

**CITY UTILITY ENGINEER**

As shown in Exhibit A, Petitioner's representative has addressed each of the enumerated concerns raised by Trent Prall. The revised drawings will contain the requested changes unless otherwise agreed to by Mr. Prall.

**CITY PARKS & RECREATION**

Petitioner is conveying and dedicating nearly 2 acres of public trails that directly further the City's goals and objectives with respect to its parks and open space program. Petitioner believes that these trail "easements" should be accepted in lieu of the required

fees and that exacting further cash payments constitutes an unnecessary "double dipping". For this reason Petitioner will be requesting the Planning Commission to recommend, and City Council to accept, waiver of the parks/open space fees. A copy of the letter setting forth this request is attached hereto as Exhibit "B".

In addition to the above comments Petitioner has requested that its significant improvements to South Camp Road, required as a part of project approval, be credited against the TCP payments that otherwise would be due. A letter from Jeff Crane to Jim Shank formalizing this request is attached hereto as Exhibit "C". Petitioner also states that it will be entering into a Disbursement Agreement with the City and a local lender as well as a Development Improvement Agreement. The final cost estimate for the DIA will be determined before the plat is recorded.



  
**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627

---

May 23, 1996

Planning Commission  
City of Grand Junction  
250 N. 5th St.  
Grand Junction, CO 81501-2668

City Council  
City of Grand Junction  
250 N. 5th St.  
Grand Junction, CO 81501-2668

**Re: Trails West Village/File #FPP-96-110**

Members of the Planning Commission and City Council:

Camelot Investments LLC is the developer of Trails West Village which is currently awaiting final plat approval for Filings I & II. I am writing to petition the City, pursuant to Section 5-4-6(E) of the Zoning and Development Code, for waiver of the parks/open space fees that have been allocated to this project in the amount of \$9,450. Specifically, I am requesting the City of Grand Junction to accept in lieu thereof 1.86 acres of Trails West Village lands dedicated to public recreational use. 0.75 acres of this total consists of a 20' wide, nearly 2,000' long trail and the balance comprises the land underlying the Redlands canal and service road, to be conveyed to the City in fee simple. Both tracts will be dedicated as trail easements for public, non-motorized recreational use. Each and every one of the criteria listed at Section 10-1-1B.2. of the Code are satisfied if the City accepts land in lieu of fees, primarily because of the benefits gained by the public through the dedications. It should be noted that the Redlands canal right-of-ways have been designated as desired public recreational corridors according to the Multi-Modal Plan adopted by the City and Mesa County.

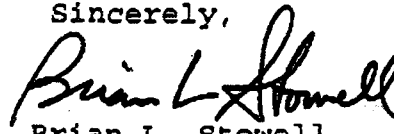
The average sales price for vacant land of comparable size in the Redlands area is \$55,753 per acre. A copy of the most recent Redlands area comps is attached hereto. Clearly, the fair market value of the dedicated lands exceeds the cash payment that would be required.

I am told this is an unprecedented request. I sincerely believe it is a justifiable one. *Trails West Village*

distinguishes itself as a residential subdivision by promoting access to, and integration with, the area's surrounding trail system. The conveyance and dedication of the above-referenced trails manifests this premise and fulfills the spirit of the City's parks/open space fee policy. To require Camelot to pay cash on top of the dedications would constitute double-dipping and serve to discourage further dedications of critical inventory.

In light of the above, I am respectfully asking the Planning Commission to recommend, and the City Council to accept, waiver of the parks/opens space fees for this project. Thank you for your consideration of this request.

Sincerely,

A handwritten signature in black ink that reads "Brian L. Stowell". The signature is written in a cursive style with a large, stylized "B" and "S".

Brian L. Stowell

cc: Ms. Kathy Portner (hand delivered in fax form)  
Mr. Shawn Cooper

05/23/96 11:22

SOLD VACANT LAND

LIST #	ADDRESS	AR	LIST PRICE	SALE PRICE	OFFMKDT	MT	ACREAGE
*95 3436	316 DAKOTA CT	07	39,900	37,950	01/03/96	145	1.33
*94 1948	2215 RED CANYON CT	07	47,500	46,750	12/19/95	597	1.36
*94 1935	316 DAKOTA DR	07	48,500	48,500	04/04/96	704	1.05
*94 1340	IND VALL DR L	07	57,500	55,500	01/16/96	669	1.54
*94 1233	ROOSEVELT CT	07	57,500	56,500	02/22/96	706	1.25
*94 1336	INDEP VALLEY	07	57,500	56,500	01/30/96	683	1.53
*96 0264	2033 BASELINE DR	07	59,900	58,000	02/16/96	37	1.86
*95 4478	0 INDEPEND VALL	07	58,500	58,500	03/25/96	738	1.13
*94 1990	304 DAKOTA DR E.	07	59,500	59,500	12/20/95	580	1.23
*96 1171	2030 ROOSEVELT CT	07	60,500	60,500	03/29/96	28	1.43
*94 1989	306 DAKOTA DR E.	07	61,000	61,000	03/13/96	682	1.13
*94 1972	2214 BURRO CANYON	07	66,500	66,500	03/05/96	674	1.74
*95 5148	665 LINCOLN CT	07	67,500	67,500	12/15/95	1	1.12

TOTAL LISTINGS SOLD SINCE 12/1/96

AVERAGE SALES PRICE \$55,773.00

Jody Kliska, P.E., Development Engineer  
Trent Prall, P.E., Utility Engineer  
City of Grand Junction  
Engineering Division  
250 North 5th Street  
Grand Junction, CO 81501

**Re: Trails West Village, File #FFP-96-110**  
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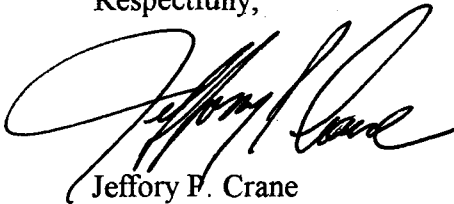
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If I can be of any further assistance please contact me at your earliest convenience. Until then I remain,

Respectfully,



Jeffery P. Crane  
Project Manager

Jim Shanks, Public Works Director  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

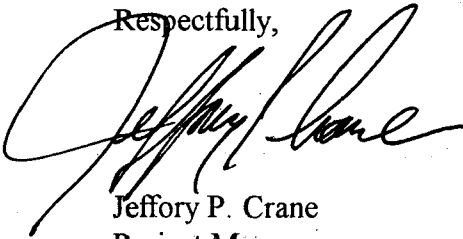
Re: Credit for Transportation Capacity Payment  
Trails West Village Subdivision; File #FFP-96-110

Dear Mr. Shanks:

Camelot Investments respectfully requests a credit for the Transportation Capacity Payment of \$500.00/Lot for the proposed 42 lots within Filings 1 and 2 of Trails West Village. The estimated cost of \$62,000.00 for improvements to South Camp Road well exceed the \$21,000.00 required by the Transportation Capacity Payment.

If I can be of any further assistance in this matter, please contact me at your earliest convenience. Until then I remain,

Respectfully,



Jeffory P. Crane  
Project Manager

TRAILS WEST SUBDIVISION  
 SOUTH CAMP ROAD IMPROVEMENTS-Filing 2

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Embankment	CY	195	\$3.00	\$585.00
2	Class 6 Base	TN	195	\$9.50	\$1,852.50
3	4" Grade C HBP	TN	129	\$28.00	\$3,612.00
4	11.5' C, G & SW	LF	430	\$16.50	\$7,095.00
5	Handicap Ramps	EA	2	\$1,050.00	\$2,100.00
6	Road Striping	LF	2275	\$0.50	\$1,137.50
7	Traffic Control	EA	1	\$2,000.00	\$2,000.00
8	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
<b>TOTAL</b>					<b>\$20,382.00</b>

TRAILS WEST SUBDIVISION  
**SOUTH CAMP ROAD IMPROVEMENTS - Filing 1**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Embankment	CY	240	\$3.00	\$720.00
2	Class 6 Base	TN	240	\$9.50	\$2,280.00
3	4" Grade C HBP	TN	157	\$28.00	\$4,396.00
4	11.5' C,G & SW	LF	470	\$16.50	\$7,755.00
5	Steel Handrail	LF	320	\$35.00	\$11,200.00
6	Handicap Ramps	EA	2	\$1,050.00	\$2,100.00
7	Road Striping	LF	2475	\$0.50	\$1,237.50
8	4' x 6' Box Culvert Extension	LF	25	\$320.00	\$8,000.00
9	Traffic Control	EA	1	\$2,000.00	\$2,000.00
10	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
<b>TOTAL</b>					<b>\$41,688.50</b>



**STORM SEWER  
FLOW REPORT**

FOR

**TRAILS WEST VILLAGE  
FILING No. 1 & 2**

**Prepared For:**

**Camelot Investments, LLC  
0090 Caballo Road  
Carbondale, Colorado 81623  
(970) 963-0627**

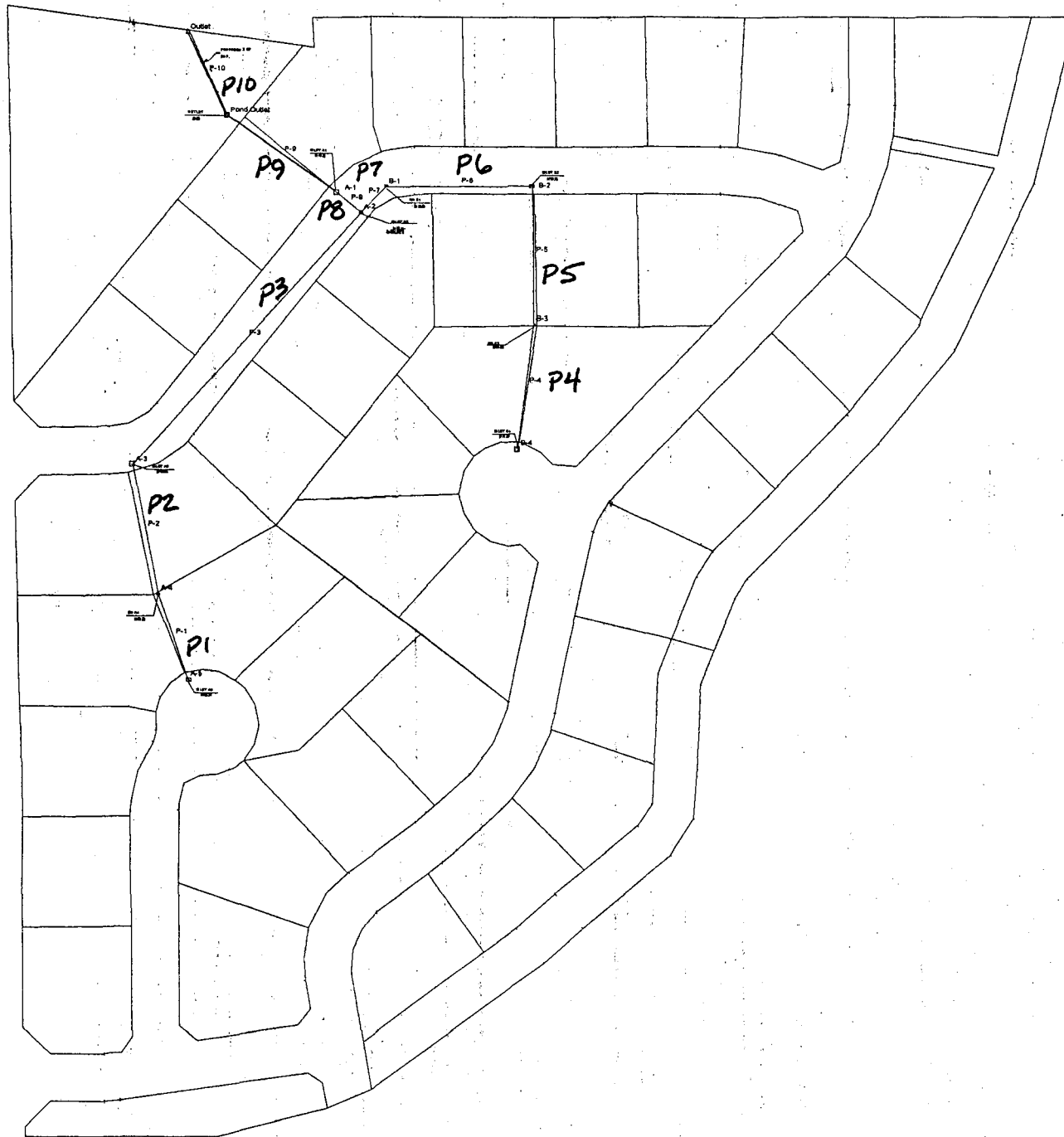
**PREPARED BY:**

**LANDesign, LLC**

**PLANNING ENGINEERING SURVEYING  
259 Grand Avenue  
Grand Junction, CO 81501  
(970) 245-4099**

**JOB No. 95182**

**May, 1996**



## Combined Pipe/Node Report 10 YEAR STORM

Pipe	Upstream Node	Downstream Node	Length (ft)	Inlet Area (acres)	Weighted Roughness Coefficient	Inlet CA (acres)	Total CA (acres)	Inlet Discharge (cfs)	Section Size	Capacity (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Constructed Slope (ft/ft)	Description
P-4	B-4	B-3	115.00	3.80	0.44	1.67	1.67	2.38	18 inch	10.55	4.28	4,747.55	4,746.39	0.010087	
P-5	B-3	B-2	127.00	N/A	N/A	N/A	1.67	N/A	18 inch	11.49	3.30	4,746.19	4,744.67	0.011969	
P-6	B-2	B-1	136.00	1.02	0.44	0.45	2.12	0.65	18 inch	7.43	2.43	4,744.47	4,743.79	0.005000	Class IV RCI
P-7	B-1	A-2	34.00	N/A	N/A	N/A	2.12	N/A	18 inch	7.43	1.63	4,743.59	4,743.42	0.005000	Class IV RCI
P-1	A-5	A-4	82.00	2.16	0.44	0.95	0.95	1.38	18 inch	13.97	4.11	4,749.80	4,748.35	0.017683	
P-2	A-4	A-3	120.00	N/A	N/A	N/A	0.95	N/A	18 inch	9.44	2.87	4,748.15	4,747.18	0.008083	
P-3	A-3	A-2	316.00	1.67	0.44	0.73	1.69	0.98	18 inch	11.15	2.47	4,746.98	4,743.42	0.011266	
P-8	A-2	A-1	29.00	2.98	0.44	1.31	5.12	1.67	18 inch	8.72	3.68	4,743.22	4,743.02	0.006897	Class IV RCI
P-9	A-1	Pond Outlet	122.00	1.33	0.44	0.59	5.70	1.10	22.0 x 13.5 inch	6.94	4.38	4,742.93	4,742.25	0.005574	
P-10	Pond Outlet	Outlet	85.00	0.00	0.00	0.00	5.70	0.00	12 inch	3.86	4.90	4,742.25	4,742.00	0.002941	2- 12" RCP's

**DOT Report**  
**10 YEAR STORM**

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-4	B-4	3.80	1.67	1.67	4,750.89	4,748.13	0.009700	2.38	Circular	115.00	4.28	
	B-3				4,749.58	4,746.87	0.010087	10.55	18 inch			
P-5	B-3	N/A	N/A	1.67	4,749.58	4,746.77	0.011660	2.36	Circular	127.00	3.30	
	B-2				4,746.94	4,745.38	0.011969	11.49	18 inch			
P-6	B-2	1.02	0.45	2.12	4,746.94	4,745.25	0.001250	2.95	Circular	136.00	2.43	Class IV RCI
	B-1				4,745.99	4,745.19	0.005000	7.43	18 inch			
P-7	B-1	N/A	N/A	2.12	4,745.99	4,745.17	0.000756	2.89	Circular	34.00	1.63	Class IV RCI
	A-2				4,745.90	4,745.15	0.005000	7.43	18 inch			
P-1	A-5	2.16	0.95	0.95	4,755.72	4,750.24	0.016290	1.38	Circular	82.00	4.11	
	A-4				4,754.32	4,748.67	0.017683	13.97	18 inch			
P-2	A-4	N/A	N/A	0.95	4,754.32	4,748.59	0.007922	1.37	Circular	120.00	2.87	
	A-3				4,750.94	4,747.69	0.008083	9.44	18 inch			
P-3	A-3	1.67	0.73	1.69	4,750.94	4,747.55	0.008180	2.25	Circular	316.00	2.47	
	A-2				4,745.90	4,745.15	0.011266	11.15	18 inch			
P-8	A-2	2.98	1.31	5.12	4,745.90	4,744.98	0.003830	6.50	Circular	29.00	3.68	Class IV RCI
	A-1				4,745.90	4,744.87	0.006897	8.72	18 inch			
P-9	A-1	1.33	0.59	5.70	4,745.90	4,744.72	0.006037	7.22	Arch	122.00	4.38	
	Pond Outlet				4,744.00	4,743.98	0.005574	6.94	22.0 x 13.5			
P-10	Pond Outlet	0.00	0.00	5.70	4,744.00	4,743.76	0.009898	7.14	Circular	85.00	4.90	2- 12" RCP's
	Outlet				4,742.00	4,742.81	0.002941	3.86	12 inch			

LANDESIGN  
259 Grand Avenue  
GRAND JUNCTION, CO 81501  
(970) 245-4099  
FAX (970) 245-3076

JOB 95182.40  
SHEET NO. 1 OF 1  
CALCULATED BY JPC DATE 5/20/96  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

REQUIRED PIPE STRENGTH IN TERMS  
OF 0.01-INCH CRACK D-LOAD

GIVEN: 18" CIRCULAR RCP  
0.5' COVER - NARROW TRENCH  
120 lbs/cf BACKFILL MATERIAL

$$\text{EARTH LOAD (WE)} = W H B_c$$

W = SOIL DENSITY = 100 lbs/cf (FROM LINCOLN DEVORE STUDY)

H = DEPTH OF FILL = 0.5'

B<sub>c</sub> = OUTSIDE DIAMETER OF PIPE = 1.92'

$$W_E = 120 \times 0.5 \times 1.92 = 110 \text{ lbs/LINEAR FOOT}$$

USE STANDARD CLASS C BEDDING

$$B_f = \text{BEDDING FACTOR} = 1.5 \text{ (FROM FIG 227)}$$

$$\text{SAFETY FACTOR (FS)} = 1.0$$

$$W_L = \text{LIVE LOAD} = 4110 \text{ lbs/LINEAR FOOT (FROM TABLE 45)}$$

$$\text{D-LOAD} = D_{0.01} = \frac{W_L + W_E}{B_f \times D} \times \text{F.S.}$$

$$= \frac{4110 + 110}{1.5 \times 1.5} \times 1.0 = 1871.1 \text{ lbs/L.F./FOOT INSIDE DIA.}$$

$$= 2816.8 \text{ lbs/L.F.}$$

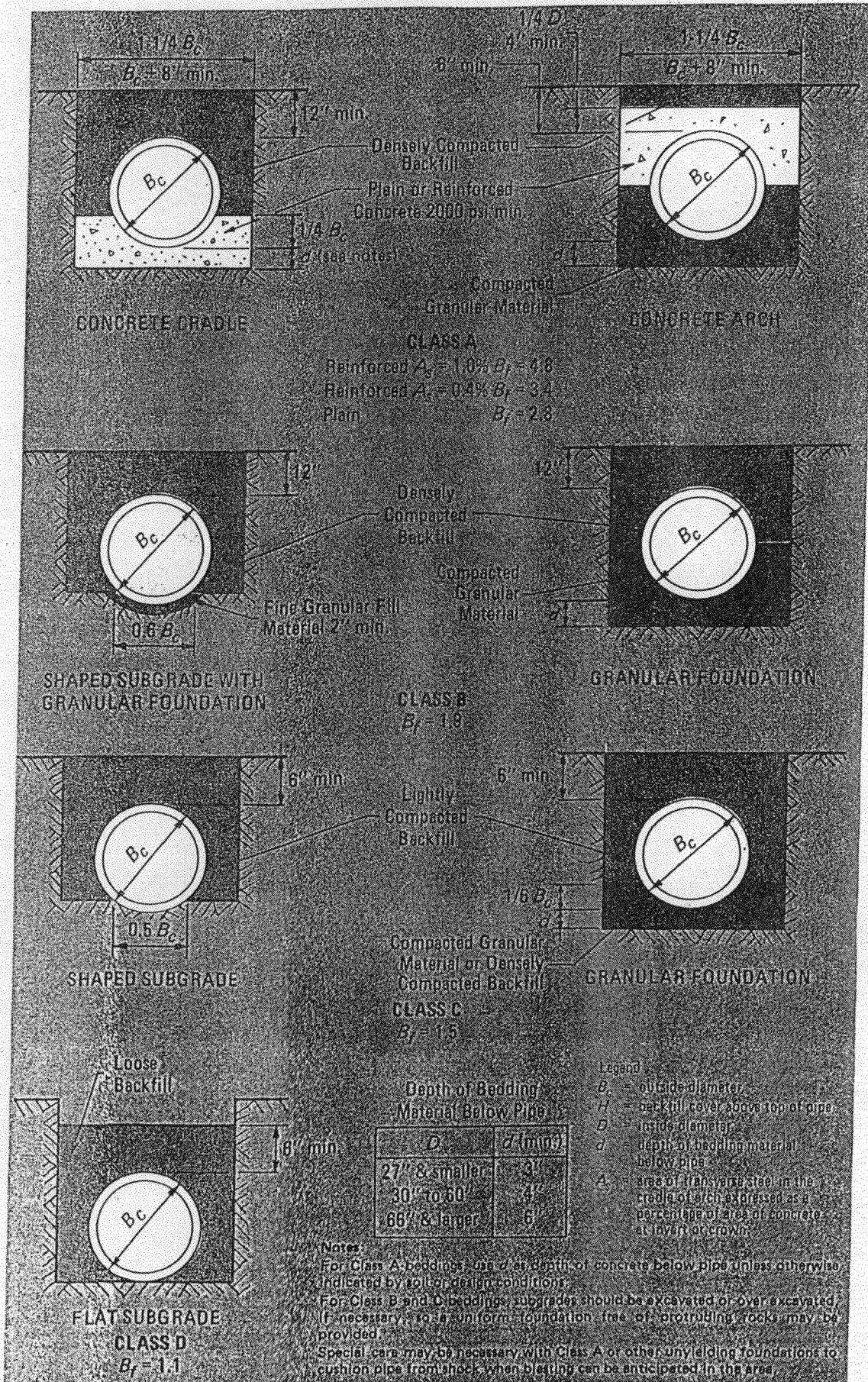
FROM ASTM C-76 FOR REINFORCED CONCRETE  
CULVERT, STORM DRAIN AND SEWER PIPE

USE CLASS IV PIPE

D-LOAD FOR CLASS IV PIPE = 2000 lbs/LF/FOOT INSIDE DIAMETER  
SEE TABLE 4.

FIGURE 227

TRENCH BEDDINGS  
CIRCULAR PIPE



HIGHWAY LOADS ON CIRCULAR PIPE  
POUNDS PER LINEAR FOOT

PIPE SIZE D IN INCHES	B <sub>c</sub> (ft.)	HEIGHT OF FILL H ABOVE TOP OF PIPE IN FEET												PIPE SIZE D IN INCHES	
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0		9.0
12	1.33	3780	2080	1470	1080	760	550	450	380	290	230	190	160	130	12
15	1.63	4240	2360	1740	1280	900	660	540	450	350	280	230	190	160	15
18	1.92	4110	2610	1970	1460	1030	750	620	520	400	320	260	220	190	18
21	2.21	3920	2820	2190	1620	1150	840	690	580	450	360	300	250	210	21
24	2.50	4100	3010	2400	1780	1270	930	760	640	500	400	330	280	240	24
27	2.79	3880	2940	2590	1930	1380	1010	830	700	560	440	360	300	260	27
30	3.08	3620	2830	2770	2070	1480	1080	890	750	590	480	390	330	280	30
33	3.38	3390	2930	2950	2200	1580	1160	960	810	630	510	420	360	300	33
36	3.67	3190	2810	2930	2330	1670	1230	1020	860	670	550	450	380	330	36
39	3.96	3010	2670	2850	2440	1760	1290	1070	910	710	580	480	410	350	39
42	4.25	2860	2550	2770	2560	1840	1360	1130	950	750	610	510	430	370	42
48	4.83	2590	2330	2620	2480	1990	1470	1230	1040	820	670	560	470	410	48
54	5.42	2360	2150	2490	2360	2050	1580	1320	1120	890	730	610	520	440	54
60	6.00	2170	1990	2450	2250	1960	1680	1400	1190	950	780	650	560	480	60
66	6.58	2010	1850	2520	2160	1880	1640	1480	1260	1010	830	700	590	510	66
72	7.17	1870	1730	2580	2190	1810	1570	1510	1330	1060	880	740	630	540	72
78	7.75	1750	1630	2630	2240	1770	1520	1460	1390	1110	920	780	660	570	78
84	8.33	1650	1540	2730	2290	1810	1460	1410	1360	1160	960	810	690	600	84
90	8.92	1550	1460	2530	2330	1850	1470	1360	1310	1210	1000	850	720	630	90
96	9.50	1470	1380	2410	2290	1880	1500	1330	1270	1250	1040	880	750	650	96
102	10.08	1390	1320	2300	2190	1910	1530	1350	1240	1290	1070	910	780	680	102
108	10.67	1320	1260	2200	2090	1830	1560	1380	1230	1330	1110	940	810	700	108
114	11.25	1260	1200	2110	2010	1760	1540	1410	1260	1362	1140	970	830	730	114
120	11.83	1210	1150	2020	1930	1700	1480	1420	1280	1400	1170	990	860	750	120
126	12.42	1160	1100	1940	1860	1640	1430	1380	1300	1430	1200	1020	880	770	126
132	13.00	1110	1060	1870	1800	1580	1380	1330	1290	1460	1220	1040	900	790	132
138	13.58	1070	1020	1800	1730	1530	1340	1290	1250	1490	1250	1070	920	810	138
144	14.17	1020	980	1740	1670	1480	1300	1250	1210	1470	1280	1090	940	830	144

TABLE 45

TABLES

- DATA:
1. Unsurfaced roadway.
  2. Loads — AASHTO HS 20, two 16,000 lb. dual-tired wheels, 4 ft. on centers, or alternate loading, four 12,000 lb. dual-tired wheels, 4 ft. on centers with impact included.
- NOTES:
1. Interpolate for intermediate pipe sizes and/or fill heights.
  2. Critical loads:
    - a. For H = 0.5 and 1.0 ft., a single 16,000 lb. dual-tired wheel.
    - b. For H = 1.5 through 4.0 ft., two 16,000 lb. dual-tired wheels, 4 ft. on centers.
    - c. For H > 4.0 ft. alternate loading.
  3. Truck live loads for H = 10.0 ft. or more are insignificant.



Designation: C 76 - 90

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Highway and Transportation  
Officials Standard AASHTO No.: M 170-811

## Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe<sup>1</sup>

This standard is issued under the fixed designation C 76; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.*

### 1. Scope

1.1 This specification covers reinforced concrete pipe intended to be used for the conveyance of sewage, industrial wastes, and storm water, and for the construction of culverts.

1.2 A complete metric companion to Specification C 76 has been developed—C 76M; therefore, no metric equivalents are presented in this specification.

NOTE 1—This specification is a manufacturing and purchase specification only, and does not include requirements for bedding, backfill, or the relationship between field load condition and the strength classification of pipe. However, experience has shown that the successful performance of this product depends upon the proper selection of the class of pipe, type of bedding and backfill, and care that installation conforms to the construction specifications. The purchaser of the reinforced concrete pipe specified herein is cautioned that he must correlate the field requirements with the class of pipe specified and provide inspection at the construction site.

NOTE 2—Attention is called to the specification for reinforced concrete D-load culvert, storm drain, and sewer pipe (Specification C 655).

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- A 82 Specification for Steel Wire, Plain, for Concrete Reinforcement<sup>2</sup>
- A 185 Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement<sup>2</sup>
- A 496 Specification for Steel Wire, Deformed, for Concrete Reinforcement<sup>2</sup>
- A 497 Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement<sup>2</sup>
- A 615 Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement<sup>2</sup>
- C 14 Specification for Concrete Sewer, Storm Drain, and Culvert Pipe<sup>3</sup>
- C 33 Specification for Concrete Aggregates<sup>4</sup>
- C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens<sup>4</sup>
- C 150 Specification for Portland Cement<sup>5</sup>
- C 309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete<sup>4</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C-13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.02 on Reinforced Sewer and Culvert Pipe.

Current edition approved July 17, 1990. Published September 1990. Originally published as C 76 - 30 T. Last previous edition C 76 - 89.

<sup>2</sup> Annual Book of ASTM Standards, Vol 01.04.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.05.

<sup>4</sup> Annual Book of ASTM Standards, Vol 04.02.

<sup>5</sup> Annual Book of ASTM Standards, Vol 04.01.

C 497 Method for Testing Concrete Pipe, Manhole Sections, or Tile<sup>3</sup>

C 595 Specification for Blended Hydraulic Cements<sup>5</sup>

C 618 Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete<sup>4</sup>

C 655 Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe<sup>3</sup>

C 822 Definitions of Terms Relating to Concrete Pipe and Related Products<sup>3</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Definitions C 822.

### 4. Classification

4.1 Pipe manufactured in accordance with this specification shall be of five classes identified as Class I, Class II, Class III, Class IV, and Class V. The corresponding strength requirements are prescribed in Tables 1 to 5.

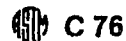
### 5. Basis of Acceptance

5.1 Unless otherwise designated by the purchaser at the time of, or before placing an order, two separate and alternative bases of acceptance are permitted as follows:

5.1.1 *Acceptance on the Basis of Plant Load-Bearing Tests, Material Tests, and Inspection of Manufactured Pipe for Visual Defects and Imperfections*—Acceptability of the pipe in all diameters and classes produced in accordance with 7.1 or 7.2 shall be determined by the results of the three-edge bearing tests for either the load to produce a 0.01-in. crack, or at the option of the purchaser, the load to produce a 0.01-in. crack and the ultimate strength of the pipe; by such material tests as are required in 6.1, 6.2, and 6.4; by absorption tests on selected samples of concrete from the wall of the pipe; and by visual inspection of the finished pipe to determine its conformance with the accepted design and its freedom from defects.

5.1.2 *Acceptance on the Basis of Material Tests and Inspection of Manufactured Pipe for Defects and Imperfections*—Acceptability of the pipe in all diameters and classes produced in accordance with 7.1 or 7.2 shall be determined by the results of such material tests as are required in 6.1, 6.2, and 6.4; by crushing tests on concrete cores or cured concrete cylinders; by absorption tests on selected samples from the wall of the pipe; and by inspection of the finished pipe including amount and placement of reinforcement to determine its conformance with the accepted design and its freedom from defects.




**TABLE 1 Design Requirements for Class I Reinforced Concrete Pipe<sup>A</sup>**

NOTE—See Section 5 for basis of acceptance specified by the purchaser.

The strength test requirements in pounds-force per linear foot of pipe under the three-edge-bearing method shall be either the D-load (test load expressed in pounds-force per linear foot per foot of diameter) to produce a 0.01-in. crack, or the D-loads to produce the 0.01-in. crack and the ultimate load as specified below, multiplied by the internal diameter of the pipe in feet.

Internal Designated Diameter, in.	D-load to produce a 0.01-in. crack		800		D-load to produce the ultimate load <sup>D</sup>		1200					
	Reinforcement, in. <sup>2</sup> /linear ft of pipe wall											
	Wall A				Wall B							
	Concrete Strength, 4000 psi				Concrete Strength, 4000 psi							
Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>					
	Inner Cage	Outer Cage			Inner Cage	Outer Cage						
60	5	0.25	0.15	0.28	6	0.21	0.13	0.23				
66	5½	0.30	0.18	0.33	6½	0.25	0.15	0.28				
72	6	0.35	0.21	0.39	7	0.29	0.17	0.32				
78	6½	0.40	0.24	0.44	7½	0.32	0.19	0.36				
84	7	0.45	0.27	0.50	8	0.37	0.22	0.41				
90	7½	0.49	0.29	0.54	8½	0.41	0.25	0.46				
96	8	0.54	0.32	0.60	9	0.46	0.28	0.51				
Concrete Strength, 5000 psi												
102	8½	0.63	0.38	Inner Circular Plus Elliptical	0.25	0.38	9½	0.54	0.32	Inner Circular Plus Elliptical	0.22	0.32
108	9	0.68	0.41	Inner Circular Plus Elliptical	0.27	0.41	10	0.61	0.37	Inner Circular Plus Elliptical	0.24	0.37
114	A	...	...	...	...	...	A	...	...	...	...	...
120	A	...	...	...	...	...	A	...	...	...	...	...
126	A	...	...	...	...	...	A	...	...	...	...	...
132	A	...	...	...	...	...	A	...	...	...	...	...
138	A	...	...	...	...	...	A	...	...	...	...	...
144	A	...	...	...	...	...	A	...	...	...	...	...

<sup>A</sup> For modified or special designs see 7.2 or with the permission of the purchaser utilize the provisions of Specification C 655. Steel areas may be interpolated between those shown for variations in diameter, loading, or wall thickness. Pipe over 96 in. in diameter shall have two circular cages or an inner circular plus one elliptical cage.

<sup>B</sup> As an alternative to designs requiring both inner and outer circular cages the reinforcement may be positioned and proportioned in either of the following manners: An inner circular cage plus an elliptical cage such that the area of the elliptical cage shall not be less than that specified for the outer cage in the table and the total area of the inner circular cage plus the elliptical cage shall not be less than that specified for the inner cage in the table.

An inner and outer cage plus quadrant mats in accordance with Fig. 1, or An inner and outer cage plus an elliptical cage in accordance with Fig. 2.

<sup>C</sup> Elliptical and quadrant steel must be held in place by means of holding rods, chairs, or other positive means throughout the entire casting operation.

<sup>D</sup> Three-edge-bearing test to ultimate load is not required for any class of pipe 60-in. or less in diameter provided all other requirements of this specification are met.

5.1.3 When agreed upon by the purchaser and manufacturer, any portion or any combination of the tests itemized in 5.1.1 or 5.1.2 may form the basis of acceptance.

5.2 *Age for Acceptance*—Pipe shall be considered ready for acceptance when it conforms to the requirements as indicated by the specified tests.

## 6. Materials

6.1 *Reinforced Concrete*—The reinforced concrete shall consist of cementitious materials, mineral aggregates, and water, in which steel has been embedded in such a manner that the steel and concrete act together.

### 6.2 Cementitious materials:

6.2.1 *Cement*—Cement shall conform to the requirements for portland cement of Specification C 150 or shall be portland blast-furnace slag cement or portland-pozzolan cement conforming to the requirements of Specification C 595, except that the pozzolan constituent in the Type IP portland pozzolan cement shall be fly ash and shall not exceed 25 % by weight.

6.2.2 *Fly Ash*—Fly ash shall conform to the requirements of Class F or Class C of Specification C 618.

### 6.2.3 Allowable Combinations of Cementitious Materi-

als—The combination of cementitious materials used in the concrete shall be one of the following:

6.2.3.1 Portland cement only,

6.2.3.2 Portland blast furnace slag cement only;

6.2.3.3 Portland pozzolan cement only, or

6.2.3.4 A combination of portland cement and fly ash wherein the proportion of fly ash is between 5 and 25 % by weight of total cementitious material (portland cement plus fly ash).

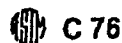
6.3 *Aggregates*—Aggregates shall conform to Specification C 33 except that the requirement for gradation shall not apply.

6.4 *Admixtures and Blends*—Admixtures and blends may be used with the approval of the purchaser.

6.5 *Steel Reinforcement*—Reinforcement shall consist of wire conforming to Specification A 82 or Specification A 496 or of wire fabric conforming to Specification A 185 or Specification A 497 or of bars of Grade 40 steel conforming to Specification A 615.

## 7. Design

7.1 *Design Tables*—The diameter, wall thickness, compressive strength of the concrete, and the area of the



**TABLE 2 Design Requirements for Class II Reinforced Concrete Pipe<sup>A</sup>**

NOTE—See Section 5 for basis of acceptance specified by the purchaser.

<sup>A</sup> The strength test requirements in pounds-force per linear foot of pipe under the three-edge-bearing method shall be either the D-load (test load expressed in pounds-force per linear foot per foot of diameter) to produce a 0.01-in. crack, or the D-loads to produce the 0.01-in. crack and the ultimate load as specified below, multiplied by the internal diameter of the pipe in feet.

Internal Designated Diameter, in.	Reinforcement, in. <sup>2</sup> /linear ft of pipe wall											
	Wall A				Wall B				Wall C			
	Concrete Strength, 4000 psi				Concrete Strength, 4000 psi				Concrete Strength, 4000 psi			
	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>	Wall Thickness, in.	Circular Reinforcement <sup>C</sup>		Elliptical Reinforcement <sup>D</sup>
	Inner Cage	Outer Cage			Inner Cage	Outer Cage			Inner Cage	Outer Cage		
12	1 3/4	0.07 <sup>B</sup>	...	...	2	0.07 <sup>B</sup>	...	...	2 3/4	0.07 <sup>B</sup>	...	...
15	1 7/8	0.07 <sup>B</sup>	...	...	2 1/4	0.07 <sup>B</sup>	...	...	3	0.07 <sup>B</sup>	...	...
18	2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	2 1/2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 1/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
21	2 1/4	0.12	...	0.10	2 3/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 1/2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
24	2 1/2	0.13	...	0.11	3	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 3/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
27	2 5/8	0.15	...	0.13	3 1/4	0.13	...	0.11	4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
30	2 3/4	0.15	...	0.14	3 1/2	0.14	...	0.12	4 1/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
33	2 7/8	0.16	...	0.15	3 3/4	0.15	...	0.13	4 1/2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
36	3	0.14	0.08	0.15	4 <sup>E</sup>	0.12	0.07	0.13	4 3/4 <sup>E</sup>	0.07	0.07	0.08
42	3 1/2	0.16	0.10	0.18	4 1/2	0.15	0.09	0.17	5 1/4	0.10	0.07	0.11
48	4	0.21	0.13	0.23	5	0.18	0.11	0.20	5 3/4	0.14	0.08	0.15
54	4 1/2	0.25	0.15	0.28	5 1/2	0.22	0.13	0.24	6 1/4	0.17	0.10	0.19
60	5	0.30	0.18	0.33	6	0.25	0.15	0.28	6 3/4	0.22	0.13	0.24
66	5 1/2	0.35	0.21	0.39	6 1/2	0.31	0.19	0.34	7 1/4	0.25	0.15	0.28
72	6	0.41	0.25	0.45	7	0.35	0.21	0.39	7 3/4	0.30	0.18	0.33
78	6 1/2	0.46	0.28	0.51	7 1/2	0.40	0.24	0.44	8 1/4	0.35	0.21	0.39
84	7	0.51	0.31	0.57	8	0.46	0.28	0.51	8 3/4	0.41	0.25	0.46
90	7 1/2	0.57	0.34	0.63	8 1/2	0.51	0.31	0.57	9 1/4	0.48	0.28	0.53
96	8	0.62	0.37	0.69	9	0.57	0.34	0.63	9 3/4	0.55	0.33	0.61

Concrete Strength, 5000 psi																	
102	8 1/2	0.76	0.46	Inner Circular Plus Elliptical	0.30	0.46	9 1/2	0.68	0.41	Inner Circular Plus Elliptical	0.27	0.41	10 1/4	0.82	0.37	Inner Circular Plus Elliptical	0.25
108	9	0.85	0.51	Inner Circular Plus Elliptical	0.34	0.51	10	0.76	0.46	Inner Circular Plus Elliptical	0.30	0.46	10 3/4	0.70	0.42	Inner Circular Plus Elliptical	0.28
114	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...
120	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...
126	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...
132	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...
138	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...
144	A	...	...	...	...	...	A	...	...	...	...	...	A	...	...	...	...

<sup>A</sup> For modified or special designs see 7.2 or with the permission of the purchaser utilize the provisions of Specification C 655. Steel areas may be interpolated between those shown for variations in diameter, loading, or wall thickness. Pipe over 96 in. in diameter shall have two circular cages or an inner circular plus one elliptical cage.

<sup>B</sup> For these classes and sizes, the minimum practical steel reinforcement is specified. The actual ultimate strength is greater than the minimum strength specified for nonreinforced pipe of equivalent diameters in Specification C 14.

<sup>C</sup> As an alternative to designs requiring both inner and outer circular cages the reinforcement may be positioned and proportioned in either of the following manners:  
 An inner circular cage plus an elliptical cage such that the area of the elliptical cage shall not be less than that specified for the outer cage in the table and the total area of the inner circular cage plus the elliptical cage shall not be less than that specified for the inner cage in the table,  
 An inner and outer cage plus quadrant mats in accordance with Fig. 1, or  
 An inner and outer cage plus an elliptical cage in accordance with Fig. 2.

<sup>D</sup> Elliptical and quadrant steel must be held in place by means of holding rods, chairs, or other positive means throughout the entire casting operation.

<sup>E</sup> As an alternative, single cage reinforcement may be used. The reinforcement area in square in. per linear foot shall be 0.20 for wall B and 0.16 for wall C.

<sup>F</sup> Three-edge-bearing test to ultimate load is not required for any class of pipe 60-in. or less in diameter provided all other requirements of this specification are met.

circumferential reinforcement shall be as prescribed for Classes I to V in Tables 1 to 5, except as provided in 7.2.

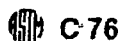
7.1.1 Footnotes to the tables herein are intended to be amplifications of tabulated requirements and are to be considered applicable and binding as if they were contained in the body of the specification.

**7.2 Modified and Special Designs:**

7.2.1 If permitted by the purchaser the manufacturer may

request approval by the purchaser of modified designs that differ from the designs in 7.1; or special designs for sizes and loads beyond those shown in Tables 1 to 5, 7.1, or special designs for pipe sizes that do not have steel reinforcement areas shown in Tables 1 to 5 of 7.1.

7.2.2 Such modified or special designs shall be based on rational or empirical evaluations of the ultimate strength and cracking behavior of the pipe and shall fully describe to the



**TABLE 3 Design Requirements for Class III Reinforced Concrete Pipe<sup>A</sup>**

NOTE—See Section 5 for basis of acceptance specified by the purchaser.

The strength test requirements in pounds-force per linear foot of pipe under the three-edge-bearing method shall be either the D-load (test load expressed in pounds-force per linear foot per foot of diameter) to produce a 0.01-in. crack, or the D-loads to produce the 0.01-in. crack and the ultimate load as specified below, multiplied by the internal diameter of the pipe in feet.

D-load to produce a 0.01-in. crack 1350  
 D-load to produce the ultimate load<sup>F</sup> 2000

Internal Designated Diameter, in.	Reinforcement, in. <sup>2</sup> /linear ft of pipe wall											
	Wall A				Wall B				Wall C			
	Concrete Strength, 4000 psi				Concrete Strength, 4000 psi				Concrete Strength, 4000 psi			
	Wall Thicknesses, in.	Circular Reinforcement <sup>C</sup>		Elliptical Reinforcement <sup>D</sup>	Wall Thicknesses, in.	Circular Reinforcement <sup>C</sup>		Elliptical Reinforcement <sup>D</sup>	Wall Thicknesses, in.	Circular Reinforcement <sup>C</sup>		Elliptical Reinforcement <sup>D</sup>
Inner Cage		Outer Cage	Inner Cage			Outer Cage	Inner Cage			Outer Cage		
12	1 3/4	0.07 <sup>B</sup>	...	...	2	0.07 <sup>B</sup>	...	...	2 3/4	0.07 <sup>B</sup>	...	...
15	1 7/8	0.07 <sup>B</sup>	...	...	2 1/4	0.07 <sup>B</sup>	...	...	3	0.07 <sup>B</sup>	...	...
18	2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	2 1/2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 1/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
21	2 1/4	0.14	...	0.11	2 3/4	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 1/2	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>
24	2 1/2	0.17	...	0.14	3	0.07 <sup>B</sup>	...	0.07 <sup>B</sup>	3 3/4	0.07	...	0.07 <sup>B</sup>
27	2 5/8	0.18	...	0.16	3 1/4	0.16	...	0.14	4	0.08	...	0.07 <sup>B</sup>
30	2 3/4	0.19	...	0.18	3 1/2	0.18	...	0.15	4 1/4	0.10	...	0.08
33	2 7/8	0.21	...	0.20	3 3/4	0.20	...	0.17	4 1/2	0.12	...	0.10
36	3	0.21	0.13	0.23	4	0.17	0.10	0.19	4 3/4 <sup>E</sup>	0.08	0.07	0.09
42	3 1/2	0.25	0.15	0.28	4 1/2	0.21	0.13	0.23	5 1/4	0.12	0.07	0.13
48	4	0.32	0.19	0.35	5	0.24	0.14	0.27	5 3/4	0.16	0.10	0.18
54	4 1/2	0.38	0.23	0.42	5 1/2	0.29	0.17	0.32	6 1/4	0.21	0.13	0.23
60	5	0.44	0.26	0.49	6	0.34	0.20	0.38	6 3/4	0.25	0.15	0.28
66	5 1/2	0.50	0.30	0.55	6 1/2	0.41	0.25	0.46	7 1/4	0.31	0.19	0.34
72	6	0.57	0.34	0.63	7	0.49	0.29	0.54	7 3/4	0.36	0.22	0.40
Concrete Strength, 5000 psi												
78	6 1/2	0.64	0.38	0.71	7 1/2	0.57	0.34	0.63	8 1/4	0.42	0.25	0.47
84	7	0.72	0.43	0.80	8	0.64	0.38	0.71	8 3/4	0.50	0.30	0.56
Concrete Strength, 5000 psi												
90	7 1/2	0.81	0.49	0.90	8 1/2	0.69	0.41	0.77	9 1/4	0.59	0.35	0.66
96	8	0.93	0.56	1.03	9	0.78	0.46	0.84	9 3/4	0.70	0.42	Inner Circular Plus Elliptical 0.28
102	8 1/2	1.03	0.62	Inner Circular Plus Elliptical 0.41	9 1/2	0.90	0.54	Inner Circular Plus Elliptical 0.36	10 1/4	0.83	0.50	Inner Circular Plus Elliptical 0.33
108	9	1.22	0.73	Inner Circular Plus Elliptical 0.62	10	1.08	0.65	Inner Circular Plus Elliptical 0.54	10 3/4	0.99	0.59	Inner Circular Plus Elliptical 0.50
114	A	...	...	Inner Circular Plus Elliptical 0.49	A	...	...	Inner Circular Plus Elliptical 0.43	A	...	...	Inner Circular Plus Elliptical 0.40
120	A	...	...	Inner Circular Plus Elliptical 0.73	A	...	...	Inner Circular Plus Elliptical 0.65	A	...	...	Inner Circular Plus Elliptical 0.59
126	A	...	...	...	A	...	...	...	A	...	...	...
132	A	...	...	...	A	...	...	...	A	...	...	...
138	A	...	...	...	A	...	...	...	A	...	...	...
144	A	...	...	...	A	...	...	...	A	...	...	...

<sup>A</sup> For modified or special designs see 7.2 or with the permission of the purchaser utilize the provisions of Specification C 655. Steel areas may be interpolated between those shown for variations in diameter, loading, or wall thickness. Pipe over 96 in. in diameter shall have two circular cages or an inner circular plus one elliptical cage.

<sup>B</sup> For these classes and sizes, the minimum practical steel reinforcement is specified. The actual ultimate strength is greater than the minimum strength specified for nonreinforced pipe of equivalent diameters in Specification C 14.

<sup>C</sup> As an alternative to designs requiring both inner and outer circular cages the reinforcement may be positioned and proportioned in either of the following manners: An inner circular cage plus an elliptical cage such that the area of the elliptical cage shall not be less than that specified for the outer cage in the table and the total area of the inner circular cage plus the elliptical cage shall not be less than that specified for the inner cage in the table, An inner and outer cage plus quadrant mats in accordance with Fig. 1, or An inner and outer cage plus an elliptical cage in accordance with Fig. 2.

<sup>D</sup> Elliptical and quadrant steel must be held in place by means of holding rods, chairs, or other positive means throughout the entire casting operation.

<sup>E</sup> As an alternative, single cage reinforcement may be used. The reinforcement area in square in. per linear foot shall be 0.30 for wall B and 0.20 for wall C.

<sup>F</sup> Three-edge-bearing test to ultimate load is not required for any class of pipe 60-in. or less in diameter provided all other requirements of this specification are met.



**TABLE 4 Design Requirements for Class IV Reinforced Concrete Pipe<sup>A</sup>**

Note—See Section 5 for basis of acceptance specified by the purchaser.

The strength test requirements in pounds-force per linear foot of pipe under the three-edge-bearing method shall be either the D-load (test load expressed in pounds-force per linear foot per foot of diameter) to produce a 0.01-in. crack, or the D-loads to produce the 0.01-in. crack and the ultimate load as specified below, multiplied by the internal diameter of the pipe in feet.

D-load to produce a 0.01-in. crack 2000  
 D-load to produce the ultimate load<sup>E</sup> 3000

Internal Designated Diameter, in.	Reinforcement, in. <sup>2</sup> /linear ft of pipe wall											
	Wall A				Wall B				Wall C			
	Concrete Strength, 5000 psi				Concrete Strength, 4000 psi				Concrete Strength, 4000 psi			
	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>	Wall Thickness, in.	Circular Reinforcement <sup>B</sup>		Elliptical Reinforcement <sup>C</sup>
	Inner Cage	Outer Cage			Inner Cage	Outer Cage			Inner Cage	Outer Cage		
12	1 3/4	0.15	...	...	2	0.07	...	...	2 1/4	0.07 <sup>D</sup>	...	...
15	1 3/4	0.16	...	...	2 1/4	0.10	...	...	3	0.07 <sup>D</sup>	...	...
18	2	0.17	...	0.15	2 1/2	0.14	...	0.11	3 1/4	0.07 <sup>D</sup>	...	0.07 <sup>D</sup>
21	2 1/4	0.23	...	0.21	2 3/4	0.20	...	0.17	3 1/2	0.07 <sup>D</sup>	...	0.07 <sup>D</sup>
24	2 1/2	0.29	...	0.27	3	0.27	...	0.23	3 3/4	0.07	0.07	0.08
27	2 3/4	0.33	...	0.31	3 1/4	0.31	...	0.25	4	0.08	0.07	0.09
30	2 3/4	0.38	...	0.35	3 1/2	0.35	...	0.28	4 1/4	0.09	0.07	0.10
33	^	...	...	...	3 3/4	0.27	0.16	0.30	4 1/2	0.11	0.07	0.12
36	^	...	...	...	4	0.30	0.18	0.33	4 3/4	0.14	0.08	0.15
42	^	...	...	...	4 1/2	0.35	0.21	0.39	5 1/4	0.20	0.12	0.22
48	^	...	...	...	5	0.42	0.25	0.47	5 3/4	0.26	0.18	0.29
54	^	...	...	...	5 1/2	0.50	0.30	0.55	6 1/4	0.34	0.20	0.38
					Concrete Strength, 5000 psi							
60	^	...	...	...	6	0.59	0.35	0.86	6 3/4	0.41	0.25	0.48
66	^	...	...	...	6 1/2	0.69	0.41	0.77	7 1/4	0.51	0.31	0.57
									Concrete Strength, 5000 psi			
72	^	...	...	...	7	0.79	0.47	0.88	7 3/4	0.61	0.37	0.68
78	^	...	...	...	^	...	...	...	8 1/4	0.71	0.43	0.79
84	^	...	...	...	^	...	...	...	8 3/4	0.85	0.51	0.94
90	^	...	...	...	^	...	...	...	^	...	...	...
96	^	...	...	...	^	...	...	...	^	...	...	...
102	^	...	...	...	^	...	...	...	^	...	...	...
108	^	...	...	...	^	...	...	...	^	...	...	...
114	^	...	...	...	^	...	...	...	^	...	...	...
120	^	...	...	...	^	...	...	...	^	...	...	...
126	^	...	...	...	^	...	...	...	^	...	...	...
132	^	...	...	...	^	...	...	...	^	...	...	...
138	^	...	...	...	^	...	...	...	^	...	...	...
144	^	...	...	...	^	...	...	...	^	...	...	...

<sup>A</sup> For modified or special designs see 7.2 or with the permission of the purchaser utilize the provisions of Specification C 655. Steel areas may be interpolated between those shown for variations in diameter, loading, or wall thickness. Pipe over 96 in. in diameter shall have two circular cages or an inner circular plus one elliptical cage.

<sup>B</sup> As an alternative to designs requiring both inner and outer circular cages the reinforcement may be positioned and proportioned in either of the following manners: An inner circular cage plus an elliptical cage such that the area of the elliptical cage shall not be less than that specified for the outer cage in the table and the total area of the inner circular cage plus the elliptical cage shall not be less than that specified for the inner cage in the table.

An inner and outer cage plus quadrant mats in accordance with Fig. 1, or

An inner and outer cage plus an elliptical cage in accordance with Fig. 2.

For Wall C, in sizes 24 to 33 in., a single circular cage with an area not less than the sum of the specified inner and outer circular reinforcement areas.

<sup>C</sup> Elliptical and quadrant steel must be held in place by means of holding rods, chairs, or other positive means throughout the entire casting operation.

<sup>D</sup> For these classes and sizes, the minimum practical steel reinforcement is specified.

<sup>E</sup> Three-edge-bearing test to ultimate load is not required for any class of pipe 60-in. or less in diameter provided all other requirements of this specification are met.

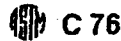
purchaser any deviations from the requirements of 7.1. The descriptions of modified or special designs shall include the wall thickness, the concrete strength, and the area, type, placement, number of layers, and strength of the steel reinforcement.

7.2.3 The manufacturer shall submit to the purchaser proof of the adequacy of the proposed modified or special design. Such proof may comprise the submission of certified three-edge-bearing tests already made, which are acceptable to the purchaser or, if such three-edge-bearing tests are not available or acceptable, the manufacturer may be required to

perform proof tests on sizes and classes selected by the purchaser to demonstrate the adequacy of the proposed design.

7.2.4 Such pipe must meet all of the test and performance requirements specified by the purchaser in accordance with Section 5.

7.3 Area—In this specification, when the word area is not described by adjectives, such as cross-section or single wire, it shall be understood to be the cross-sectional area of reinforcement per unit lengths of pipe.



**TABLE 5 Design Requirements for Class V Reinforced Concrete Pipe<sup>A</sup>**

NOTE—See Section 5 for basis of acceptance specified by the purchaser.

The strength test requirements in pounds-force per linear foot of pipe under the three-edge-bearing method shall be either the D-load (test load expressed in pounds-force per linear foot per foot of diameter) to produce a 0.01-in. crack, or the D-loads to produce the 0.01-in. crack and the ultimate load as specified below, multiplied by the internal diameter of the pipe in feet.

D-load to produce a 0.01-in. crack 3000  
 D-load to produce the ultimate load<sup>E</sup> 3750

Internal Designated Diameter, in.	Reinforcement, in. <sup>2</sup> /linear ft. of pipe wall											
	Wall A			Wall B				Wall C				
	Concrete Strength, 6000 psi			Concrete Strength, 6000 psi				Concrete Strength, 6000 psi				
	Wall Thickness, in.	Circular Reinforcement <sup>a</sup>		Wall Thickness, in.	Circular Reinforcement <sup>a</sup>		Elliptical Reinforcement <sup>c</sup>	Wall Thickness, in.	Circular Reinforcement <sup>a</sup>		Elliptical Reinforcement <sup>c</sup>	
Inner Cage		Outer Cage	Inner Cage		Outer Cage	Inner Cage			Outer Cage			
12	A	...	...	2	0.10	...	2 3/4	0.07 <sup>D</sup>	...	...		
15	A	...	...	2 1/4	0.14	...	3	0.07 <sup>D</sup>	...	...		
18	A	...	...	2 1/2	0.19	...	3 1/4	0.10	...	...		
21	A	...	...	2 3/4	0.24	...	3 1/2	0.10	...	...		
24	A	...	...	3	0.30	...	3 3/4	0.12	0.07	0.13		
27	A	...	...	3 1/4	0.38	0.23	4	0.14	0.08	0.16		
30	A	...	...	3 1/2	0.41	0.25	4 1/4	0.18	0.11	0.20		
33	A	...	...	3 3/4	0.48	0.28	4 1/2	0.23	0.14	0.25		
36	A	...	...	4	0.50	0.30	4 3/4	0.27	0.16	0.30		
42	A	...	...	4 1/2	0.60	0.36	5 1/4	0.36	0.22	0.40		
48	A	...	...	5	0.73	0.44	5 3/4	0.47	0.28	0.52		
54	A	...	...	A	...	...	6 1/4	0.58	0.35	0.64		
60	A	...	...	A	...	...	6 3/4	0.70	0.42	0.78		
66	A	...	...	A	...	...	7 1/4	0.84	0.50	0.93		
72	A	...	...	A	...	...	7 3/4	0.99	0.59	1.10		
78	A	...	...	A	...	...	A	...	...	...		
84	A	...	...	A	...	...	A	...	...	...		
90	A	...	...	A	...	...	A	...	...	...		
96	A	...	...	A	...	...	A	...	...	...		
102	A	...	...	A	...	...	A	...	...	...		
108	A	...	...	A	...	...	A	...	...	...		
114	A	...	...	A	...	...	A	...	...	...		
120	A	...	...	A	...	...	A	...	...	...		
126	A	...	...	A	...	...	A	...	...	...		
132	A	...	...	A	...	...	A	...	...	...		
138	A	...	...	A	...	...	A	...	...	...		
144	A	...	...	A	...	...	A	...	...	...		

<sup>A</sup> For modified or special designs see 7.2 or with the permission of the purchaser utilize the provisions of Specification C 855. Steel areas may be interpolated between those shown for variations in diameter, loading, or wall thickness. Pipe over 96 in. in diameter shall have two circular cages or an inner circular plus one elliptical cage.

<sup>B</sup> As an alternative to designs requiring both inner and outer circular cages the reinforcement may be positioned and proportioned in either of the following manners: An inner circular cage plus an elliptical cage such that the area of the elliptical cage shall not be less than that specified for the outer cage in the table and the total area of the inner circular cage plus the elliptical cage shall not be less than that specified for the inner cage in the table.

An inner and outer cage plus quadrant mats in accordance with Fig. 1, or  
 An inner and outer cage plus an elliptical cage in accordance with Fig. 2.

<sup>C</sup> Elliptical and quadrant steel must be held in place by means of holding rods, chairs, or other positive means throughout the entire casting operation.

<sup>D</sup> For these classes and sizes, the minimum practical steel reinforcement is specified.

<sup>E</sup> Three-edge-bearing test to ultimate load is not required for any class of pipe 60-in. or less in diameter provided all other requirements of this specification are met.

**8. Reinforcement**

8.1 *Circumferential Reinforcement*—A line of circumferential reinforcement for any given total area may be composed of two layers for pipe with wall thicknesses of less than 7 in. or three layers for pipe with wall thicknesses of 7 in. or greater. The layers shall not be separated by more than the thickness of one longitudinal plus 1/4 in. The multiple layers shall be fastened together to form a single cage. All other specification requirements such as laps, welds, and tolerances of placement in the wall of the pipe, etc., shall apply to this method of fabricating a line of reinforcement.

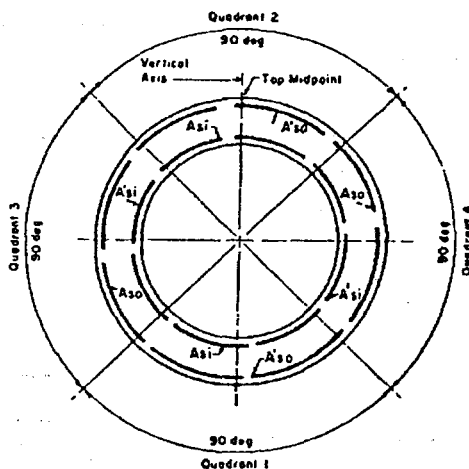
8.1.1 Where one line of circular reinforcement is used, it shall be placed from 35 to 50 % of the wall thickness from the inner surface of the pipe, except that for wall thicknesses less than 2 1/2 in., the protective cover of the concrete over the

circumferential reinforcement in the wall of the pipe shall be 3/4 in.

8.1.2 In pipe having two lines of circular reinforcement, each line shall be so placed that the protective covering of concrete over the circumferential reinforcement in the wall of the pipe shall be 1 in.

8.1.3 In pipe having elliptical reinforcement with wall thicknesses 2 1/2 in. or greater, the reinforcement in the wall of the pipe shall be so placed that the protective covering of concrete over the circumferential reinforcement shall be 1 in. from the inner surface of the pipe at the vertical diameter and 1 in. from the outer surface of the pipe at the horizontal diameter. In pipe having elliptical reinforcement with wall thicknesses less than 2 1/2 in., the protective covering of the

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NOTE 1—The total reinforcement area ( $A_{si}$ ) of the inner cage plus the quadrant mat in Quadrants 1 and 2 shall not be less than that specified for the inner cage in Tables 1 to 5.

NOTE 2—The total reinforcement area ( $A_{so}$ ) of the outer cage plus the quadrant mat in Quadrants 3 and 4 shall not be less than that specified for the outer cage in Tables 1 to 5.

NOTE 3—The reinforcement area ( $A'_{si}$ ) of the inner cage in Quadrants 3 and 4 shall be not less than 25 % of that specified for the inner cage in Tables 1 to 5.

NOTE 4—The reinforcement area ( $A'_{so}$ ) of the outer cage in Quadrants 1 and 2 shall be not less than 25 % of that specified for the outer cage in Tables 1 to 5.

NOTE 5—If the reinforcement area ( $A'_{so}$ ) of the outer cage in Quadrants 1 or 2 is less than 50 % of that specified for the outer cage in Tables 1 to 5, the quadrant mats used for the outer cage in Quadrants 3 and 4 shall extend into Quadrant 1 and 2 not less than a distance equal to the wall thickness as specified in Tables 1 to 5.

FIG. 1 Quadrant Reinforcement

concrete shall be  $\frac{3}{4}$  in. at the vertical and horizontal diameters.

8.1.4 The location of the reinforcement shall be subject to the permissible variations in dimensions given in 12.5.

8.1.5 The spacing center to center of circumferential reinforcement in a cage shall not exceed 4 in. for pipe up to and including pipe having a 4-in. wall thickness nor exceed the wall thickness for larger pipe, and shall in no case exceed 6 in.

8.1.6 Where the wall reinforcement does not extend into the joint, the maximum longitudinal distance to the last circumferential from the inside shoulder of the bell or the shoulder of the spigot shall be 3 in. except that if this distance exceeds one-half the wall thickness, the pipe wall shall contain at least a total reinforcement area of the minimum specified area per linear foot times the laying length of the pipe section. The minimum cover on the last circumferential near the spigot shoulder shall be  $\frac{1}{2}$  in.

8.1.6.1 Where reinforcement is in the bell or spigot the minimum end cover on the last circumferential shall be  $\frac{1}{2}$  in. in the bell or  $\frac{1}{4}$  in. in the spigot.

8.1.7 The continuity of the circumferential reinforcing steel shall not be destroyed during the manufacture of the pipe, except that when agreed upon by the purchaser, lift eyes or holes may be provided in each pipe for the purpose of handling.

8.1.8 If splices are not welded, the reinforcement shall be lapped not less than 20 diameters for deformed bars and deformed cold-worked wire, and 40 diameters for plain bars

and cold-drawn wire. In addition, where lapped cages of welded-wire fabric are used without welding, the lap shall contain a longitudinal wire.

8.1.8.1 When splices are welded and are not lapped to the minimum requirements above, pull tests of representative specimens shall develop at least 50 % of the minimum specified strength of the steel, and there shall be a minimum lap of 2 in. For butt-welded splices in bars or wire, permitted only with helically wound cages, pull tests of representative specimens shall develop at least 75 % of the minimum specified strength of the steel.

8.2 *Longitudinal Reinforcement*—Each line of circumferential reinforcement shall be assembled into a cage that shall contain sufficient longitudinal bars or members, to maintain the reinforcement in shape and in position within the form to comply with permissible variations in 8.1. The exposure of the ends of longitudinals, stirrups, or spacers that have been used to position the cages during the placement of the concrete shall not be a cause for rejection.

8.3 *Joint Reinforcement*—The length of the joint as used herein means the inside length of the bell or the outside length of the spigot from the shoulder to the end of the pipe section. The end distances or cover on the end circumferential shall apply to any point on the circumference of the pipe or joint. When convoluted reinforcement is used, these distances and reinforcement areas shall be taken from the points on the convolutions closest to the end of the pipe section. Unless otherwise permitted by the purchaser, the following requirements for joint reinforcement shall apply.

8.3.1 *Joint Reinforcement for Non-Rubber Gasket Joints:*

8.3.1.1 For pipe 36 in. and larger in diameter, either the bell or spigot shall contain circumferential reinforcement. This reinforcement shall be an extension of a wall cage, or may be a separate cage of at least the area per foot of that specified for the outer cage or one-half of that specified for single cage wall reinforcement, whichever is less.

8.3.1.2 Where bells or spigots require reinforcement, the maximum end cover on the last circumferential shall be one-half the length of the joint or 3 in., whichever is less.

8.3.2 *Joint Reinforcement for Rubber Gasket Joints:*

8.3.2.1 For pipe 12 in. and larger in diameter, the bell ends shall contain circumferential reinforcement. This reinforcement shall be an extension of the outer cage or a single wall cage, whichever is less, or may be a separate cage of at least the same area per foot with longitudinals as required in 8.2. If a separate cage is used, the cage shall extend into the pipe with the last circumferential wire at least one in. past the inside shoulder where the pipe barrel meets the bell of the joint.

8.3.2.2 Where bells require reinforcement, the maximum end cover on the last circumferential shall be  $1\frac{1}{2}$  in.

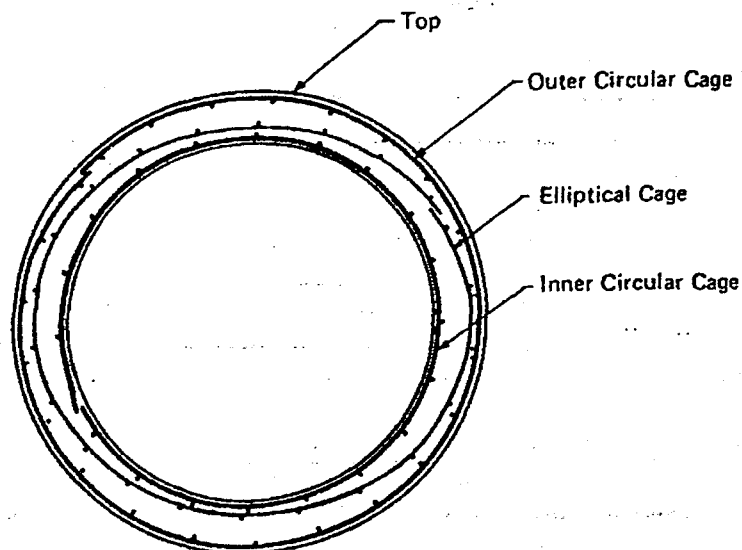
## 9. Joints

9.1 The joints shall be of such design and the ends of the concrete pipe sections so formed that the pipe can be laid together to make a continuous line of pipe compatible with the permissible variations given in Section 12.

## 10. Manufacture

10.1 *Mixture*—The aggregates shall be sized, graded, proportioned, and mixed with such proportions of

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NOTE 1—The total reinforcement area of the inner circular cage and the elliptical cage shall not be less than that specified for the inner cage in Tables 1 to 5.  
 NOTE 2—The total reinforcement area of the outer circular cage and the elliptical cage shall not be less than that specified for the outer cage in Tables 1 to 5.

FIG. 2 Triple Cage Reinforcement

cementitious materials and water as will produce a homogeneous concrete mixture of such quality that the pipe will conform to the test and design requirements of this specification. All concrete shall have a water-cementitious materials ratio not exceeding 0.53 by weight. Cementitious materials shall be as specified in 6.2 and shall be added to the mix in a proportion not less than 470 lb/yd<sup>3</sup> unless mix designs with a lower cementitious materials content demonstrate that the quality and performance of the pipe meet the requirements of this specification.

10.2 *Curing*—Pipe shall be subjected to any one of the methods of curing described in 10.2.1 to 10.2.4 or to any other method or combination of methods approved by the purchaser, that will give satisfactory results. The pipe shall be cured for a sufficient length of time so that the specified D-load is obtained when acceptance is based on 5.1.1 or so that the concrete will develop the specified compressive strength at 28 days or less when acceptance is based on 5.1.2.

10.2.1 *Steam Curing*—Pipe may be placed in a curing chamber, free of outside drafts, and cured in a moist atmosphere maintained by the injection of steam for such time and such temperature as may be needed to enable the pipe to meet the strength requirements. The curing chamber shall be so constructed as to allow full circulation of steam around the entire pipe.

10.2.2 *Water Curing*—Concrete pipe may be water-cured by covering with water saturated material or by a system of perforated pipes, mechanical sprinklers, porous hose, or by any other approved method that will keep the pipe moist during the specified curing period.

10.2.3 The manufacturer may, at his option, combine the methods described in 10.2.1 to 10.2.4 provided the required concrete compressive strength is attained.

10.2.4 A sealing membrane conforming to the requirements of Specification C 309 may be applied and should be left intact until the required strength requirements are met.

The concrete at the time of application shall be within 10°F of the atmospheric temperature. All surfaces shall be kept moist prior to the application of the compounds and shall be damp when the compound is applied.

## 11. Physical Requirements

11.1 *Test Specimens*—The specified number of pipe required for the tests shall be furnished without charge by the manufacturer and shall be selected at random by the purchaser, and shall be pipe that would not otherwise be rejected under this specification. The selection shall be made at the point or points designated by the purchaser when placing the order.

11.2 *Number and Type of Test Required for Various Delivery Schedules:*

11.2.1 *Preliminary Tests for Extended Delivery Schedules*—A purchaser of pipe, whose needs require shipments at intervals over extended periods of time, shall be entitled to such tests, preliminary to delivery of pipe, as are required by the type of basis of acceptance specified by the purchaser in Section 5, of not more than three sections of pipe covering each size in which he is interested.

11.2.2 *Additional Tests for Extended Delivery Schedules*—After the preliminary tests described in 11.2.1, a purchaser shall be entitled to additional tests in such numbers and at such times as he may deem necessary, provided that the total number of pipe tested (including preliminary tests) shall not exceed 1 % of the pipe delivered.

11.2.3 *Tests for Occasional Orders*—A purchaser who places occasional orders shall be entitled to test a number of pipe not to exceed 2 % of an order, and not to exceed five pieces of any one size; otherwise the number of pipe desired for testing shall be included in the order.

11.3 *External Load Crushing Strength:*

11.3.1 The load to produce a 0.01-in. crack or the ultimate load, as determined by the three-edge-bearing method as

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described in the Methods C 497 shall be not less than that prescribed in Tables 1 to 5 for each respective class of pipe. Pipe that have been tested only to the formation of a 0.01-in. crack and that meet the 0.01-in. crack load requirements shall be accepted for use. Three-edge-bearing test to ultimate load is not required for any class of pipe 60 in. or less in diameter listed in Tables 1 through 5 provided all other requirements of this specification are met.

NOTE 3—As used in this specification, the 0.01-in. crack is a test criterion for pipe tested in the three-edge-bearing test and is not intended as an indication of overstressed or failed pipe under installed conditions.

**11.3.2 Retests of Pipe Not Meeting the External Load Crushing Strength Requirements**—Pipe shall be considered as meeting the strength requirements when all test specimens conform to the strength requirements. Should any of the test specimens fail to meet the strength requirements, the manufacturer shall be allowed a retest on two additional specimens for each specimen that failed, and the pipe shall be acceptable only when all of the retest specimens meet the strength requirements.

#### 11.4 Concrete Strength:

**11.4.1 Compressive Strength**—Compression tests for satisfying the design concrete strength may be made on either standard rodded concrete cylinders or cylinders compacted and cured in like manner as the pipe, or on cores drilled from the wall of the pipe. If cylinders are tested, they shall be tested in accordance with Test Method C 39. The average compressive strength of all cylinders tested shall be equal to or greater than the design strength. Not more than 10 % of the cylinders tested shall fall below the design strength. In no case shall any cylinder tested fall below 80 % of the design strength. If cores are cut from the wall of the pipe and tested they shall be cut and tested in accordance with the requirements of Methods C 497. The compressive strength of each core tested shall be equal to or greater than the design strength of the concrete. If a core does not meet the required strength, another core from the same pipe may be tested. If this core does not meet the required strength, that pipe shall be rejected. Additional tests shall be made on other pipe to determine the acceptability of the lot. When the cores cut from a section of pipe successfully meet the strength requirement, the core holes shall be plugged and sealed by the manufacturer in a manner such that the pipe section will meet all of the requirements of this specification. Pipe sections, so sealed shall be considered as satisfactory for use.

**11.4.2 Absorption**—The absorption of a sample from the wall of the pipe, as determined in accordance with Methods C 497, shall not exceed 9 % of the dry mass for Method A or 8.5 % for Method B. Each Method A sample shall have a minimum mass of 0.1 kg, shall be free of visible cracks, and shall represent the full wall thickness of the pipe. When the initial absorption sample from a pipe fails to conform to this specification, the absorption test shall be made on another sample from the same pipe and the results of the retest shall be substituted for the original test results.

**11.4.3 Retests of Pipe**—When not more than 20 % of the concrete test specimens fail to pass the requirements of the specification, the manufacturer may cull his stock and may eliminate whatever quantity of pipe he desires and must so mark those pipe that they will not be shipped. The required tests shall be made on the balance of the order and the pipe

shall be accepted if they conform to the requirements of this specification.

**11.5 Test Equipment**—Every manufacturer furnishing pipe under this specification shall furnish all facilities and personnel necessary to carry out the tests described in Methods C 497.

## 12. Permissible Variations

**12.1 Internal Diameter**—The internal diameter of 12 to 24-in. pipe shall vary not more than  $\pm 1.5$  % from the design diameter. The internal diameter of 27-in. and larger pipe shall not vary from the design diameter by more than  $\pm 1$  % of the design diameter or  $\pm \frac{3}{16}$  in., whichever is greater.

**12.2 Wall Thickness**—The wall thickness shall not vary more than shown in the design or specified wall by more than  $\pm 5$  % or  $\frac{3}{16}$  in., whichever is greater. A specified wall thickness more than required in the design is not cause for rejection. Pipe having localized variations in wall thickness exceeding those specified above shall be accepted if the three-edge-bearing strength and minimum steel cover requirements are met.

**12.3 Length of Two Opposite Sides**—Variations in the laying length of two opposite sides of the pipe shall not be more than  $\frac{1}{4}$  in. for all sizes through 24-in. internal diameter, and not more than  $\frac{1}{8}$  in./ft. for all sizes larger with a maximum of  $\frac{3}{8}$  in. in any length of pipe through 84-in. internal diameter, and a maximum of  $\frac{3}{4}$  in. for 90-in. internal diameter or larger, except where beveled end pipe for laying on curves is specified by the purchaser.

**12.4 Length of Pipe**—The underrun in length of a section of pipe shall not be more than  $\frac{1}{8}$  in./ft. with a maximum of  $\frac{1}{2}$  in. in any length of pipe. Regardless of the underrun or overrun in any section of the pipe, the end cover requirements of Sections 8 and 12 shall apply.

#### 12.5 Position or Area of Reinforcement:

**12.5.1 Position**—The maximum variation in the position of the reinforcement shall be  $\pm 10$  % of the wall thickness or  $\pm \frac{1}{2}$  in., whichever is greater. Pipe having variations in the position of the reinforcement exceeding those specified above shall be accepted if the three-edge-bearing strength requirements obtained on a representative specimen are met. In no case, however, shall the cover over the circumferential reinforcement be less than  $\frac{1}{4}$  in. as measured to the end of the spigot or  $\frac{1}{2}$  in. as measured to any other surface. The preceding minimum cover limitations do not apply to mating surfaces of nonrubber gasket joints or gasket grooves in rubber gasket joints. If convoluted reinforcement is used, the convoluted circumferential end wire may be at the end surface of the joint providing the alternate convolutions have at least 1 in. cover from the end surface of the joint.

**12.5.2 Area of Reinforcement**—Reinforcement will be considered as meeting the design requirements if the area, computed on the basis of nominal area of the wire or bars used, equals or exceeds the requirements of 7.1 or 7.2. Actual area of the reinforcing used may vary from the nominal area according to permissible variations of the standard specifications for the reinforcing. When inner cage and outer cage reinforcing is used, the inner cage design area may vary to the lower limit of 85 % of the elliptical design area and the outer cage design area may vary to the lower limit of 51 % of the elliptical design area provided that the total design area of





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the inner cage plus the outer cage shall not vary beyond the lower limit of 140 % of the elliptical design area.

### 13. Repairs

13.1 Pipe may be repaired, if necessary, because of imperfections in manufacture or damage during handling and will be acceptable if, in the opinion of the purchaser, the repaired pipe conforms to the requirements of this specification.

### 14. Inspection

14.1 The quality of materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by an inspector employed by the purchaser.

### 15. Rejection

15.1 Pipe shall be subject to rejection on account of failure to conform to any of the specification requirements. Individual sections of pipe may be rejected because of any of the following:

15.1.1 Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

15.1.2 Defects that indicate proportioning, mixing, and molding not in compliance with 10.1 or surface defects

indicating honey-combed or open texture that would adversely affect the function of the pipe.

15.1.3 The ends of the pipe are not normal to the walls and center line of the pipe, within the limits of variations given in 12.3 and 12.4.

15.1.4 Damaged or cracked ends where such damage would prevent making a satisfactory joint.

15.1.5 Any continuous crack having a surface width of 0.01 in. or more and extending for a length of 12 in. or more, regardless of position in the wall of the pipe.

### 16. Marking

16.1 The following information shall be legibly marked on each section of pipe:

16.1.1 The pipe class and specification designation,

16.1.2 The date of manufacture,

16.1.3 The name or trademark of the manufacturer, and

16.1.4 Identification of plant.

16.2 One end of each section of pipe with elliptical or quadrant reinforcement shall be clearly marked during the process of manufacturing or immediately thereafter, on the inside and the outside of opposite walls along the minor axis of the elliptical reinforcing or along the vertical axis for quadrant reinforcing.

16.3 Markings shall be indented on the pipe section or painted thereon with waterproof paint.

*The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, PA 19103.*

TRAILS WEST SUBDIVISION COST ESTIMATE - Filing 1  
**STREET IMPROVEMENTS**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Remove Clear & Grub	LOAD	18	\$100.00	\$1,800.00
2	Excavation/Embankment	CY	10000	\$2.00	\$20,000.00
3	Subgrade Prep	CY	2900	\$0.60	\$1,740.00
4	Class 6 Base (under C, G & Walk only)	TN	780	\$9.50	\$7,410.00
5	4" Grade C HBP	TN	1230	\$28.00	\$34,440.00
6	Adjust MH's and Valves	EA	16	\$75.00	\$1,200.00
7	6.5' C & G S/W	LF	3237	\$13.80	\$44,670.60
8	8" Conc Pans & Fillets	SF	740	\$3.70	\$2,738.00
9	Handicap Ramps	EA	4	\$1,050.00	\$4,200.00
10	6' Concrete Drain Pan	SF	344	\$4.40	\$1,513.60
11	Road Barricades	EA	2	\$30.00	\$60.00
12	Street Signs	EA	14	\$90.00	\$1,260.00
13	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
TOTAL STREET IMPROVEMENTS					\$123,032.20

TRAILS WEST SUBDIVISION  
SANITARY SEWER IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	8" Sanitary Sewer Main	LF	2295	\$12.00	\$27,540.00
2	4" Sanitary Sewer Service	LF	1292	\$9.00	\$11,628.00
3	Standard Manhole	EA	14	\$900.00	\$12,600.00
4	Service Connections	EA	28	\$50.00	\$1,400.00
5	Join Existing	EA	1	\$200.00	\$200.00
6	Asphalt Patch - S. Camp Road	TN	10	\$28.00	\$280.00
7	Compliance Testing	LS	1	\$1,200.00	\$1,200.00
TOTAL SANITARY SEWER IMPROVEMENTS					\$54,848.00

TRAILS WEST SUBDIVISION  
DOMESTIC WATER IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	8" C 900 PVC Water Main	LF	1710	\$15.00	\$25,650.00
2	8" Gate Valve w/Box	EA	5	\$500.00	\$2,500.00
3	Fire Hydrant Assembly	EA	5	\$1,600.00	\$8,000.00
4	3/4" Service Connections	EA	28	\$475.00	\$13,300.00
5	Join Existing	EA	2	\$250.00	\$500.00
6	Asphalt Patch - S. Camp Rd.	TN	4	\$28.00	\$112.00
7	Compliance Testing	LS	1	\$800.00	\$500.00
TOTAL DOMESTIC WATER IMPROVEMENTS					\$800.00
					\$51,362.00

TRAILS WEST SUBDIVISION  
DRY UTILITY IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Trenching, Backfill, & Testing	LF	2000	\$3.80	\$7,600.00
2	4" PVC Conduits	LF	2000	\$1.50	\$3,000.00
3	Compliance Testing	LS	1	\$200.00	\$200.00

TOTAL DRY UTILTIY IMPROVEMENTS

**\$10,800.00**

TRAILS WEST SUBDIVISION  
EROSION CONTROL IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Silt Fence	LF	900	\$2.00	\$1,800.00

TOTAL EROSION CONTROL IMPROVEMENTS

\$1,800.00

TRAILS WEST SUBDIVISION  
IRRIGATION SYSTEM IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	4" PVC Irrigation Main	LF	910	\$4.10	\$3,731.00
2	Service Connection	EA	28	\$150.00	\$4,200.00
3	4" Gate Valve w/ Box	EA	5	\$350.00	\$1,750.00
4	Trench Compaction	LF	200	\$2.50	\$500.00
5	3" PVC Irrigation Main	EA	2480	\$3.10	\$7,688.00
6	3" Gate Valve	EA	5	\$250.00	\$1,250.00
7	Drainage Connections	EA	1	\$750.00	\$750.00
8	Join Exisiting	EA	0	\$500.00	\$0.00
9	Testing	EA	1	\$500.00	\$500.00

TOTAL IRRIGATION WATER IMPROVEMENTS

\$20,369.00

TRAILS WEST SUBDIVISION  
**STORM SEWER IMPROVEMENTS**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	9' x 2' Box Culvert	LF	55	\$200.00	\$11,000.00
2	18" RCP Storm Sewer	LF	760	\$19.50	\$14,820.00
3	18" Class IV RCP Storm Sewer	LF	200	\$22.00	\$4,400.00
4	Outlet Structure	EA	1	\$2,500.00	\$2,500.00
5	18" Arched RCP Storm Sewer	LF	120	\$25.00	\$3,000.00
5	Standard Street Inlet	EA	6	\$900.00	\$5,400.00
6	12" RCP	LF	160	\$16.00	\$2,560.00
7	Release Weir & Stilling Basin	LS	1	\$14,000.00	\$14,000.00
8	Storm Sewer Manholes	EA	3	\$820.00	\$2,460.00
9	Trench Compaction	LS	520	\$2.00	\$1,040.00
10	Compliance Testing	LS	1	\$500.00	\$500.00
TOTAL STORM SEWER IMPROVEMENTS					\$61,680.00



TRAILS WEST SUBDIVISION  
UTILITY DEPOSITS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Gas and Electric Deposits	EA	28	\$1,500.00	\$42,000.00
2	Telephone Deposits	EA	28	\$500.00	\$14,000.00
3	Street Lights	EA	5	\$1,250.00	\$6,250.00
TOTAL UTILITY DEPOSITS					\$62,250.00

TRAILS WEST SUBDIVISION  
**SOUTH CAMP ROAD IMPROVEMENTS - Filing 1**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Embankment	CY	240	\$3.00	\$720.00
2	Class 6 Base	TN	240	\$9.50	\$2,280.00
3	4" Grade C HBP	TN	157	\$28.00	\$4,396.00
4	11.5' C,G & S/W	LF	470	\$16.50	\$7,755.00
5	Steel Handrail	LF	320	\$35.00	\$11,200.00
6	Handicap Ramps	EA	2	\$1,050.00	\$2,100.00
7	Road Striping	LF	2475	\$0.50	\$1,237.50
8	4' x 6' Box Culvert Extension	LF	25	\$320.00	\$8,000.00
9	Traffic Control	EA	1	\$2,000.00	\$2,000.00
10	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
<b>TOTAL</b>					<b>\$41,688.50</b>

TRAILS WEST SUBDIVISON COST ESTIMATE - Filing #1

TOTAL STREET IMPROVEMENTS	\$123,032.20
TOTAL SANITARY SEWER IMPROVEMENTS	\$54,848.00
TOTAL DOMESTIC WATER IMPROVEMENTS	\$51,362.00
TOTAL DRY UTILTIY IMPROVEMENTS	\$10,800.00
TOTAL EROSION CONTROL IMPROVEMENTS	\$1,800.00
TOTAL IRRIGATION WATER IMPROVEMENTS	\$20,369.00
TOTAL STORM SEWER IMPROVEMENTS	\$61,680.00
TOTAL UTILITY DEPOSITS	\$62,250.00
TOTAL CONSTRUCTION COSTS	\$269,043.20
SOUTH CAMP ROAD IMPROVEMENTS	\$41,688.50
CONTINGENCIES	\$26,904.32
TOTAL	<b>\$337,636.02</b>
CITY INSPECTION FEES	\$1,000.00
CONSTRUCTION MANAGEMENT	\$4,350.00
STAKING	\$9,350.00
TOTAL PROJECT	<b>\$352,336.02</b>
COST PER UNIT (28 UNITS)	<b>\$12,583.43</b>

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Developer \_\_\_\_\_ Date \_\_\_\_\_

I have reviewed the estimated costs and time schedule shown above and, based on the plan layouts submitted to date and the current costs of construction, I take no exception to the above.

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City Engineer \_\_\_\_\_ Date \_\_\_\_\_

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Community Development \_\_\_\_\_ Date \_\_\_\_\_

TRAILS WEST SUBDIVISION COST ESTIMATE - Filing 2  
**STREET IMPROVEMENTS**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Remove Clear & Grub	LOAD	7	\$100.00	\$700.00
2	Subgrade Prep	CY	1950	\$0.60	\$1,170.00
3	Class 6 Base (under C, G & Walk only)	TN	570	\$9.50	\$5,415.00
4	4" Grade C HBP	TN	850	\$28.00	\$23,800.00
5	Adjust MH's and Valves	EA	7	\$75.00	\$525.00
6	6.5' C & G S/W	LF	2292	\$13.80	\$31,629.60
7	8" Conc Pans & Fillets	SF	225	\$3.70	\$832.50
8	Handicap Ramps	EA	3	\$1,050.00	\$3,150.00
9	6' Concrete Drain Pan	SF	168	\$4.40	\$739.20
10	Road Barricades	EA	1	\$30.00	\$30.00
11	Street Signs	EA	5	\$90.00	\$450.00
12	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
TOTAL STREET IMPROVEMENTS					<b>\$70,441.30</b>

TRAILS WEST SUBDIVISION  
SANITARY SEWER IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	8" Sanitary Sewer Main	LF	581	\$12.00	\$6,972.00
2	4" Sanitary Sewer Service	LF	662	\$9.00	\$5,958.00
3	Standard Manhole	EA	4	\$900.00	\$3,600.00
4	Service Connections	EA	14	\$50.00	\$700.00
5	Compliance Testing	LS	1	\$1,200.00	\$1,200.00
TOTAL SANITARY SEWER IMPROVEMENTS					\$18,430.00

TRAILS WEST SUBDIVISION  
**DOMESTIC WATER IMPROVEMENTS**

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	8" C 900 PVC Water Main	LF	1145	\$15.00	\$17,175.00
2	8" Gate Valve w/Box	EA	4	\$500.00	\$2,000.00
3	Fire Hydrant Assembly	EA	3	\$1,600.00	\$4,800.00
4	3/4" Service Connections	EA	14	\$475.00	\$6,650.00
5	Join Existing	EA	2	\$250.00	\$500.00
6	Asphalt Patch - S. Camp Rd.	TN	4	\$28.00	\$112.00
7	Compliance Testing	LS	1	\$800.00	\$500.00
TOTAL DOMESTIC WATER IMPROVEMENTS					\$800.00

<b>\$32,537.00</b>
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TRAILS WEST SUBDIVISION  
DRY UTILITY IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Trenching, Backfill, & Testing	LF	150	\$3.80	\$570.00
2	4" PVC Conduits	LF	150	\$1.50	\$225.00
3	Compliance Testing	LS	1	\$200.00	\$200.00

TOTAL DRY UTILITY IMPROVEMENTS

\$995.00

TRAILS WEST SUBDIVISION  
IRRIGATION SYSTEM IMPROVEMENTS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Service Connection	EA	14	\$150.00	\$2,100.00
2	4" Gate Valve w/ Box	EA	1	\$350.00	\$350.00
3	Trench Compaction	LF	50	\$2.50	\$125.00
4	3" PVC Irrigation Main	EA	1275	\$3.10	\$3,952.50
5	3" Gate Valve	EA	1	\$250.00	\$250.00
6	Drainage Connections	EA	1	\$750.00	\$750.00
7	Join Existing	EA	1	\$500.00	\$0.00
8	Testing	EA	1	\$500.00	\$500.00

TOTAL IRRIGATION WATER IMPROVEMENTS

\$8,027.50



TRAILS WEST SUBDIVISION  
UTILITY DEPOSITS

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Gas and Electric Deposits	EA	14	\$1,500.00	\$21,000.00
2	Telephone Deposits	EA	14	\$500.00	\$7,000.00
3	Street Lights	EA	3	\$1,250.00	\$3,750.00
TOTAL UTILITY DEPOSITS					\$31,750.00

TRAILS WEST SUBDIVISION  
SOUTH CAMP ROAD IMPROVEMENTS-Filing 2

ITEM	DESCRIPTION	UNIT	QUAN	UNIT PRICE	CONTRACT TOTAL
1	Embankment	CY	195	\$3.00	\$585.00
2	Class 6 Base	TN	195	\$9.50	\$1,852.50
3	4" Grade C HBP	TN	129	\$28.00	\$3,612.00
4	11.5' C, G & S/W	LF	430	\$16.50	\$7,095.00
5	Handicap Ramps	EA	2	\$1,050.00	\$2,100.00
6	Road Striping	LF	2275	\$0.50	\$1,137.50
7	Traffic Control	EA	1	\$2,000.00	\$2,000.00
8	Compliance Testing	LS	1	\$2,000.00	\$2,000.00
<b>TOTAL</b>					<b>\$20,382.00</b>

TRAILS WEST SUBDIVISON COST ESTIMATE - Filing 2

TOTAL STREET IMPROVEMENTS	\$70,441.30
TOTAL SANITARY SEWER IMPROVEMENTS	\$18,430.00
TOTAL DOMESTIC WATER IMPROVEMENTS	\$32,537.00
TOTAL DRY UTILTIY IMPROVEMENTS	\$995.00
TOTAL IRRIGATION WATER IMPROVEMENTS	\$8,027.50
TOTAL UTILITY DEPOSITS	\$31,750.00
TOTAL CONSTRUCTION COSTS	\$162,180.80
CONTINGENCIES	\$16,218.08
SOUTH CAMP ROAD IMPROVEMENTS	\$20,382.00
TOTAL	<b>\$178,398.88</b>
CITY INSPECTION FEES	\$500.00
CONSTRUCTION MANAGEMENT	\$2,150.00
STAKING	\$4,650.00
TOTAL PROJECT	<b>\$185,698.88</b>
COST PER UNIT (14 UNITS)	<b>\$6,632.10</b>

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Developer \_\_\_\_\_ Date \_\_\_\_\_

I have reviewed the estimated costs and time schedule shown above and, based on the plan layouts submitted to date and the current costs of construction, I take no exception to the above.

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City Engineer \_\_\_\_\_ Date \_\_\_\_\_

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Community Development \_\_\_\_\_ Date \_\_\_\_\_

## STAFF REVIEW

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FILE: FPP-96-110  
DATE: May 29, 1996  
STAFF: Kathy Portner  
REQUEST: Trails West Village, Filings 1 and 2, Final Plat  
LOCATION: E of S. Camp Road, S of S. Broadway  
APPLICANT: Camelot Investments, LLC--Brian Stowell

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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)

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### RELATIONSHIP TO COMPREHENSIVE PLAN:

No Comprehensive Plan exists for this area. The draft Growth Plan designates this area for Residential Medium-Low Density, 2 - 3.9 units per acre.

### STAFF ANALYSIS:

Trails West Village received Preliminary approval for the lots proposed below the active Redlands Water and Power Canal by the City Council at their February 21, 1996 hearing. The

remainder of the lots that were proposed did not receive preliminary approval. The conditions of approval were as follows:

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 easements (s), Petitioner may retain ownership, may convey such to the City if the City consents, or may provide for the homeowners 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 land 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.

The following restrictions were placed on the remainder of the proposed lots:

1. 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.

2. 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, <sup>City</sup> 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.

This proposal is for final approval of Filings I and II of Trails West Village, consisting of 42 single family lots, 28 in Filing I and 14 in Filing II. This is an increase of 3 lots from the preliminary approval. The additional lots were achieved by the modification of lots lines and to create lots more uniformly sized. The overall design and circulation of the filings remains the same. Petitioner has addressed the preliminary conditions of approval as follows (responses are numbered consistent with the numbering of the conditions above):

1. Petitioner indicates no lots would be subject to flows from a line break in the 24" Ute Water line. Flows will be intercepted by the canal, streets and storm drainage systems.
2. Petitioner is proposing to dedicate a public use easement along both the abandoned canal and the active canal. The proposed widths are 20' along the abandoned Redlands 3rd Lift Canal and 40' along the active 2nd Lift Canal. Title will be conveyed to the City of Grand Junction, if the City consents.
3. Street stubs will be constructed.
4. Petitioner indicates that all lots are buildable under the RSF-4 setbacks and the proposed 1600 s.f. minimum dwelling unit size.
5. Center turn lane will be constructed with the first two filings. Petitioner is proposing that the required 10' wide concrete bicycle/pedestrian path be attached instead of detached as originally required. The reason stated is because of the size of the required drainage easement carrying basin wide flows which pass under South Camp Road. To stay in character with the pathway system along other sections of South Camp Road, staff recommends that the path be detached along the frontage. Short sections of attached path would be acceptable where there are specific problem areas.
6. Intersections have been designed to meet City standards.
7. The plans reflect all drainage improvements.
8. The plans and CCR's reflect the dedication of common tracts and provide for the maintenance and annexation of future filings.

9. The two outlots have been appropriately identified.

Petitioner is also requesting approval of a site-specific development plan for these filings as a step toward Vested Property Rights pursuant to section 2-3 of the Zoning and Development Code.

The applicant has requested a waiver of the Parks and Open Space fees for these filings in the amount of \$9,450 in exchange for the dedication of 1.86 acres of linear open space for trails. .75 acres of this total consists of a 20' wide, 2,000' long trail along the abandoned Redlands Canal. The remainder is the land underlying the active Redlands Canal and service road, which will be dedicated for public use. Section 5-4-6.E of the Zoning and Development Code states:

the City Council may accept the dedication of public land(s), park(s), and/or open space(s) in lieu of payment. The fair market value of dedicated land(s) shall not be less than the payment that would be required under B above.

The applicant has submitted a list of comparable sales in the area to justify his estimated value of \$55,753 per acre. City Parks and Recreation is reviewing the request and will have a recommendation for the hearing.

City Fire Department has commented that the utility composite must be revised with the following changes:

1. Move the hydrant proposed at lot 1, block two of filing one to the southwest corner of lot 1, block one of filing one.
2. Move the hydrant proposed at the north frontage of lot 9, block one of filing two to the northwest corner of lot 10, block one of filing two.

The petitioner has requested a credit to the Transportation Capacity Payment (TCP) for the cost of improvements to South Camp Road. The Public Works Director will make the decision on the credit.

**STAFF RECOMMENDATION:**

Staff recommends approval of the final plat for filings 1 and 2 of Trails West Village and the Site Specific Development Plan with the following conditions:

1. The 10' wide path along South Camp Road shall be detached.
2. Hydrants must be relocated as indicated by the Fire Department.
3. The following comment must be added to the sewer sheets:  
"Montero Street sewer stub out shall be capped and plugged at development property line. Stub out shall be identified with a steel fence post buried 1' below finished grade. As-Built surveying of stub out required prior to backfill."

4. The following comments of the Development Engineer must be addressed:
- Size, type and location of storm drain inlets must be shown on the plans.
  - Street name signs must be shown on the plans.
  - Details for box culvert extension must be provided.
  - Signage and striping plan must be revised as per the City Engineer comments.

The City Parks Department will have a recommendation on the request to accept land in lieu of Open Space Fees at the hearing.

RECOMMENDED PLANNING COMMISSION MOTION:

Mr. Chairman, on item FPP-96-110, I move we approve the final plat for filings 1 and 2 and the Site Specific Development Plan subject to the staff recommendation.

Mr. Chairman, I move we recommend approval of the request to accept land in lieu of Parks and Open Space fees.

- Redlands WSP objects to the trail on the active canal but not the abandoned canal.

6/4/96 PC - Approval with staff recommendation, modifying that the path be detached where possible. & Water break calculations to satisfaction of City Engineer  
7-0

- Recommended credit for inactive canal trail  
7-0



Thomas and Sun, Inc.  
John M. Thomas  
321 Quail Drive  
Grand Junction, CO.  
81503

June 1, 1996

Dear Jody,

I was reviewing the file on Trails West Village and as part of that I read the drainage study prepared by Lincoln Devore. If I understood it correctly the author of the report based his conclusions on the assumption that the upper basin would produce flows on the order of 200+/- cfs during the 100 year event. That upper basin flow assumption is in conflict with the HEC-1 analysis of the same basin for a drainage study for Canyon View in January of 1994 by Williams Engineering. That study concluded that the peak flow in the South Camp drainage way is estimated to be 419 cfs, a significant difference.

I did not know if you were aware of this study. I also understand that for various reasons it may not be applicable or relevant. I have included a copy of the page which refers to the estimated peak flow. It is in the last sentence of paragraph A. If it is relevant and you need a copy of the study, I will make that available to you. This comment is just for your information only, not to be entered into the record as a comment on the petitioner's plan.

Sincerely,



## II. DRAINAGE IMPACT UPSTREAM

### A. No-Change Condition

Proposed subdivision facilities will not redirect, block, or change inflow conditions from upstream areas. Therefore, it is unlikely that there will be a changed condition upstream due to development. However, it would be well to look at current drainage restrictions and resultant drainage patterns in the vicinity upstream of the site. The 100-year peak flow was estimated in the October 1993 report at 419 cfs.

### B. Existing Upstream Facilities and Drainage Patterns

Drainage restrictions and facilities alongside Wingate Elementary School were investigated to identify drainage patterns. Findings are presented below, starting with the uppermost culvert, and heading towards the proposed subdivision. Information described is depicted on Exhibit "A" at the end of this report.

1. Wingate School Upper Culvert The upper culvert is a corrugated metal pipe arch (CMPA), 72" wide by 44" high with flared end sections on both ends. Cover is approximately 3 feet; however, the west channel embankment only rises to approximately 2 feet above the top of the culvert. These conditions result in a clean culvert capacity of approximately 160 cfs before channel overflow to the west, and 185 cfs prior to overflow over the school entrance. Based upon field observations, blockage potential due to tumbleweeds appeared high, and it would be reasonable to assume only 50% capacity. This would result in a culvert capacity before overflow to South Camp Road of approximately  $185/2 = 92.5$  cfs. By field observation, the balance of approximately 327 cfs would not all flow west, but would in part overflow onto South Camp Road. Overflows are depicted in Exhibit "A", which indicates that the larger proportion of overflow goes onto the school grounds, while some would return to the channel, and some would go to the east side of South Camp Road. A more detailed analysis at this point is not merited, as is later made apparent.
2. Wingate School Middle Culvert The middle culvert is also a 72" by 44" CMPA, although without flared end sections. Cover is approximately 3½ feet. These conditions indicate a clean culvert capacity of approximately 170 cfs. The culvert is somewhat silted in, and there is also vegetative blockage potential, though less than for the upper culvert. A capacity reduction of 25% is reasonable, or approximately 127 cfs prior to overflow. This is likely adequate to convey any runoff remaining in the channel after the upper culvert, but, if not, overflow would return to the channel and also flow to the east side of South Camp Road. Again, a more detailed analysis is unnecessary. (Reference is made to Exhibit "A".)

3. Wingate School Lower Culvert The lower culvert is a 5' diameter corrugated metal pipe (CMP) without flared end sections. The west embankment at the inlet is only approximately 1 foot above the top of the culvert, and the entrance road perhaps 2 feet above the top of the culvert. Clean culvert capacity is approximately 175 cfs, which is similar to that of the middle culvert. However, additional side inflow between the two culverts must again overflow, which will be to the west. However, the significant feature is that nearly all flow from upstream will return to the South Camp Road channel at the upper end of the proposed subdivision, both under current and proposed conditions, regardless of the undercapacity of upstream culverts and channels.

C. Proposed Upstream Drainage Impact

Given the information presented above, it is reasonable to conclude that not only would the upstream areas not be adversely impacted by the proposed development, but that the drainage channel alongside the site should be designed for the full 100 year runoff of approximately 419 cfs.

III. DRAINAGE IMPACT DOWNSTREAM

If the channel discharge of approximately 419 cfs remains unchanged, then adverse impacts to the downstream areas, if any, must be limited to changes in runoff from on-site.

A. Downstream Receiving Channels

1. South Camp Road Channel Under both existing and proposed conditions, the larger portion of area involved with Phase I, II, and pertaining upstream area drains to the South Camp Road channel. This point of discharge is shown as point "B" on Exhibits "A" and "B". If, under proposed conditions, runoff is not increased at this discharge point in the 10- and 100-year storm event, then adverse impacts are mitigated.
2. Irrigation Tailwater Ditch Much of the proposed site was formerly irrigated. Tailwater ditches on the west portion of the site conveyed runoff to a culvert under the driveway of the downstream property, which discharges into an irrigation tailwater ditch. This point of discharge is shown as point "A" on Exhibits "A" and "B". Contributing area which provides runoff to this culvert and ditch would be significantly reduced by the proposed development. Again, if under proposed conditions runoff is not increased at point "A" in the 10- and 100-year storm event, then adverse impacts are mitigated.

B. Total Versus Split Site Runoff

In the Thompson-Langford Corp. report, Basin "A" consisted of the areas involved with Phase I, II, and pertaining upstream areas. Existing condition Basin "A" runoff was estimated to be 10 and 15 cfs, respectively, in the 10-

## STAFF REVIEW

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FILE: #FPP-96-110  
DATE: June 6, 1996  
STAFF: Kathy Portner  
REQUEST: Land dedication in lieu of Parks and Open Space fees  
LOCATION: Trails West Village--South Camp Road  
APPLICANT: Camelot Investments

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### EXECUTIVE SUMMARY:

The developer of Trails West Village is requesting the City accept lands for trails in lieu of payment of Parks and Open Space fees.

### STAFF ANALYSIS:

Trails West Village Subdivision, located East of South Camp Road and South of South Broadway on the Redlands, received Preliminary approval by City Council on February 21, 1996 and Final approval for Filings 1 and 2 by Planning Commission on June 4, 1996. Conditions of approval included a requirement for dedication of trail easements along both the active Redlands Canal and the abandoned canal located on the property. The applicant is proposing to deed the tracts of land containing the active and inactive canal to the City for trail purposes, retaining an easement along the active canal for Redlands Water and Power. The applicant is requesting that the City accept the lands in lieu of the required Parks and Open Space fees for Filings 1 and 2, totaling \$9,450.

Section 5-4-6.E of the Zoning and Development Code states:

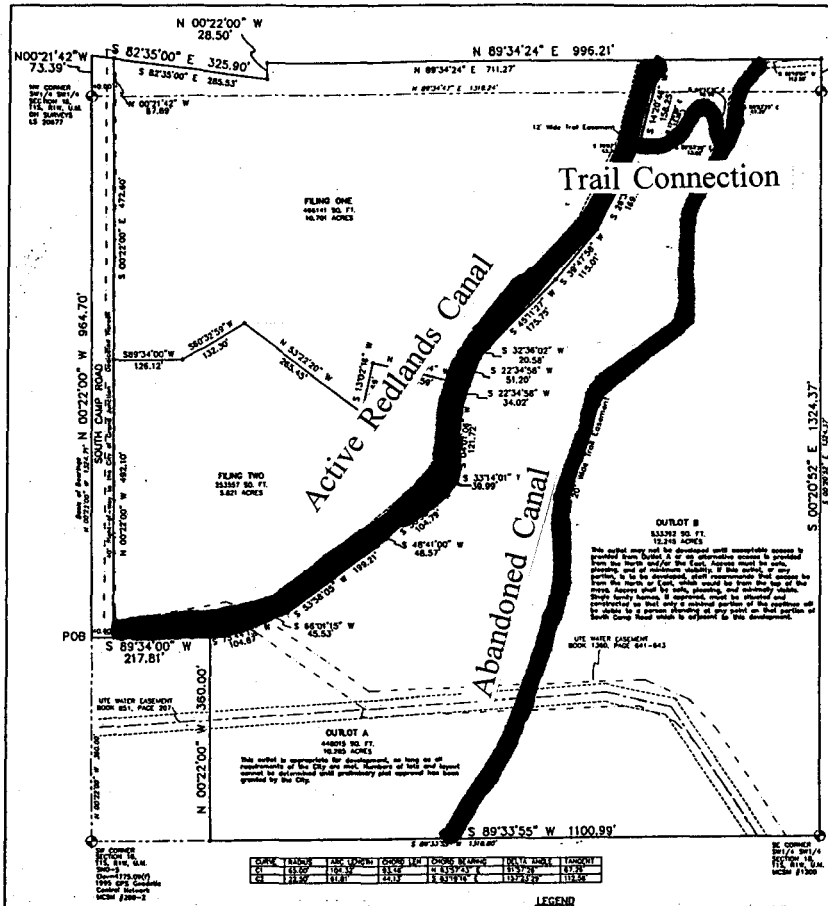
The City Council may accept the dedication of public lands, parks and/or open space in-lieu of payment. The fair market value of dedicated land shall not be less than the payment that would be required under B above (\$225 per unit).

The developer is proposing to dedicate approximately 1.86 acres for public trails, .75 acres of which consists of a 20' wide, nearly 2,000' long trails along the abandoned canal, and the remainder being the land underlying the Redlands canal and service road. The applicant has submitted their estimate of value for the property, which is significantly higher than the City's Property Agent's estimate (see attached). City Parks recommended to Planning Commission that the City accept the lands dedicated along the abandoned canal and the connecting easement only as a credit to the Parks and Open Space fees. Based on the City Property Agent's estimate of value, the credit would be a total of \$6,150.

STAFF AND PLANNING COMMISSION RECOMMENDATION:

Staff and Planning Commission recommend the City Council accept the land dedicated along the abandoned canal as a credit to the Parks and Open Space fees.

# TRAILS WEST VILLAGE



**DEDICATION**

KNOW ALL MEN BY THESE PRESENTS: That Corneal Investments, L.L.C., a Colorado Limited Liability Company, is the owner of that real property located in part of the Southwest Quarter of Section 18, Township 1 South, Range 1 West of the 11th Meridian, Mesa County, Colorado, (being more particularly described as follows: (Original Township Ditch Book 2170, Pages 878 through 876), COMMENCING at the Southwest Corner of Section 18, Township 1 South, Range 1 West of the 11th Meridian, from whence the Northwest Corner of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) bears North 00 degrees 22 minutes 00 seconds the distance of 113.07 feet to a Bench of Bearings, with all bearings established herein relative thereto; thence North 00 degrees 22 minutes 00 seconds West, a distance of 360.00 feet to the POINT OF BEGINNING; thence North 00 degrees 22 minutes 00 seconds West, a distance of 954.70 feet; thence North 00 degrees 21 minutes 42 seconds West, a distance of 73.39 feet; thence South 83 degrees 35 minutes 00 seconds East, a distance of 325.90 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 28.50 feet; thence North 89 degrees 34 minutes 00 seconds East, a distance of 217.81 feet; thence South 00 degrees 20 minutes 01 seconds East, a distance of 87.37 feet; thence South 00 degrees 20 minutes 02 seconds East, a distance of 1324.37 feet; thence South 89 degrees 34 minutes 00 seconds West, a distance of 360.00 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 217.81 feet to the POINT OF BEGINNING.

Said parcel containing 40,002 Acres, as described.

That said owners have caused the real property to be laid out and platted as Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, that said owners hereby dedicate and set apart real property as shown and located at the accompanying plat of Trails West Village as follows:

- All Streets and Rights-of-way to the City of Grand Junction for the use of the public forever.
  - All Private Open Space to the Trails West Village Homeowners Association, a Colorado non-profit corporation, for the purpose of the Association, including but not limited to landscaping and signs.
  - All Build-Purpose Easements to the City of Grand Junction for the use of the public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water, telephone lines, and also for the installation and maintenance of traffic control facilities, street lighting, street trees and grade structures.
  - All Utility Easements to the City of Grand Junction for the use of public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, and telephone lines.
  - All Irrigation Easements as set forth on this plat to the Trails West Village Homeowners Association, as perpetual easements for the installation, operation, maintenance and repair of private irrigation systems.
  - All Pedestrian Easements and rights-of-way to the City of Grand Junction as perpetual easements for ingress and egress use by the general public pedestrian.
  - All Drainage Easements hereby platted to the Trails West Village Homeowners Association Inc., as perpetual easements for the conveyance of runoff water which originates within the area hereby platted or from upstream areas, through natural or man-made facilities above or below ground.
- All easements include the right of ingress and egress on, along, over, under, and through and across by the beneficiaries, their successors, or assigns, together with the right to trim or remove interfering trees and brush, provided, however, that the beneficiaries of said easements shall utilize the same in a reasonable and prudent manner. Furthermore, the owners of lots or tracts hereby platted shall not burden nor obstruct said easements by erecting or placing any improvements thereon which may prevent reasonable ingress and egress to and from the easement.

Said owner hereby declares there are no Encumbrances to herein described real property.

IN WITNESS WHEREOF, said owners, Corneal Investments, L.L.C., a Colorado Limited Liability Company, has caused the same to be hereunto subscribed this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1998.

By: \_\_\_\_\_ Title: Managing Member  
 For: Corneal Investments, L.L.C.  
 a Colorado Limited Liability Company  
**NOTARY PUBLIC CERTIFICATION**  
 STATE OF COLORADO )  
 COUNTY OF MESA )  
 I, the foregoing instrument was acknowledged before me by Brian L. Stewart, Managing Member, Corneal Investments, L.L.C., a Colorado Limited Liability Company, this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1998.  
 Witness my hand and official seal.

My Commission Expires \_\_\_\_\_

**CLERK AND RECORDER'S CERTIFICATE**  
 STATE OF COLORADO )  
 COUNTY OF MESA )  
 I hereby certify that this instrument was filed in my office at \_\_\_\_\_ o'clock \_\_\_\_\_ M., \_\_\_\_\_ A.D. 1998, and was duly recorded in Plat Book No. \_\_\_\_\_ Page \_\_\_\_\_ Reception No. \_\_\_\_\_ Drawer No. \_\_\_\_\_

Clerk and Recorder

**CITY OF GRAND JUNCTION APPROVAL**  
 This plat of Trails West Village, a subdivision of a part of the City of Grand Junction, County of Mesa, State of Colorado, is approved and accepted this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1998.

City Manager \_\_\_\_\_ President of City Council \_\_\_\_\_

**SURVEYOR'S CERTIFICATION**  
 I, Brian L. Stewart, do hereby certify that the accompanying plat of Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, is a true and correct representation of the actual survey and represents the best and true copy of same this plat according to the requirements for subdivision plats specified in the State of Colorado. I am duly licensed to do the appropriate form of the State of Colorado.

Done and written \_\_\_\_\_

**LEGEND**

- MESA COUNTY OR BLM SURVEY MARKER
- SET CENTERLINE MONUMENTS
- SET ALUMINUM CAP ON No. 5 REBAR, PLS 16835, IN CONCRETE
- (R) RECORDED MEASUREMENT
- FOUND PROPERTY CORNER, AS NOTED
- ALUMINUM CAP ON No. 5 REBAR, PLS 16835, TO BE SET AT ALL LOT CORNERS

**BASIC OF BEARINGS**

Bench of bearings against the West line of the SW1/4 SW1/4 of Section 18 to bear N 00°22'00" W, 1324.37 feet, as described in Warranty Deed recorded at Book 2170, Pages 875 and 876, Mesa County Records. Monument on this line are a Mesa County Marker and a Private Survey Marker as shown on the accompanying plat. Easement and utility easements (schedule A&B) provided by \_\_\_\_\_ Land Use Company - this plat.

Note: Existing property corners which were recovered during this survey which were within 0.25 feet ± of the established position were accepted as being in position.

The Declaration of Contents and Restrictions are recorded in Book \_\_\_\_\_ Page \_\_\_\_\_ Mesa County Records.

SCALE: 1" = 100'

100' 50' 0' 100'

Approval of this plan may create a vested property right pursuant to C.R.S. 24-68-101, et seq.

APPROVED AND RECORDED IN MY OFFICE AS NOTARY PUBLIC FOR THE COUNTY OF MESA, COLORADO, ON \_\_\_\_\_ DAY OF \_\_\_\_\_ A.D. 1998.

\_\_\_\_\_  
 Notary Public

**TRAILS WEST VILLAGE**  
 A Part of the SW1/4 SECTION 18, T1S, R1W, UTE MERIDIAN, MESA COUNTY, CO

**LANDesign**  
 DESIGNERS & SURVEYORS & PLANNERS

BRUCE H. JOHNSON, PLS  
 215 GRAND AVENUE  
 GRAND JUNCTION, COLORADO 81501 (970) 244-0889

FILED IN BOOK 1200, PAGE 643 (RECORDED) CHECKED BY \_\_\_\_\_ DATE: APRIL 1998



JUN 06 09 04 1996  
**facsimile**  
TRANSMITTAL

~~FC~~  
Tim  
Dan

6/6 \$

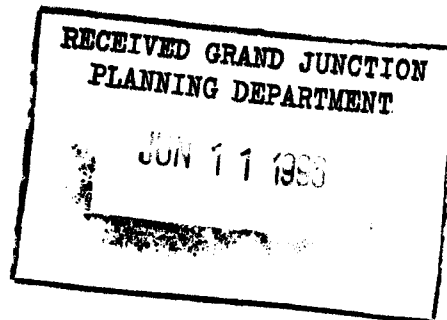
**to:** John Shaver, Esq.  
**fax #:** 1-970-244-1456  
**re:** Trails West Village  
**date:** June 6, 1996  
**pages:** 2, including this cover sheet

John:

As we discussed the other night at the Planning Commission meeting, I am enclosing the deed, recorded at Book 412, Page 394, Mesa County records, appearing in Camelot's chain of title that reserves a 40 foot "right of way" for the second lift canal across Camelot's property. The deed reservation contains no language regarding exclusivity or other privileges accruing to Redlands. I trust you will find this helpful in crafting the City's legal position against Redlands' "policies".

Once again, I feel that the public trail dedication language on the plat should come from the City rather than the developer. It would seem to me that if the language of fee simple conveyance of the tract underlying the canal to the City preceded the public trail dedication we would accomplish the desired result. Let me know if I can be of further assistance.

Brian



From the desk of...

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

970-963-0627  
Fax: 970-963-5570



The Redlands Company by  
Chas Rump, Vice President  
Attest: Pearle Larson, Secretary  
(Corporation Seal)

to  
Andrew J. Wilson and Lourine V  
Wilson not in tenancy in common but  
in joint tenancy, the survivor of  
them, their assigns and the heirs and  
assigns of such survivor forever

WARRANTY DEED \$1.00 and other  
valuable consideration  
Dated January 22, 1944  
Filed February 1, 1944  
At 1:45 o'clock P. M.

#416269  
Book 412  
Page 334

Conveys: A tract of land  
located in Lots 3 and 4 of Sec. 18,  
T.1S., R.1W., U.P.M., being more  
particularly described as follows:  
Beginning at the SW corner of said  
Sec. 18, thence N 0°22' W 1398.1 feet  
thence S 82°35' E 1330 feet to the E  
line of Lot 4, thence S 0°22' W on  
the E line of said Lot 4 1218.5 feet

to the S line of Lot 4, thence W to the point of beginning, containing 37.8  
acres, more or less. Reserving therefrom however, a 40 foot right of way for  
the Second Lift Canal, a 40 foot right of way for the Third Lift Canal, and a  
65 foot right of way for the Third Lift Pump Station and pipe line, all as now  
located, of The Redlands Water & Power Company; also reserving a 20 foot right  
of way for road purposes extending from the county highway along the S side of  
the right of way for the Second Lift Canal to the Third Lift pump station. Also  
reserving 20 feet along the W side of said tract, being 1/2 the width of the  
County Highway. Except taxes assessed in 1943 payable in 1944, which party of  
second part agrees to pay. (IRS \$4.40)

Ack. January 22, 1944 by Chas. Rump as Vice President and Pearle Larson as Sec-  
retary of The Red Lands Company, a corporation, before Robert Gustafson, Notary  
Public, Mesa County, Colorado.

(N. P. Seal)q

Commission expires August 29, 1955.

  
**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970) 963-0627

---

July 16, 1996

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

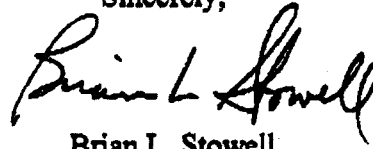
*VIA FAX*

**RE: Trails West Village-Request for Waiver of Parks/Open Space Fees**

Dear Kathy:

I am writing to request postponement of Camelot's appearance before City Council on July 17, 1996 to discuss waiver of the parks and open space fees assessed against the above-referenced project. It would be beneficial to both the City and Camelot if we could have additional time to evaluate the method for determining value and the actual values involved. Accordingly, I would appreciate it if this matter could be placed on the City's August 7, 1996 agenda. Thank you for your cooperation in advance.

Sincerely,



Brian L. Stowell

August 16, 1976

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

Re: Trails West Village

Dear Brian:

We have reviewed your decision as set forth in your letter faxed to us on August 15. We find the terms therein not acceptable.

Your problem with the water and sewer is not our problem. The solution to it must be found among yourself, your engineer, Ute Water and/or the City of Grand Junction. To cause us concern and the sacrifice of our tree(s) is not the solution. We understand that the Honey Locust is a protected tree. The other trees, of course, provide afternoon shade, protect our house from the western exposure, and act as a sound buffer, to say nothing of the devaluation to our property once they are removed.

Please be advised that you do not have permission to come on our property and destroy the southernmost tree. Neither will we accept destruction of this tree by digging too close to its roots.

We are discussing this matter with the City, and are going to ask Trent Prall if it will be necessary to go before the City Council for a review of this matter. Trent will be back on Monday, August 19.

Sincerely,

*Bud Wood*  
*Nancy Wood*  
Bud and Nancy Wood  
424 South Camp Road  
Grand Junction, CO 81503

cc: Trent Prall  
Ute Water  
McCaffrey Construction

**CAMELOT INVESTMENTS LLC**  
0890 CABALLO RD.  
CARBONDALE, COLORADO 81633  
(970)963-0627

August 15, 1996

1. STATE FOREST SERVICE  
6TH ST.

2. CURTIS SWIRT  
MESA CITY EXTENSION OFFICE

30 DON HOBBS/PARKS  
- ROW TREE

Mr. & Mrs. Wood  
424 S. Camp Rd.  
Grand Junction, CO 81503

VIA FAX

242-8781

Re: Trails West Village

Dear Bud and Nancy:

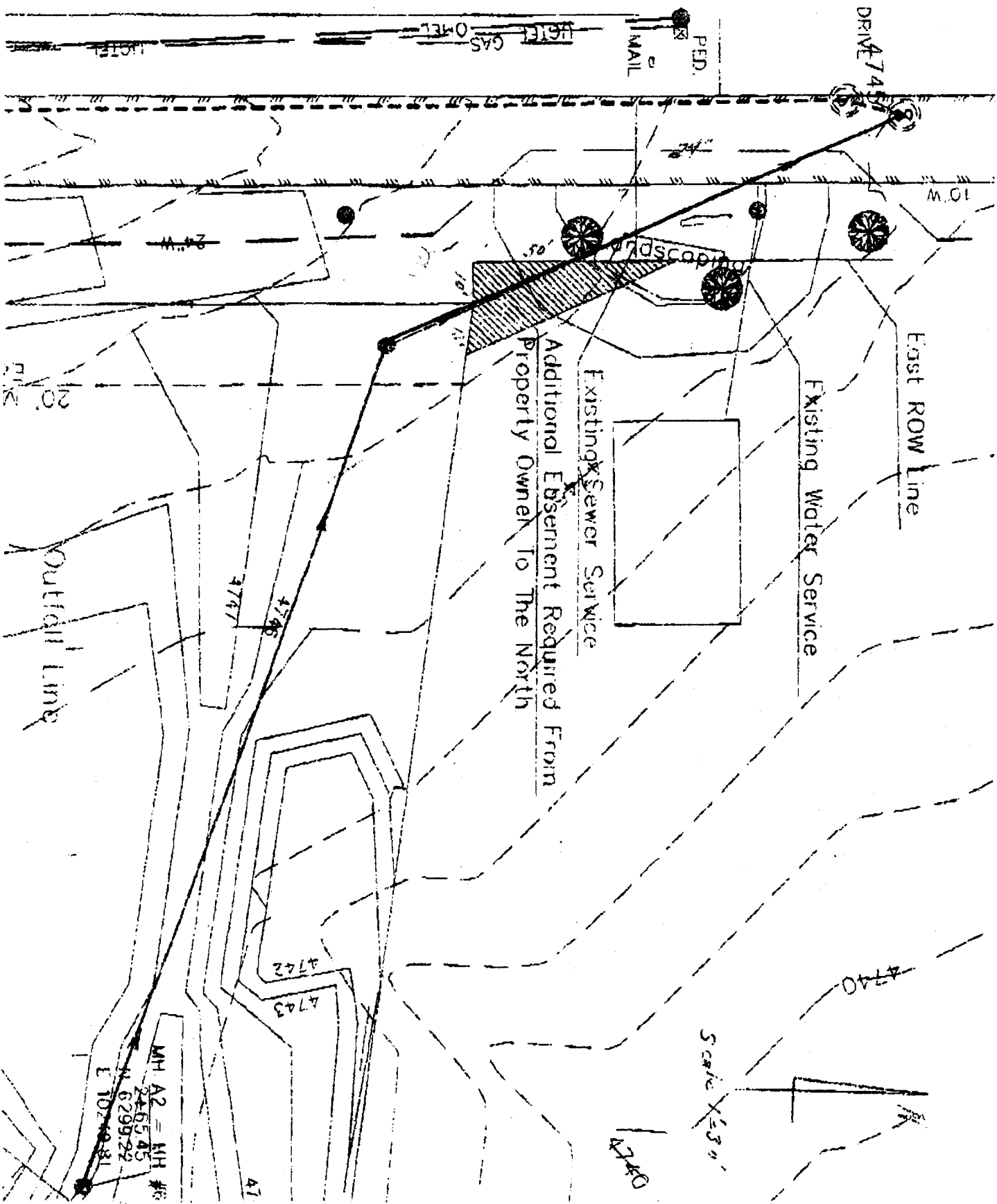
I hired Dutch Afman, a local nursery owner and tree expert, to analyze the prospect for damage to your trees as a result of our sanitary sewer line alignment proposals affecting a portion of your property. According to Mr. Afman, the diagonal alignment through the middle of your rock garden will ultimately damage both the elm in the right-of-way and the Honey Locust. The Honey Locust is healthy and valuable. However, the two southerly Elm trees are unhealthy. Therefore, Camelot's proposal is to route the line as shown on the attached diagram. This will spare the Honey Locust, but destroy the two elms. One of the elms is, as you know, in the right of way. I think you will find, upon obtaining legal counsel, that the tree is not "grandfathered" in. It may be removed without compensation for utility related reasons. The other elm in southwest corner of your property would have to be replaced. I cannot replace it with an identical tree. Camelot can replace it with like trees of 2" caliper up to the value of the tree replaced. In addition, Camelot will install a sound-barrier hedge between the rock garden and the street, up to a cost of \$750.00.

Ute Water continues to advance the position that they cannot accommodate our request to allow connection at the original design location. I ask that you consider this proposal carefully and let me know right away of your position. Camelot is running out of time and options and would like to avoid a situation where we are forced to take action on the basis of expediency rather than a mutually agreeable solution. I look forward to hearing from you at 970-920-1028 or by fax at 970-963-0627.

Sincerely,

Brian L. Stowell

cc: Jeff Crane



*How-Ute Water  
Fire Dept*

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT  
AUG 27 1998

CITY OF GRAND JUNCTION FILE #FPP-96-110 FINAL PLAT - TRAILS WEST VILLAGE FILING #1 & FILING #2, LOCATED E OF SOUTH CAMP ROAD; S OF SOUTH BROADWAY IN THE CITY OF GRAND JUNCTION HAS BEEN REVIEWED AND APPROVED BY THE UTILITY COORDINATING COMMITTEE.

*Phil Butland*  
\_\_\_\_\_  
CHAIRMAN

*6-19-96*  
\_\_\_\_\_  
DATE

*OK got verbal  
from Gary to sign off  
Hank at Ute and  
at Fire Dept*

**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970) 963-0627

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT  
SEP 15 1996

September 12, 1996

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

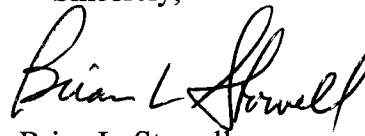
VIA FAX & MAIL

**RE: Trails West Village Filing I/Payment of Open Space Fees**

Dear Kathy:

Enclosed please find check no. 1050 in the amount of \$2,199.96 as payment for the open space fees due the City for Filing I. Thank you for your attention to this matter.

Sincerely,

  
Brian L. Stowell

  
**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970) 963-0627

**RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT**  
  
SEP 13 1996

September 12, 1996

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

VIA FAX & MAIL

**FAXED**  
9/12/96 11:45 AM

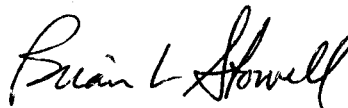
**RE: Trails West Village Filing I  
Request for Credit for Transportation Capacity Payment**

Dear Kathy:

I am writing to request full credit for the transportation capacity payments ("TCP") Camelot owes the City as a part of obtaining subdivision approval for Filing I. This request is based on the fact that Camelot will be making physical improvements to South Camp Road, the cost of which far exceeds the TCP. Off-site improvements for Filing I, mandated by the City, require Camelot to widen approximately 300 feet of South Camp Road north of Mescalero. The costs associated with these improvements are estimated at \$40,000-45,000. In contrast, the City TCP for Filing I is \$14,000.

As with the open space fee issue, where a developer provides inventory or actual improvements, the purpose behind the associated impact fees is satisfied and a credit ought to be given. I appreciate your consideration of this request.

Sincerely,



Brian L. Stowell

*APPROVED*  
*J. R. [Signature]*  
10-14-96



**facsimile**  
TRANSMITTAL

---

**to:** Kathy Portner  
**fax #:** 1-970-244-1599  
**re:** Trails West Village  
**date:** September 12, 1996  
**pages:** 2, including this cover sheet

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT  
SEP 13 1996

Kathy:

Attached please find a filed copy of Articles of Incorporation for Trails West Village Homeowners Association, Inc. as evidence of the formation of the homeowners association. In addition, Bylaws have been adopted by the Association and a DCC appointed. Thank you.

From the desk of...

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

970-963-0627  
Fax: 970-963-5570

Mail to: Secretary of State  
Corporations Section  
1560 Broadway, Suite 200  
Denver, CO 80202  
(303) 894-2251  
Fax (303) 894-2242

For office use only

MUST BE TYPED  
FILING FEE: \$50.00  
MUST SUBMIT TWO COPIES

ARTICLES OF INCORPORATION  
OF A COLORADO NONPROFIT  
CORPORATION

FILED COPY  
961076220 M \$50.00  
SECRETARY OF STATE  
07-22-96 14:04

Please include a typed  
self-addressed envelope

The undersigned person(s) acting as incorporator(s) of a nonprofit corporation under the Colorado Nonprofit Corporation Act execut(e)s the following Articles of Incorporation for such corporation:

FIRST: The name of the nonprofit corporation is: Trails West Village Homeowners Association

SECOND: The address of the initial registered office of the nonprofit corporation in Colorado is: 0090 Caballo Road, Carbondale, CO 81623  
(Address must include building number and suite number, street (or rural route number), town or city and zip code. Include a P.O. Box if mailing address is different than street address)

and the name of its initial registered agent at such address is Brian L. Stowell

THIRD: The nonprofit corporation (will/will not) (circle one) have members.

FOURTH: Provisions regarding the distribution of assets on dissolution are: \_\_\_\_\_  
Not presently known but shall be in accordance with C.R.S., §7-26-103  
& 104

FIFTH: The nonprofit corporation shall have 1 directors who shall serve as the initial board of directors.

The name and address of each director is: (This information is not required)

NAME OF DIRECTOR

ADDRESS (include zip code)

Brian L. Stowell

0090 Caballo Road, Carbondale, CO 81623

SIXTH: The name and address of each incorporator is:

NAME OF INCORPORATOR

ADDRESS (include zip code)

Brian L. Stowell

0090 Caballo Road, Carbondale, CO 81623

The signature of each incorporator:

Brian L. Stowell



ENGINEERING • SURVEYING • PLANNING

### FAX TRANSMISSION COVER SHEET

Date: 10-31-96

To: JODY KUSKA

Fax: 244-1599

Subject: TRAILS WEST VILLAGE -  
STORM SEWER

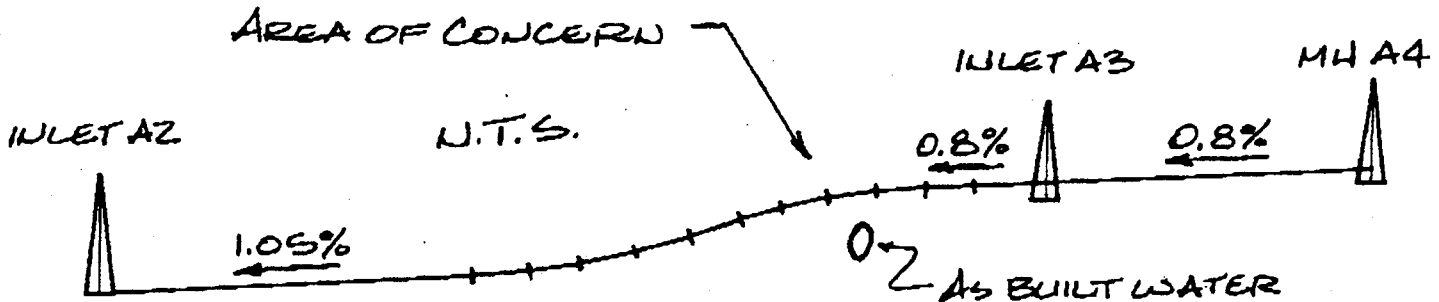
Sender: STEVEN SHARPE

RECEIVED  
 OCT 31 1003

You should receive 1 page(s), including this cover sheet,  
 if you do not receive all the pages, please call (970) 245-4099.

Message:

JODY - NO PART OF THE LINE INVOLVED WITH DEFLECTION WILL BE LESS THAN 0.80% SLOPE. IN FACT ALL SECTIONS OF PIPE INVOLVED WILL BE SUBSTANTIALLY GREATER THAN 0.80%.



# Charge Sheet

## Subdivision Name: Trailswest Village Filing #2

Community Development File: FP96-110

Annexation Name:	N/A	Project Number	
Annexation Date:	N/A	Project Engineer	LandDesign
		City Contact:	T.Prall

Developer's Fee:	Lots	\$/lot	Total
Lots < 1/3 Acre	13	\$500	\$6,500
Lots >1/3 Acre<1 Acre	1	\$675	\$675
Lots > 1 Acre	0	\$750	\$0
	14	<b>Total Developer's Fee</b>	<b>\$7,175</b>

G/L number:

SEWER EXTENSION FEE PER LOT:		South Camp Sewer Trunkline Ext.	
Per Residential Lot		Non-Residential / Commercial	
More than 1 Acre	\$1,750	More than 1 Acre	N/A
1/3 to 1 Acre	\$1,500	1/3 to 1 Acre	N/A
Less than 1/3 Acre:	\$1,000	Less than 1/3 Acre:	N/A
Service Date for Extension:	N/A		

PIF Required:	Yes
POA Required:	No
Trash Available:	Yes
Water Source:	Ute

### PAYBACK FEES

Remit to:	N/A
Address	N/A
Amount per lot:	N/A
Admin Fee:	N/A
Interest to be charged:	N/A
Date to begin interest:	N/A

Make sure you include entire acct # on T/R for the extension fee  
 (1000,\$1500, or \$1750) 903-622331-43996-30-~~222222~~

*F09804*

Addresses and Acreage of Lots to be charged with copy of recorded plat:

# Charge Sheet

## Subdivision Name: Trailswest Village Filing #1

Community Development File: FP96-110

Annexation Name:	N/A	Project Number	X09615
Annexation Date:	N/A	Project Engineer	LandDesign
		City Contact:	T.Prall

Developer's Fee:	Lots	\$/lot	Total
Lots < 1/3 Acre	27	\$500	\$13,500
Lots >1/3 Acre<1 Acre	1	\$675	\$675
Lots > 1 Acre	0	\$750	\$0
	28	<b>Total Developer's Fee</b>	<b>\$14,175</b>

G/L number:

*DEVELOPER PAID \$7,000 TO RELEASE 1/2 LOTS ON 11/7/96 (14 LOTS). DEVELOPER STILL OWES \$7,175*

SEWER EXTENSION FEE PER LOT:		South Camp Sewer Trunkline Ext.	
Per Residential Lot		Non-Residential / Commercial	
More than 1 Acre	\$1,750	More than 1 Acre	N/A
1/3 to 1 Acre	\$1,500	1/3 to 1 Acre	N/A
Less than 1/3 Acre:	\$1,000	Less than 1/3 Acre:	N/A
Service Date for Extension:	N/A		

PIF Required:	Yes
POA Required:	No
Trash Available:	Yes
Water Source:	Ute

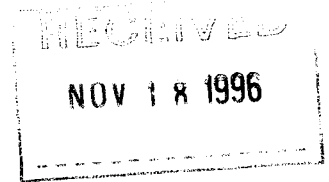
### PAYBACK FEES

Remit to:	N/A
Address	N/A
Amount per lot:	N/A
Admin Fee:	N/A
Interest to be charged:	N/A
Date to begin interest:	N/A

Make sure you include entire acct # on T/R for the extension fee (1000,\$1500, or \$1750) 903-622331-43996-30-X09615

Addresses and Acreage of Lots to be charged with copy of recorded plat:

November 12, 1996



Ms. Jody Kliska, City Development Engineer  
Public Works Department  
City of Grand Junction  
250 N. 5th Street  
Grand Junction, CO 81501

Re: Trails West Village Storm Sewer  
Job No. 95182.50

Dear Jody:

Pursuant to our conversation today, the following is a summary of the of the details covered on the above-mentioned project:

The City has agreed to allow McCaffrey Construction to convert Inlet A-3 to a manhole. The conversion will continue to redirect the flow of the storm water to the detention pond without overloading the sump inlets at A-2. The conversion is made necessary due to McCaffrey Construction locating the inlet box 2 feet out into of the proposed road.

The top of the inlet box will be cut down in order to install a standard 6" ring and cover. The installation will be outside of the concrete flow pan and in the asphalt of Muscalaro Avenue.

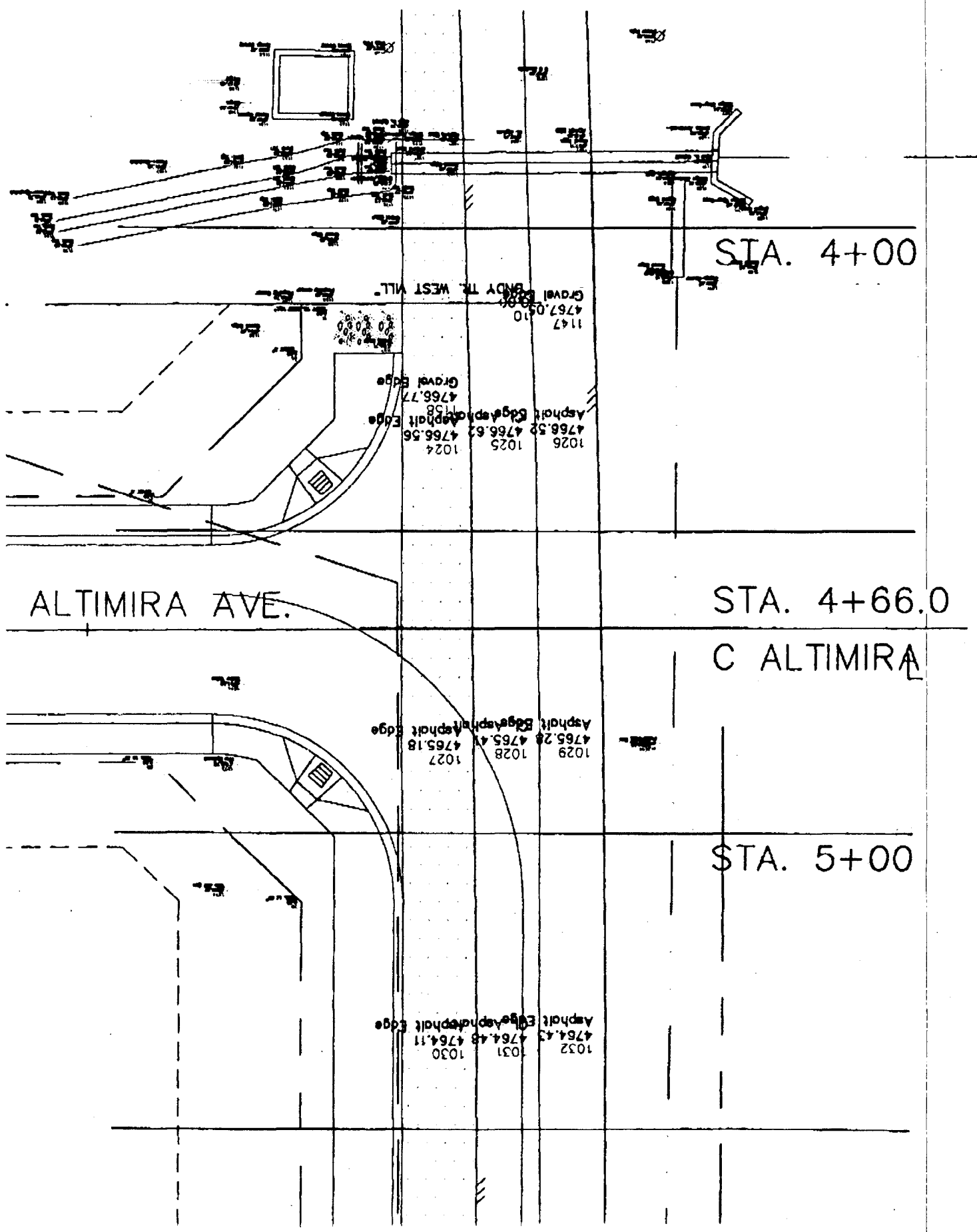
Thank you for the quick response to this problem.

Respectfully,

A handwritten signature in black ink, appearing to read "Jeffrey P. Crane".

Jeffrey P. Crane  
Project Manager

WORKING Thu Nov 20 10:51:05 1997 Banner Associates, Inc. - SGS



STA. 7+00

1041	1040	1039
4761.60	4761.70	4761.25
Asphalt	Edge	Asphalt Edge

1038	1037	1036
4762.55	4762.65	4762.27
Asphalt	Edge	Asphalt Edge

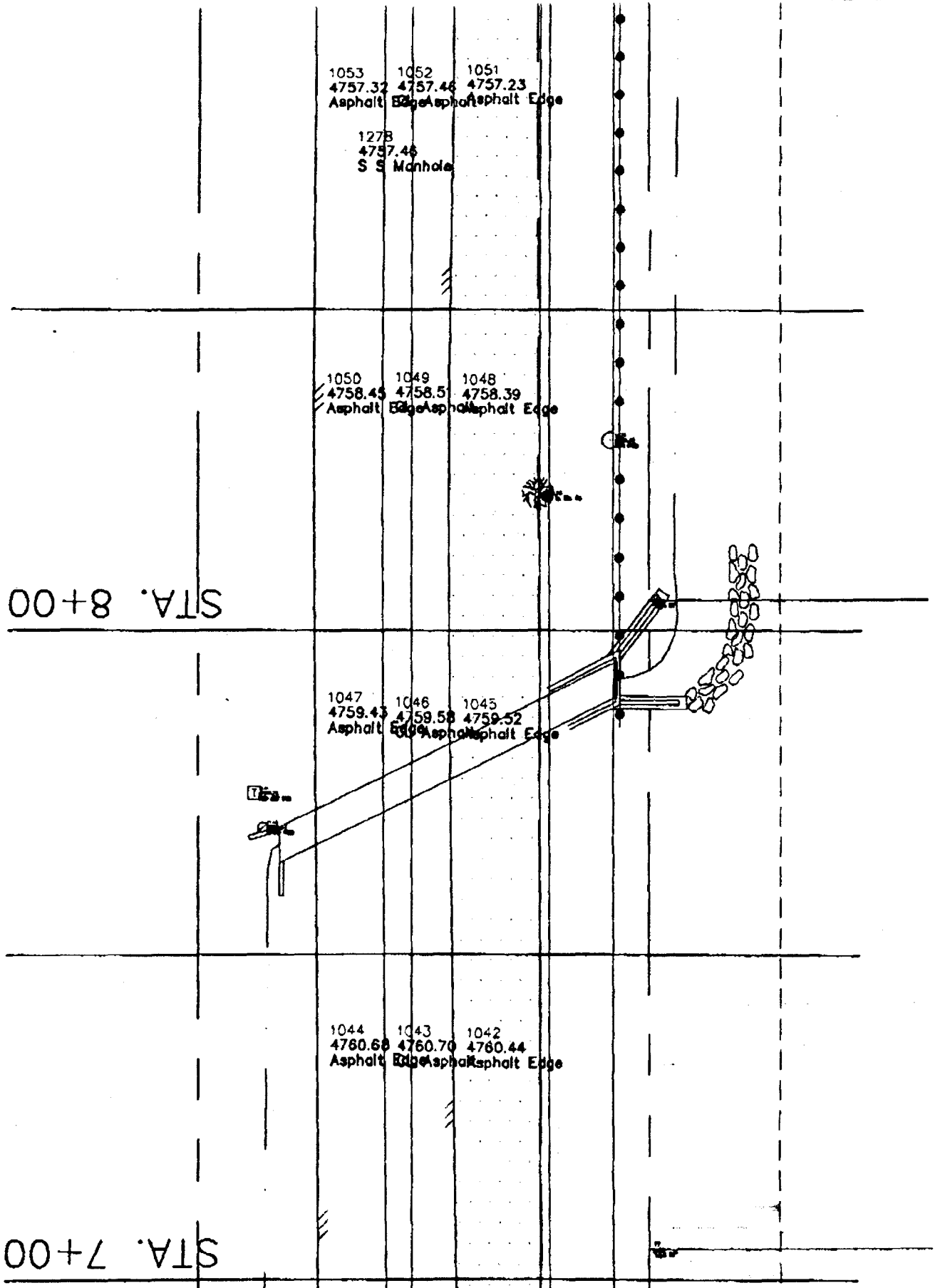
STA. 6+00

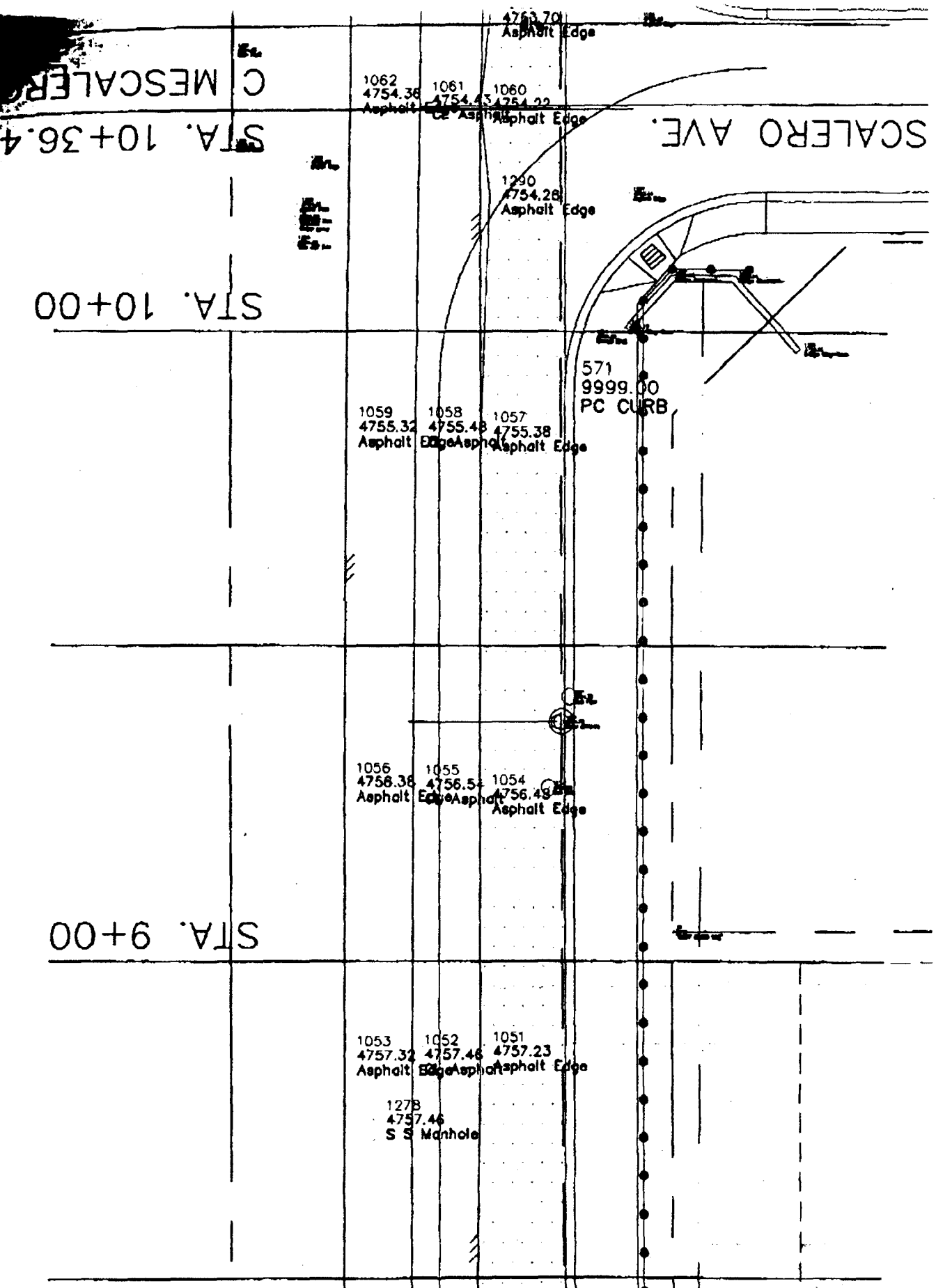
1035	1034	1033
4763.38	4763.51	4763.21
Asphalt	Edge	Asphalt Edge

1032	1031	1030
4764.43	4764.48	4764.11
Asphalt	Edge	Asphalt Edge









C MESCALERO

STA. 10+36.41

STA. 10+00

STA. 9+00

SCALERO AVE.

4763.70  
Asphalt Edge

1062 1061 1060  
4754.36 4754.43 4754.22  
Asphalt Edge Asphalt Edge Asphalt Edge

1290  
4754.28  
Asphalt Edge

571  
9999.00  
PC CURB

1059 1058 1057  
4755.32 4755.48 4755.38  
Asphalt Edge Asphalt Edge Asphalt Edge

1056 1055 1054  
4756.38 4756.54 4756.48  
Asphalt Edge Asphalt Edge Asphalt Edge

1053 1052 1051  
4757.32 4757.46 4757.23  
Asphalt Edge Asphalt Edge Asphalt Edge

1278  
4757.46  
S S Manhole



December 10, 1996

Mr. Ed McCraffrey  
McCraffrey Construction  
P. O. Box 3617  
Montrose, Colorado 81401

RE: Asphalt Paving Warranty and Paving Conditions  
Trails West Village - Filing One

Dear Ed:

Elam Construction, Inc. is willing to attempt the asphalt paving (bottom 2" lift only) for the above referenced project, but let it be known to Camelot Investments (the owner), McCraffrey Construction (the general contractor) and the City of Grand Junction that Elam Construction, Inc is not willing to guarantee or warrant the work performed. Elam Construction, Inc. will put forth full effort to see that the work performed will meet City of Grand Junction Specifications, however, Elam Construction, Inc. will not be held accountable if the specifications are not met, in particular, the temperature and density requirements.

Areas of concern to Elam Construction, Inc include:

1. As built drawings approved by the city ?
2. All test results submitted and accepted by the city ?
3. Grade free of frost and or excessive moisture ?
4. Grade to paving tolerances (+ or - 0.02 of a foot) ?
5. Cold weather paving conditions.

Again, Elam Construction, Inc. will do everything in its power to see that the owner gets a quality paving project, but that there is no guarantee due to the conditions above stated. Also let it be known that Elam Construction, Inc's asphalt plant will be shut down for the 1996 paving season as of December 11, 1996. If weather or any other condition prevents paving by Wednesday PM, the project will have to be paved next paving season.

Please contact me if you have any questions or need any additional information.

Sincerely,

*David M. Verble*

David M. Verble  
Project Manager

Contractor or Owner Signature:

*Edward McCraffrey*

FP-96-110

To: Trenton Prall  
From: Mic Cochran  
Subject: Trails West Subdivision  
Date: 12/11/96 Time: 4:33PM

Trails West Subdivision


New sewer line has been completely lapped from existing sewer MH on line A-1 STA. 0+00 to new MH on line A-1 STA. 0+12+; from new MH STA.0+12 to MH A-1 STA. 1+17.26 line A-1 or STA. 0+00 line A; From MH STA. 0+00 to MH A-2 STA. 2+78.20; Form MH A-2 STA. 2+78.20 to MH A-3 STA. 4to5.55; from MH A-3 STA. 4 to 6 .55 to MH A-4 STA. 4+70.13 from MH A-4 STA. 4+70.13 to MH A-5 STA. 7+93.00; from MH A-5 STA. 7+93.00 to MH A-6 STA. 8+77.47; from MHA-6 Line c STA. 0+92.31 to MH C1 STA 0+00; From MH A-6 line D STA. 0+00 to MH D1 STA 3+84.89; from MH D-1 STA. 3+84.89 to MH D-2 STA 6+18.91; from MH D-1 STA 3+84.89 to MH E1 STA 0+53.85; from MH A-3 line B STA. 0+00 to MH B1 STA 3+19.53; and from MHB1 STA. 3+19.53 to MH B2 STA 4+09.64. All sewer line was acceptable with full moons except from MH E-1 to MH D1 was 90% of full moon and fromMH A-3 to MH was 3/4 Full Moon.

Mick Cochran



**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627



January 30, 1997

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

**Re: Trails West Village, Filing II**

Dear Kathy:

Enclosed please find Exhibit B which is to be attached to the Development Improvements Agreement for Filing II provided to you earlier. Once again, I would appreciate receiving a copy of at least the signature page once the City signs the DIA.

If you have any questions please give me a call. You may reach me during the business day at (970)920-1028. Thank you.

Sincerely,



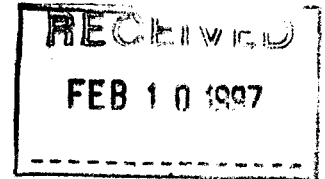
Brian L. Stowell

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT

JAN 31 1997

**CAMELOT INVESTMENTS LLC**

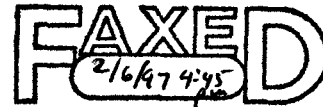
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627



February 6, 1997

Ms. Jodi Kliska  
City of Grand Junction  
Public Works & Utilities  
250 North 5th Street  
Grand Junction, CO 81501

*VIA FAX & MAIL*



**Re: Trails West Village**

Dear Jodi:

I am writing to inform you that Camelot has terminated its relationship with LANDesign and has retained the services of Banner Associates to provide the necessary drawings, survey work and engineering for the balance of the above project. Dave Chase from Banner will be the principal in charge of the project. I do not anticipate any interruption or delays in the construction of Filing II as a result of this change.

Please let me know if this change causes the City any difficulties. If I do not hear from you by February 14 I will assume the transition is acceptable to the City.

Sincerely,

A handwritten signature in cursive script that reads "Brian L. Stowell".

Brian L. Stowell

cc: Dave Chase  
Ed McCaffrey  
Kathy Portner



City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

February 27, 1997

Mr. Brian Stowell  
Camelot Investments  
90 Caballo Rd  
Carbondale CO 81623  
(970)-920-1028

**Project: Trailswest Subdivision Filing #1**  
**Subject: Sewer line cleaning**

Dear Mr. Stowell,

The enclosed invoice is for cleaning the lines within your subdivision by the Persigo Wash Sewer Treatment Plant jetting crews on the following dates:

12-4-96	1:00 to 3:30	2.5 hours
12-5-96	8:30 to 11:30	3.0 hours
12-5-96	12:45 to 3:00	2.25 hours
12-9-96	10:15 to 11:15	1.0 hours
	Total hours	8.75 @ \$76.32/hour
	Total cost	\$667.80

This jetting was requested by your contractor to enable the City Inspector to lamp the lines.

If you have any questions please give me a call at 244-1590.

Sincerely,

A handwritten signature in black ink, appearing to read "Trent Prall".

Trent Prall  
Utility Engineer

cc: Larry Brown, Persigo Wash Sewer Treatment Plant

encl. Invoice



CITY OF GRAND JUNCTION  
FINANCE DEPARTMENT

REPORT OF  
ACCOUNT RECEIVABLE

CUSTOMER INFORMATION

BRIAN STOWELL  
NAME

CAMELOT INVESTMENTS  
ADDRESS 1

90 CABALLO RD  
ADDRESS 2

CARBONDALE CO 81623  
CITY STATE ZIP

PHONE 970 920-1020

ORIGINATED BY:

PH UTILS 2/10/97  
DEPT DATE

TRENT PRALL 244-1500  
CONTACT PERSON PHONE

APPROVED

CONTRACT

MINIMUM PAYMENT

AMOUNT

TRAILWEST SEWER CLEANING

INVOICE AMOUNT \$66,780 +

ITEM	DESCRIPTION	AMOUNT
1	12/4/96 2.5 HRS @ 76.32/hr	190.80 +
2	12/5/96 5.25 HRS	400.68 +
3	12/9/96 1.0 HRS	76.32 +

FUND	cc CR6	OBJECT <del>1000</del>	PROJECT	AMOUNT
902	62221	43479		

AR SECTION

CUST NO.

INVOICE

DATE

BY:

To: Trenton Prall  
From: Larry Brown  
Subject: Sewer line cleaning Trails West  
Date: 12/11/96 Time: 3:57PM

The cleaning of this system for the contractor on

	12-4-96	1:00 to 3:30	2.5 hours
	12-5-96	8:30 to 11:30	3.0 hours
	12-5-96	12:45 to 3:00	2.25 hours
	12-9-96	10:15 to 11:15	1.0 hours
		Total hours 8.75 @ \$76.32/hour	
		Total cost \$667.80	

Thanks Larry B

To: Trenton Prall  
From: Larry Brown  
Subject: Re: Sewer line cleaning Trails West  
Date: 12/16/96 Time: 10:28AM

Originated by: LARRYB @ CITYHALL on 12/11/96 3:57PM  
Replied by: LARRYB @ CITYHALL on 12/16/96 10:28AM

The acc# is 902-62221-43479

FP-96-110

6

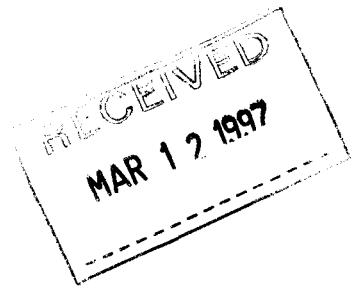
To: Trenton Prall  
From: Mic Cochran  
Subject: Trails West Filing 2  
Date: 2/27/97 Time: 3:31PM

Trails West filing 2 new sewer line was lamped Feb. 25 1997 from  
MH B-2 sta. 4+09.64 to MH B-3 sta. 5+76.11; from MH B-3 sta. 5+76.11 to  
MH B-4 sta. 6+33.29; from MH B-4 sta. 6+33.29 to MH B-5 sta. 8+05.68;  
from MH D-2 sta. 6+18.91 to MH D-3 sta. 8+45.33; and from MH D-3 sta.  
8+45.33 to MH D-4 sta. 9+56.46.

All was found acceptable with full moons.



**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627



March 7, 1997

Ms. Jodi Kliska  
City of Grand Junction  
Public Works & Utilities  
250 North 5th Street  
Grand Junction, CO 81501

**Re: Trails West Village**

Dear Jodi:

I am in receipt of Mick Cochran's daily job diary and thank you for the same. However, when I requested documentation in support of the City's inspection bill of \$3,659.74 I was trying to ascertain how many hours Mr. Cochran spent on the Trails West Village site and what hourly rate the City charged for his services. I could not determine either of those questions from the job diary. As I mentioned when I was last in to see you, this matter is of importance in any possible legal proceedings that might result from the sewer line location problem Camelot experienced last year. Therefore, I would appreciate any effort on your part to pull together any time logs or other record of Mick's actual time on the site and a corresponding hourly rate schedule.

Sincerely,

A handwritten signature in cursive script that reads "Brian L. Stowell".

Brian L. Stowell

# DAILY CONSTRUCTION REPORT

# BANNER

BANNER ASSOCIATES, INC.  
CONSULTING ENGINEERS & ARCHITECTS  
2777 CROSSROADS BOULEVARD  
GRAND JUNCTION, CO 81501 • (303) 243-2242

PROJECT: TRAILS WEST VILLAGE FILING 2  
CLIENT: \_\_\_\_\_  
CONTRACTOR: Mc CAFFERY CONST.  
FEATURE: SEWER LINE AIR TESTS

SHEET 1 OF 1

CONTRACT NO. \_\_\_\_\_ JOB NO. 8353-03 DATE 3/7/97  
WEATHER \_\_\_\_\_ MIN. TEMP. \_\_\_\_\_ MAX. TEMP. 55  
WORK PERIOD 10 <sup>A.M.</sup> P.M. 12:30 <sup>A.M.</sup> P.M. 2

EQUIPMENT: AIR COMPRESSOR, PLUGS

PERSONNEL: 2 - LABORERS

NARRATIVE: Observed air exfiltration test for sewer mains and services installed for Filing Two.

All tests were done in conformance with City of Grand Junction Standard Specifications for the construction of underground Utilities, Part UU-30, Revised June 1996 edition.

SECTIONS TESTED:	RESULTS
MH B2 - B3	Retained 3.5 psigage for min test time
MH B3 - B4	"
MH B4 - B5	"
MH D2 - D3	"
MH D3 - D4	"

TEST RESULTS: SEE TEXT

REVIEWED BY \_\_\_\_\_ PREPARED BY [Signature]

Refer to other reports: \_\_\_\_\_

# BANNER

BANNER ASSOCIATES, INC.  
CONSULTING ENGINEERS & ARCHITECTS  
2777 CROSSROADS BOULEVARD  
GRAND JUNCTION, CO 81506 • (303) 243-2242

JOB NO 8353-13  
JOB TRAILS WEST  
CALCULATED BY BL DATE 3/7/97  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

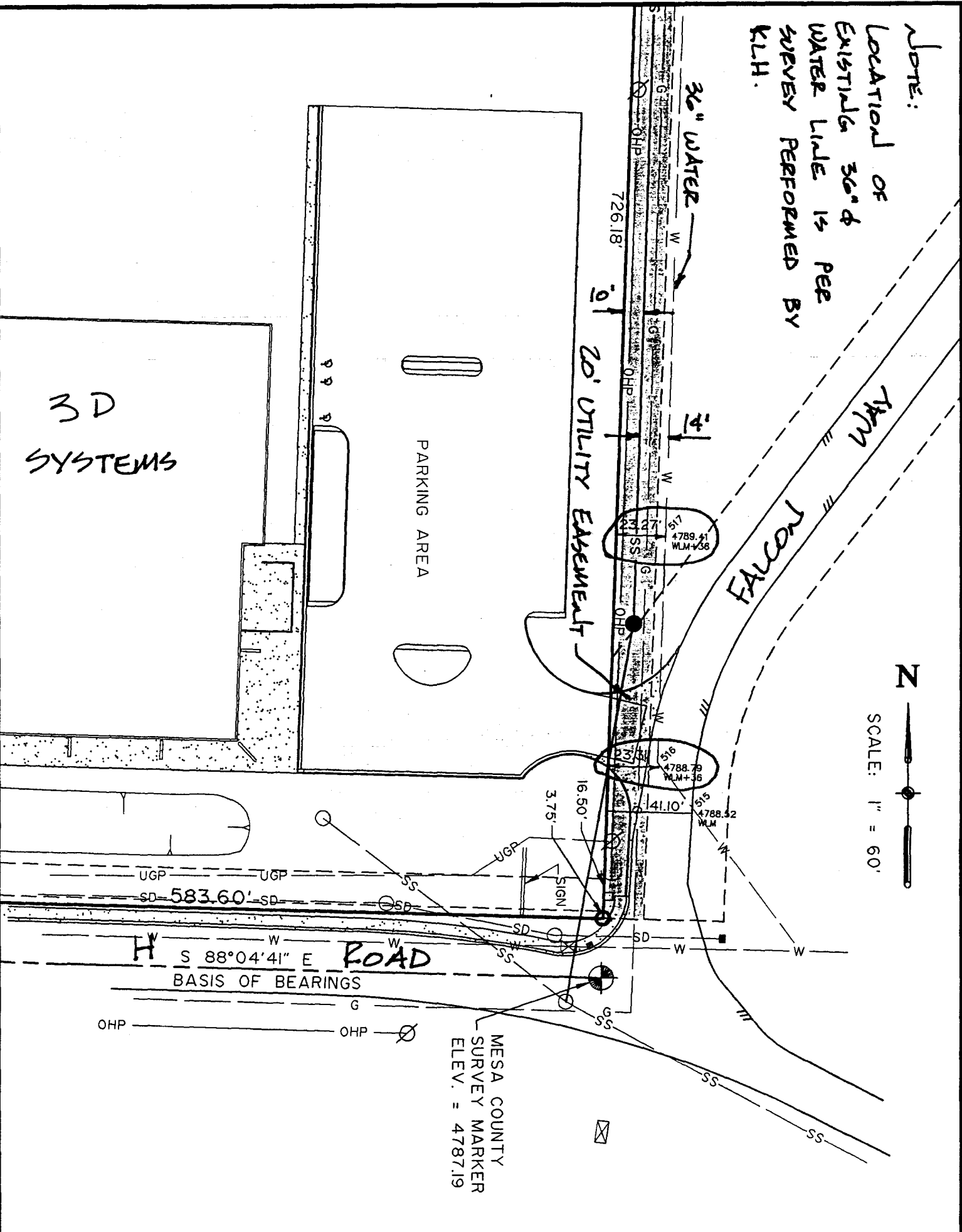
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

10 AM 3/7/97

## TRAILS WEST FILING TWD

TEST PARAMETER	AIR TEST 3.5 PSI to 2.5 PSI	SEWER @ MIN	1.2 M/100 LF. 8" $\phi$
B1 - B2	90 LF, 8" $\phi$		= 1 min 4 sec
→ FILING ONE TESTED			
B2 - B3	167 LF, 8" $\phi$		= 2 min 0 sec
			→ OKAY
B3 - B4	57 LF 8" $\phi$		= 41 sec
			→ OKAY
B4 - B5	172 LF 8" $\phi$		= 2 min 3 sec
			→ OKAY
D1 - D2	234 LF 8" $\phi$		= 2 min 48 sec
→ FILING TWO TESTED			
D2 - D3	226 LF 8" $\phi$		= 2 min 42 sec
			→ OKAY
D3 - D4	111 LF 8" $\phi$		= 1 min 20 sec
			→ OKAY

NOTE:  
 LOCATION OF  
 EXISTING 36" &  
 WATER LINE IS PER  
 SURVEY PERFORMED BY  
 KLH.



N  
 SCALE: 1" = 60'

MESA COUNTY  
 SURVEY MARKER  
 ELEV. = 4787.19

S 88°04'41" E ROAD  
 BASIS OF BEARINGS

UGP UGP  
 SD 583.60' SD

4789.41  
 WLM+38

4788.79  
 WLM+36

4788.52  
 WLM

20' UTILITY EASEMENT

36" WATER

3D  
 SYSTEMS

PARKING AREA

FALCON  
 WAY

726.18'

14'

16.50'

3.75'

41.10'

SIGN

OHP OHP



KATHI PORTNER



April 9, 1997

City of Grand Junction, Colorado

250 North Fifth Street

81501-2668

FAX: (970)244-1599

Mr. Brian Stowell  
Patrick & Stowell, P.C.  
205 South Mill Suite 300  
Aspen, CO 81611

RE: Trails West Drainage Facilities

Dear Mr. Stowell:

Recent storms and the final walkthrough of Filing 1, Trails West Village Subdivision indicate the stormwater facilities are not functioning as required by the City of Grand Junction Stormwater Management Manual.

What is existing on the site appears to be constructed in conformance with the approved plans; however, the plans do not appear consistent with the drainage report.

The detention facilities need to be redesigned and reconstructed to meet city standards. It appears the culverts conveying stormwater from the subdivision discharge directly to the adjacent property undetained. It also appears the area adjacent to South Camp Road intended for detention is insufficient in volume for the design year storms.

Because of the effects of runoff on the adjacent property, this needs to be addressed and remedied immediately. Please advise me of your schedule to address this as soon as possible.

Sincerely,

A handwritten signature in black ink, appearing to read "Jody Kliska".

Jody Kliska  
City Development Engineer

# City of Grand Junction

Community Development Department  
Planning • Zoning • Code Enforcement  
250 North 5th Street  
Grand Junction, CO 81501-2668

Phone: (970) 244-1430  
FAX: (970) 244-1599



April 9, 1997

Brian Stowell  
Camelot Investments LLC  
0090 Caballo Road  
Carbondale CO 81623

RE: ~~transwest filing #1 & #2~~ Improvements Agreements and Guarantee

Dear Mr. Stowell:

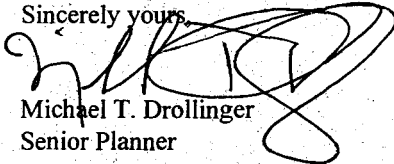
I was asked to review the status of the improvements agreements and guarantee for the above-referenced project by Jody Kliska, City Development Engineer. I understand that you desire to prepare a Development Improvements Agreement (DIA) for the remainder of Filing #1 and for Filing #2 in preparation of recording the Filing #2 plat. I have reviewed the documents on file with our office and offer you the following comments and instructions:

- One DIA may be prepared to cover the remaining items in Filing #1 and all of Filing #2. Once the City Development Engineer as reviewed the separate improvements lists (which are presently under review) a single Exhibit "B" may be prepared combining the improvements in both filings.
- We will be transmitting back to you the draft DIAs for the remainder of Filing #1 and Filing #2. In the Filing #1 DIA there is no need for Line #31 (which you added) as we will record a release of the prior improvements agreement. Also, please complete Exhibit "A". Exhibit "B" is under review by our Development Engineer. The Filing #2 DIA appears complete, although the 90 day completion period appears short. The Filing #2 Exhibit "B" is also under review and, when the review is complete, will be returned to you since the list needs to be transferred to the proper Exhibit "B" form.

You have indicated on the DIAs a desire to use a letter of credit as the form of guarantee. Please note that if you wish to have monies released during the term of your DIA, I would suggest that you use a disbursement agreement, as we will not permit the "substitution" of your original letter of credit with a new letter during the term of the DIA. Also, we will require that the term of the letter of credit exceed the term of the agreement by one month.

I trust that you find this information useful. Please do not hesitate to contact me if you require any additional information or have questions on any item.

Sincerely yours,

  
Michael T. Drollinger  
Senior Planner

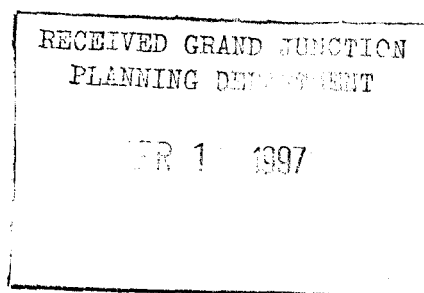
cc: Kathy Portner, Acting Community Development Director  
~~Jody Kliska, City Development Engineer~~

h:\ettrs\stowell.ltl



City of Grand Junction, Colorado  
250 North 5th Street  
81501-2668  
Phone (970) 244-1501  
FAX (970) 244-1456

April 14, 1997



Mr. Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, Colorado 81623

Via U.S. Mail and Facsimile

Dear Mr. Stowell,

I am writing in response to your letter of today's date, sent via telefax, to Jody Kliska. Ms. Kliska came to see me and asked that I respond to your concerns.

In preparation of this reply I reviewed the April 9, 1997 letter referenced in your communication and also a copy of the April 10, 1997 letter to you from Bud and Nancy Wood.

From your April 14th letter it seems that you may have misapprehended the problems identified in the April 9th communication from Ms. Kliska. The problem is not necessarily with the plan or the review of the plan but is instead that your engineer did not reconcile the plan with the drainage report which you filed and the City reviewed as part of your approval. In your letter you state that 'Pat O'Connor is currently working on a new detention pond plan' -- nowhere in her letter did Ms. Kliska require that you prepare a "new plan." She only requires what the law mandates: the facilities must meet the minimum City's standards. Jody indicates that if the drainage is built as designed and described by the narrative portion of the design documents, the drainage facilities/system will be more likely to function properly.

The City takes exception to your submitting plans 'under a reservation of rights' as you propose in your letter. The City bears no responsibility to developers to ensure the functional integrity of plans submitted by others for private benefit. Ms. Kliska is not your engineer; she did not seal the plans as a registered professional engineer. She owes no duty to you to ensure that plans and specifications designed and stamped by your engineer are functionally complete and correct. Specifically, §12-25-117(3), C.R.S. provides that "the seal and signature shall be used by an engineer only when the work being stamped was under the engineer's responsible charge." Your contention that Ms. Kliska owes you a duty as a Colorado Registered Professional Engineer for plans that she did not prepare or seal is far fetched to say the least. Is the inference to be drawn from your letter that the design that you submitted was not prepared under the responsible charge of the engineer that signed and sealed the plans?

Mr. Brian Stowell  
14 April 1997  
page 2

Any 'reservation of rights' noted on or contained in the plans will be considered null, void and of no effect. If you are intending to preserve a claim, please consult with §24-10-101, C.R.S. *et. seq.*

In summary, the effect of your position is that you are not responsible for your development -- the City is. Given that theory, it may be appropriate that your current development proposal should be immediately 'put on hold' until it is clear to all that 1) the developer is responsible for the development; 2) the Improvements Guarantees are the 'back-up' resource; and 3) the City is not responsible for your design.

Concerning your request that written communication to Camelot Investments be sent to the address on Caballo, Ms. Kliska informs me that her recent letter was sent to you at your office address because at a recent meeting you provided her with a business card showing the Aspen address. The City will endeavor to contact you as you request but will not guarantee that you may not be contacted at the Aspen address or by telephone or fax at the number you provided.

OFFICE OF THE CITY ATTORNEY

by: \_\_\_\_\_

  
John P. Shaver

Assistant City Attorney  
250 N. 5th Street  
Grand Junction, CO 81501  
(970) 244-1501

pc: Jody Kliska  
Kathy Portner  
Mark Relph  
Jim Shanks

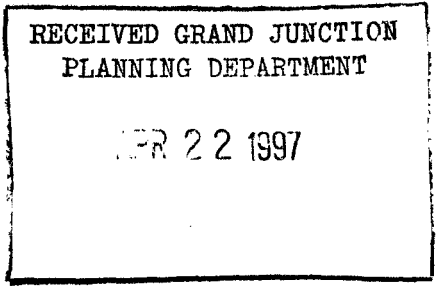
Kathy



City of Grand Junction, Colorado  
250 North 5th Street  
81501-2668  
Phone (970) 244-1501  
FAX (970) 244-1456

April 17, 1997

Mr. Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, Colorado 81623



Via U.S. Mail and Facsimile

Dear Mr. Stowell,

Your correspondence of April 14 asserts that the City is responsible in some regard for your problems with your engineering of the drainage facilities for Trails West Village (TWV) and that you are now proceeding under a reservation of rights. My letter to you of the same date was never intended as "threatening" or "confrontational" but was intended to squarely address your imperious contentions.

Concerning your April 17 letter, I am astounded at how quickly you conclude that my letter was playing "hardball." How it is that the tone and content of my letter, which simply states without equivocation what the City perceives to be the issues, is "hardball" but your letter, which makes sweeping allegations about my professionalism and directs that further contact with you should be through Camelot's attorney, is not the very thing of which you complain? Please, if you are compelled to critique written communications from me, refrain from personal attack. Nowhere in my April 14 letter or in this one will you find any chiding of or personal attacks on you or your professionalism. Please extend me the same courtesy.

The facts of this matter are that the drainage facilities constructed in TWV filing one do not function properly and that TWV filing two is designed to utilize the drainage constructed in filing one. Simply put, Camelot needs to see that the drainage facilities function properly. If Camelot determines, in consultation with its current engineer, that work designed by its former engineer needs to be redesigned, then please proceed to do so and submit a copy of those plans to the City. If the problem(s) with the drainage facilities are due to faulty construction, then please prepare a summary of the anticipated construction together with an estimate of the cost of remediation and submit that to the City for review. Please also contact the City's planner at your earliest convenience to arrange a financial guarantee for the work.

If the plain meaning of the statement, the "City bears some responsibility" does not describe Camelot's position, what does? My summary of the effect of your position, as stated in my April 14 letter (i.e., that you are not responsible for your development and that the City is), is obvious from your letter. If you are not seeking to hold the City responsible, then why say that you are? Furthermore, why would you propose that any further submissions are made with a reservation of rights? The plain meaning of your April 14 letter belies your explanation in the April 17 letter.

Mr. Brian Stowell  
17 April 1997  
page 2

In your April 17 letter you inquire "...what does Jody's signature on the plans signify[?]" . The answer to that question is contained in the stamp block containing her signature. That block states "approved for construction." While you characterize the April 14 comments concerning engineering practice as "lecturing," the fact remains that the information is a correct statement of the law and Camelot's relationship to Ms. Kliska's engineering license.

While I appreciate your offer to discuss Camelot's development paradigm, I must respectfully decline your invitation. Instead I encourage that we meet to discuss the technical problems with the project. Heretofore I have found you to be respectful of both the process and the staff, even if there were disagreements. Because of that fact I am surprised by the attempt to shift the burden of the problem with the drainage facilities to Ms. Kliska and the City. If you take issue with the design standards or feel that the standards are somehow inapplicable, please confirm that contention in detail, in writing. Colorado law recognizes two types of estoppel: promissory and equitable. Promissory estoppel is based on contract principles while equitable estoppel sounds in tort. See, Board of County Commissioners v. DeLozier, 917 P.2d 714. Claims which sound in tort and which ask for damages are barred by the Governmental Immunity Act. Lehman v. City of Louisville, 857 P.2d 455 tells us that even when a city official misrepresents to a citizen, who relies thereon, the pertinent facts, the claim is barred in Colorado. While I am not suggesting that a misrepresentation occurred here, the case is nonetheless instructive. Given the state of the law, I presume that your position that the City is estopped must sound in contract. It is not clear to me which contract would support such an analysis. If you or Camelot's counsel are aware of law that supports a theory of liability based on estoppel, please provide citations at your earliest convenience so that I may better evaluate your claims.

OFFICE OF THE CITY ATTORNEY

by:

  
John P. Shaver

Assistant City Attorney

250 N. 5th Street

Grand Junction, CO 81501

(970) 244-1501

pc: Jody Kliska  
Kathy Portner  
Mark Relph  
Jim Shanks  
Dan Wilson

BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
605 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

April 28, 1997

Ms. Jody Kliska  
City of Grand Junction  
250 N. Fifth Street  
Grand Junction, CO 81501

RE: Trails West Village

Dear Jody:

In response to comments made by the City during the final inspection of Filing #1 earlier this month and your letter to Brian Stowell dated April 9, 1997, **Banner Associates, Inc.** is preparing design modifications to the existing stormwater management facility as requested. It is not exactly clear as to what redesign the City is looking for, however, based on you earlier comments, our modifications involve alterations to the existing "detention pond outlet structure" downstream of storm sewer inlet "A1" which will allow runoff collected from the development to immediately enter the detention pond from the inlet inverts of the "outlet structure". The detention pond will also be expanded to accommodate runoff from a proposed Filing #3 (approximately 3,000 cubic feet) and to store irrigation water for all three filings (approximately 20,000 cubic feet). Adding these additional volumes to the 7,140 cubic feet required by the drainage report prepared by LANDesign (calculation sheet dated April 25, 1996) gives a total volume of approximately 30,000 cubic feet for irrigation and stormwater detention for Filings 1, 2, and 3. If you do not consider the prior drainage report to be accurate or developed in accordance with the City's stormwater management policies please let me know right away.

This storage volume will be constructed at an elevation below the "pond outlet structure" invert of 4,742.25 to allow runoff direct access to the detention pond upstream of the stilling basin. Approximately 20,000 cubic feet of irrigation storage will be at the bottom of the pond which will be lined. This will leave approximately 10,000 cubic feet of "dry" storage on the top for Filings 1, 2, and 3 stormwater detention. The "pond outlet structure" will be modified to accommodate another 18" circular discharge pipe flowing directly to the

Ms. Jody Kliska  
City of Grand Junction  
April 28, 1997  
Page 2

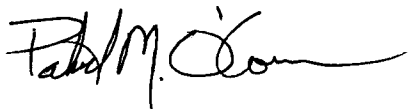
expanded detention pond. No baffle is proposed for the structure as some historic release is allowed under current Grand Junction stormwater management policies. The new 18" line will carry some flow away from the twin 12" outlet pipes and allow it to directly enter the pond on top of the irrigation water.

The existing twin 12" RCP's flowing out of the "outlet structure" box will also be redirected to enter the riprapped stilling basin and not discharge directly into the bank separating Trails West Village and the adjacent property to the north. This will dissipate energy from the discharging pipes into the stilling basin and reduce outlet scour from minor storms.

If these proposed modifications are not as you understood them to be and as directed by and discussed with the City of Grand Junction, please inform me immediately to allow required alterations to this complex system to be clearly understood.

Sincerely,

BANNER ASSOCIATES, INC.



Patrick M. O'Connor, P.E.  
Project Manager

PMO/rr

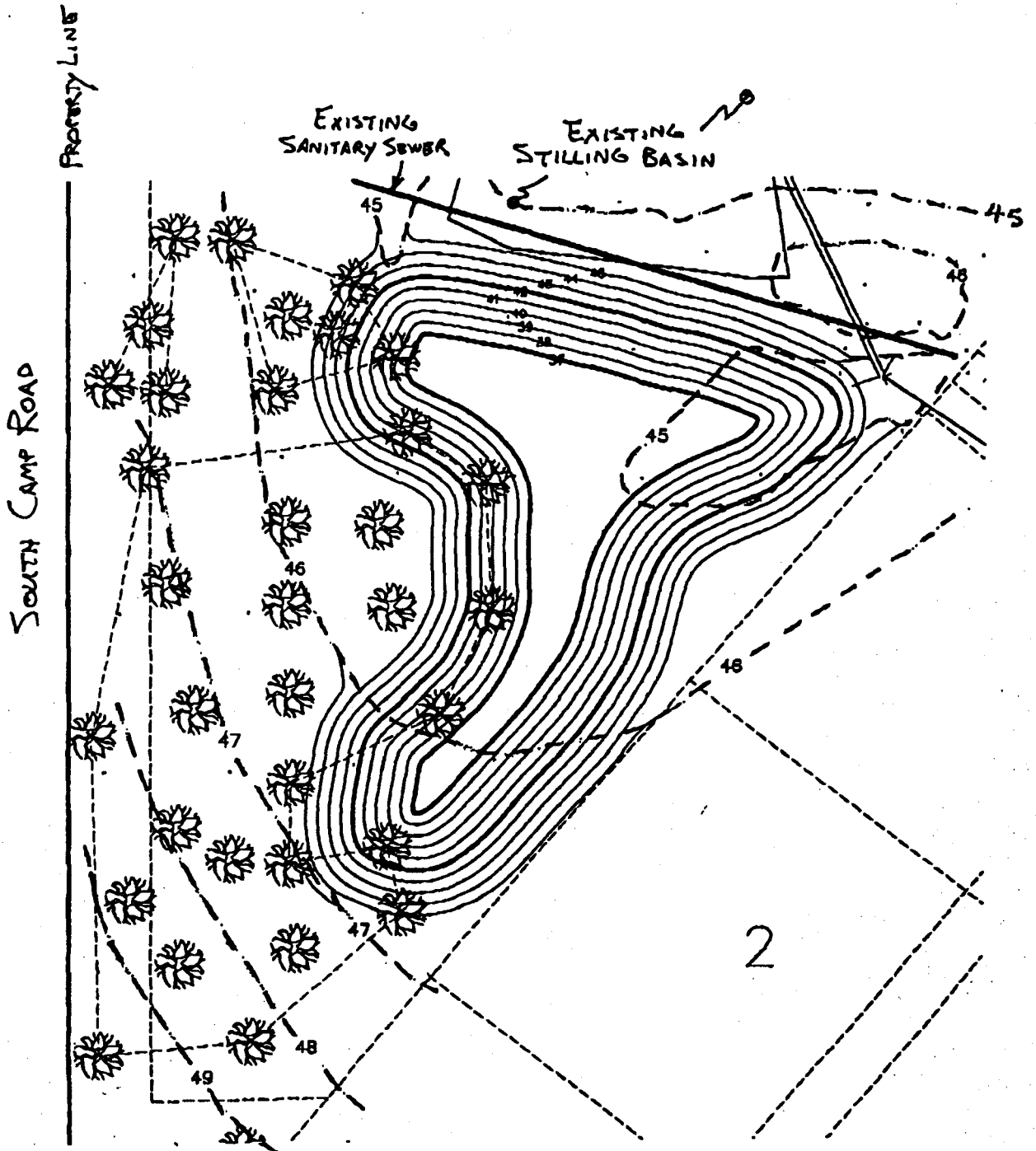
xc: Brian Stowell, Camelot Investments  
Ed McCaffrey, McCaffrey Construction



PRELIMINARY



SCALE:  
1" = 40'



5. Bid Documents: Add the following Special Provisions to page SP-1, under Standard Specifications For Road And Bridge Construction:

204 Haul For Bid Item No. 10b., Haul will not be measured but will be paid for separately.

212 Native Seeding Replace Section 212.06(a) with the following:

Soil Preparation - Contractor shall prepare the subgrade of all planted areas by applying soil amendment at a rate of 3 cu.yds. per 1000 sq. ft. over all planted areas, and discing or rototilling the soil to a depth of 6". After this has been done, all rocks bigger than 3" shall be picked up and removed from the site.

Replace Section 212.06(b) with the following:

Soil Amendment - Mulch for soil preparation shall consist of: 50% ground peat, ground well-aged cow or chicken manure, or ground sheep manure and peat, and 50% decomposed wood fiber, nitrogen stabilized, with a proven analysis to verify organic content, PH, electro-conductivity, nitrogen, potassium, and phosphorus content. A sample of the material will be supplied to the City with an analysis.

Seeding List and Application Rate are as follows:

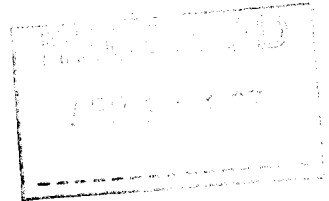
Seed List <u>Common Name</u>	Applic. Rate <u>Lbs/Acre PLS Total</u>	% of
Blue Flax	0.87 (14oz.)	10.0
Hard Fescue	1.17	5.0
Alkali Sacaton	4.67	20.0
Galleta	1.40	10.0
Crested Wheatgrass	1.69	15.0
Western Wheatgrass	1.69	15.0
<u>Fult's Alkali-grass</u>	<u>9.95</u>	<u>25.0</u>
(Redlands Native)	21.44 lb/ac	100.0

6. Construction Drawings: Replace sheet numbers 2 and 3 with sheets dated 10-1-97. (Sheet 2 had two previous versions). Replacement sheets accompany this addendum.

-- End Addendum No. 3 --

**C. JOSEPH CROKER, P.C.**

ATTORNEYS AT LAW



**C. JOSEPH CROKER\***  
**CHRISTOPHER G. McANANY**

**600 ALPINE BANK BUILDING**  
**225 NORTH FIFTH STREET**  
**P.O. BOX 2202**  
**GRAND JUNCTION, COLORADO 81502-2202**  
**(970) 241-1616**  
**TELECOPIER (970) 241-9579**

**MOAB, UTAH, OFFICE**  
**94 EAST GRAND AVENUE**  
**MOAB, UTAH 84532**  
**(801) 259-5401**

\*also admitted in Utah

April 29, 1997

Ms. Jody Kliska, City Development Engineer  
City of Grand Junction, Colorado  
250 North Fifth Street  
Grand Junction, Colorado 81501-2668

Re: Trails West Subdivision Filing 1

Dear Ms. Kliska:

This law office represents the interests of Alson and Nancy Wood. Mr. and Mrs. Wood own real property directly adjacent and downgradient from the above named subdivision. My clients called me recently and indicated that they were having some significant problems with storm water drainage from the neighboring development activities.

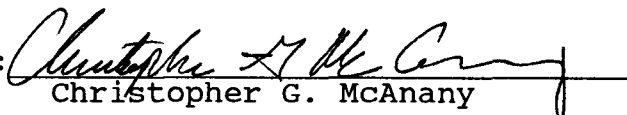
As you may know, recent rainfall has resulted in runoff from the Trails West development which has washed across the Wood property and damaged a newly constructed irrigation detention pond. I understand from my clients that the City has requested that the developer, Camelot Investments L.L.C., redesign its storm water drainage to meet City code requirements. My clients have some concerns as to whether or not the redesign will adequately protect them from anticipated storm water events.

Mr. and Mrs. Wood have expressed a desire to have the storm water detention plans evaluated by their own civil engineer. We would appreciate it if your office could make available to us for copying the revised storm water detention plans that are to be submitted by the developer. Please give us a call to let us know how we may get access to the revised plans. Likewise, if there are any other matters that require our attention, please contact me at your convenience.

Very truly yours,

C. JOSEPH CROKER, P.C.

CGM:cdc  
pc: Bud and Nancy Wood

By:   
Christopher G. McAnany

## PROJECT NOTES

**Project: Trails West Village/Legal Action**  
**Job No. 97009.00**

---

April 30, 1997

I met with Jody Kliska and new City Staff Engineer named Christy (last name unknown) today at approximately 9:30 a.m. We met in Christy's office to discuss the construction of the drainage facilities at Trails West Village. Previously Jody issued a letter to Brian Stowell claiming that during a final walk through of the drainage facility it appeared the facilities were built according to plan, but the plan did not meet the drainage requirements and the drainage was not working. I went to speak with Jody to contest those results stating that the construction was not built to plan. I showed her photo that Phil Hart had taken last week, and explained that the box which releases water from the pond through two 12" RCP pipes was not built according to plan. There was a big hole constructed along one side of the box, for what reason I have not yet determined. There was apparently no gravel put in the bottom of the box. The gravel was designed into the plan to take all of the nuisance and low flows from the subdivision and drain them into the ground through percolation. That gravel did not in the bottom of the box, as designed, and the water went from the subdivision directly off-site.

An issue she did not understand was that the two 12" pipes were designed to allow no more than the historic flow from the subdivision to the historic drainage path off-site. I explained that it would allow 4.65 cfs to travel through those pipes off-site and any additional flows would back up in the proposed detention pond. I also pointed out there were no side slopes in the proposed detention pond as constructed by McCaffery. In addition, there does not appear to be any cutoff wall at the weir, and they were using broken concrete as opposed to the 18" riprap as designed. We did not call for any change in those plans. No drainage swale was provided to allow water to flow from the box culvert on Muscelaro Avenue to the detention facility so the water from off-site could not reach said facility. I explained the volume of the pond was in excess of the 7,000 cubic feet of volume necessary for the 100 year storm. That it released the 100 year storm at historic rates through the 65' long weir. I directed her to the report which proves the calculations are correct and the design matches the report.



City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (303) 244-1599

April 30, 1997

Mr. Pat O'Connor  
Banner Consulting Engineers  
2777 Crossroads Boulevard  
Grand Junction, CO 81506

Dear Pat:

City Engineering and Community Development staff have met to discuss the sidewalk along South Camp Road adjacent to the Trails West First Filing development. As you know, the improvements to South Camp Road have been shifted to the east due to the location of the power lines on the west side of the road. This shift in the roadway has reduced the space that is available to detach the sidewalk as was required during the Planning Commission approval process.

The Planning Commission approval required that the 10 foot wide sidewalk be detached 5 to 10 feet wherever possible. Due to the major drainageway which goes under South Camp Road and is being channelized along part of this site, the portion of the sidewalk from Altimira Avenue to Mescalero Avenue cannot be detached without relocating the ditch and reconstructing the box culvert under Mescalero Avenue. The setbacks and building envelopes for Lots 1,2, and 3 are also significantly impacted by detaching the sidewalk along those lots. The sidewalk would need to be in an easement and designed to work with the overflow swale. Therefore, the City is willing to agree to allow the 10 foot wide sidewalk to be attached between Altimira Avenue and Mescalero Avenue.

The remainder of the sidewalk, along the detention pond from Mescalero Avenue north to the property line, must be detached at least 5 feet as originally required. It appears there is adequate room for the walk to fit within the r.o.w., however additional easement may be necessary. The grading for the pond must be designed to have a 1 to 2 foot wide area behind the sidewalk to support it before the side slopes of the pond begin. In addition, the sidewalk must be designed to tie in to the north property line for future extension at a point which will not conflict with the existing trees on the adjacent property. This may require providing an easement, detaching the sidewalk more than 5 feet, and meandering the walk to transition smoothly. Since the sidewalk is intended to

carry bicycle traffic, any curves in the walk should have a minimum centerline radius of 50 feet. Please feel free to submit preliminary design solutions for review prior to preparing a final plan.

If you have any questions, please contact me at 244-1443. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Kerrie Ashbeck". The signature is fluid and cursive, with a long horizontal stroke at the end.

Kerrie Ashbeck, P.E.  
Development Engineer

cc: File FPP-96-110  
Kathy Portner, Community Development



City of Grand Junction, Colorado  
250 North 5th Street  
81501-2668  
Phone (970) 244-1501  
FAX (970) 244-1456

April 30, 1997

Mr. Christopher G. McAnany  
c/o C. Joseph Croker PC  
P.O. Box 2202  
Grand Junction, Colorado 81502

Via U.S. Mail and Facsimile

Dear Chris,

I am writing in response to your letter of yesterday sent to Jody Kliska. Ms. Kliska came to see me and asked that I respond to your concerns.

The City has not received any revised or redesigned stormwater facility plans from the developer, Camelot Investments LLC. In fact, Ms. Kliska indicated to me that she recently conversed with the developer's engineer who indicated that plans have not yet been prepared. As such, your clients' request to have the plans reviewed by their engineer may be more properly addressed to Camelot or its engineer.

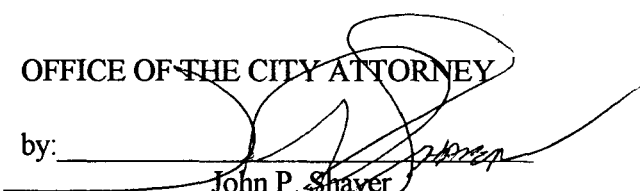
Please also understand that the City has not necessarily required the developer to redesign the facility; all that is and has been required is that the design and function of the stormwater facility be to established standards. Those standards are codified in the *Stormwater Management Manual*, a copy of which would be available for purchase from the Community Development Department.

As I am sure you are aware, the City has not designed or engineered the facility and that it is not a public water or sanitation facility under 24-10-106 C.R.S.

Should you have any questions, please feel free to contact me at the number shown below.

OFFICE OF THE CITY ATTORNEY

by: \_\_\_\_\_

  
John P. Shaver

Assistant City Attorney  
250 N. 5th Street  
Grand Junction, CO 81501  
(970) 244-1501

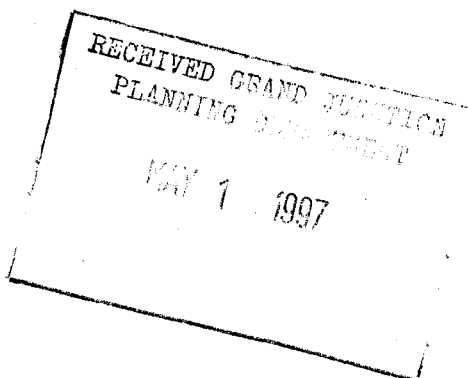
pc: Jody Kliska



City of Grand Junction, Colorado  
250 North 5th Street  
81501-2668  
Phone (970) 244-1501  
FAX (970) 244-1456

April 30, 1997

Mr. Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, Colorado 81623



Via U.S. Mail and Facsimile

Dear Mr. Stowell,

I am writing concerning a recent request that was made by legal counsel for Mr. and Mrs. Wood to Jody Kliska. I've attached a copy of their letter for your immediate reference.

While the request posed in that letter is reasonable and would fall within the purview of the Open Records Act, the city is presently unable to accommodate the Woods due to the fact that no plans have been submitted.

In my most recent correspondence to you, I asked that you determine a solution to the drainage facility problem(s) and submit information consistent with solving the problem(s). In addition, you were requested to contact the planner to discuss the project and a financial guarantee for the work. Since that time we have heard nothing. If you are unsure as to the nature of the problem and/or its solution, please minimally provide a detailed written confirmation of your present course of action and proposed timeline for addressing the extant issues.

OFFICE OF THE CITY ATTORNEY

by: \_\_\_\_\_

  
John P. Shaver

Assistant City Attorney  
250 N. 5th Street  
Grand Junction, CO 81501  
(970) 244-1501

pc: Jody Kliska  
Kathy Portner



# LANDesign

ENGINEERING • SURVEYING • PLANNING

April 30, 1997

Mr. Gary Doehling  
Doehling and Associates  
P.O Box 2734  
Grand Junction, CO 81502

Re: Trails West Detention Pond

Dear Mr. Doehling:

I am writing in response to Mr. Blockwick's letter regarding the construction of the detention pond and drainage system at Trails West Village. As you and all parties involved are aware, LANDesign was contracted to observe the construction of Trails West Filing One, however we were replaced during the construction of the project before the construction of the detention pond was completed. As a result we were not able to assure that the pond was built according to the plans.

In Mr. Blockwick's letter we were asked to help mitigate an alleged problem between our approved drainage report, the approved plans and the construction. It has been alleged that the approved plans did not correspond with the approved drainage report. We have been told in a letter from Mr. Blockwick that Mr. Stowell will only allow us to investigate the situation on site if we hire and pay for an independent surveyor to determine grades and only at a time approved by Mr. Stowell. This posture only exacerbates the situation and makes it difficult for us to determine the problem and mitigate the situation. In order to help, we need access to the site and the ability to determine grades and constructed topographic information. We will not hire an independent surveyor to take elevations as our staff has the ability and would respond quickly! This refusal to allow our staff to investigate the site only impedes our ability to assist in mitigating the situation.

In an effort to help determine the alleged problems at the site we have met with Ms. Jody Kliska of the City of Grand Junction. In a meeting held at 9:30 AM, Wednesday April 30, at the City of Grand Junction office, Ms. Kliska and our staff determined that the approved plans are correct and indeed do correspond with the approved drainage report however, the construction is not completed in accordance with the approved plans. Ms Kliska has indicated to us that a letter informing Mr. Stowell of these findings will be sent to him immediately.

Further, the findings by our office in observing the construction indicates that the contractor does not understand the concept of the detention design and that construction is not completed according to the approved plans. The materials used are not in accordance with specifications and some work is not completed. The discrepancies in the construction procedures and items not completed include but are not limited to the following:

1. No grate has been placed on the top of the outlet structure and only a piece of chipboard covers the top inlet.
2. There is dirt in the bottom of the outlet structure instead of graded gravel.

**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627

April 30, 1997

John P. Shaver, Esq.  
Assistant City Attorney  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

**FAXED**  
4/30/97 7:15 pm

**Re: Trails West Village**

**RECEIVED GRAND JUNCTION  
PLANNING & MAILING DEPARTMENT  
VIA FAX & MAIL**  
MAY 2 1997

Dear John:

I am in receipt of your April 30, 1997 letter enclosing correspondence directed to Jody Kliska from Christopher McAnany. While the request posed in Mr. McAnany's letter may be reasonable, any efforts on behalf of the City to turn the re-design mandated by Jody Kliska into an open-ended public process with resulting delays would not be. Please bear in mind that in addition to Mr. & Mrs. Wood, the families now occupying new homes within Trails West Village filing I are also the City's constituents and deserving of a speedy resolution of this drainage facility issue.

Regarding the last paragraph of your letter to me, it is my understanding that the project engineer, Pat O'Connor, delivered a letter to Jody yesterday or today outlining a proposed solution to the drainage facility problem. Please let me know if that letter has not yet been received and I will follow up with Pat. Concerning your request that I contact the project planner to discuss the project and financial guarantees, please be advised that I spoke to Kathy Portner shortly after the drainage problem was discovered and relayed the status of the project to her at that time. I explained to her that I was waiting for the South Camp Road improvements re-design and the drainage facility plan re-design to be approved by the City so that the costs of constructing those improvements could be put out to bid. That status has not changed and therefore, I have nothing presently to discuss with Kathy. Without approved plans I am not sure how to approach the financial guarantee issue. I intend to communicate with Kathy as soon as I know what Camelot will be permitted to construct with respect to these improvements.

I will be away until May 7, 1997. In my absence, feel free to contact Pat O'Connor regarding any engineering/design issues and Craig Blockwick, Esq. concerning any legal issues that arise during my absence.

Sincerely,

A handwritten signature in cursive script that reads "Brian L. Stowell". The signature is written in dark ink and is positioned above the printed name.

Brian L. Stowell

cc: Pat O'Connor  
Craig Blockwick, Esq.  
Ed McCaffrey  
~~Kathy Portner~~



May 6, 1997

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (303) 244-1599

Mr. Patrick O'Connor, P.E.  
Banner Associates, Inc.  
2777 Crossroads Blvd.  
Grand Junction, CO 81506

RE: Trails West Village

Dear Patrick:

Attached are the redlined plans for the South Camp Road improvements along Filing #1. The City's comments regarding the requirements for the sidewalk alignment and width were forwarded to you last week. Please note that the curb along Filing #1 should remain a consistent distance from centerline to provide full half street improvements along the frontage of the development. The taper needs to be defined by striping and delineators rather than actually tapering the curb line. The other comments are as marked on the plan. Please return the redlined plans with your submittal of revisions.

Jody Kliska and I also reviewed the letter you submitted regarding the site stormwater management system. The City's primary concern regarding site drainage is that, at the time the City performed the final inspection of Filing #1 on April 7, it appeared that the stormwater facilities including the detention pond and outlet structure were not yet complete and therefore not functioning as intended.

Currently, as described in your letter dated April 28, 1997, the developer is proposing to expand the pond to store irrigation water as well as to detain runoff from all three filings. Since the stormwater facilities originally designed on the plans accepted for construction have not yet been completed and now a change to that original design is proposed, the City needs to review revised stormwater management, grading, and drainage plans, and an addendum to the original drainage report. These items should explain and detail the ultimate design of the stormwater management system proposed for the development as well as how that design conforms to City criteria. The drainage report addendum should include a description of how the proposed changes affect the original stormwater management plan for the development. City approval of the revised plans and report must be obtained prior to construction of the improvements.

Please include the revised grading plans for the detention pond along with the revised plans for South Camp Road so that it is clear how all of the proposed improvements for the road, sidewalk, and detention pond fit together. Similarly, the addendum to the drainage report and the revised stormwater management, grading, and drainage plans must all be submitted together for review. Please call me at 244-1443 or Jody at 244-1591 if you have further questions. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Kerrie Ashbeck". The signature is written in a cursive, flowing style.

Kerrie Ashbeck, P.E.  
Development Engineer

cc: File #FPP-96-110  
Kathy Portner - Community Development  
Brian Stowell

BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
605 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

May 20, 1997

MAY 22 1997

Ms. Jody Kliska  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

RE: Trails West Village

Dear Jody,

Thank you for meeting on-site with me yesterday to discuss Trails West Village issues. Also present were: Kerrie Ashbeck (City of Grand Junction), Phil Hart and Jeff Crane (LANDesign), and Ed McCaffrey and Ron Gurman (McCaffrey Construction).

The drawings I presented you with reflect The City's requested revisions to the South Camp Road improvements submitted earlier by our office. They also include our effort to satisfy the City's requested redesign of the stormwater facilities with our suggested modifications to the stormwater detention pond and 12" RCP discharge pipes. The modifications to the pond and discharge piping were discussed at length and recognized by all parties as acceptable improvements to the irrigation and stormwater management systems. These improvements consist of increasing the detention pond volume to include approximately 32,000 cubic feet of storage for irrigation purposes (below the outlet box elevation of 4744.0) and approximately 13,000 cubic feet of storage for stormwater detention (above elevation 4744.0). The other improvement proposed and accepted was to shorten the 12" RCP's and redirect them into the stilling basin to utilize it for energy dissipation of minor flows from the development. Also discussed was the need to finalize grading of the detention area including all inlet channels for on-site and off-site flows. The use of broken concrete to replace the lower 18" of the 36" layer of riprap called for in the original design in the stilling basin was accepted by the City in accordance with your earlier verbal approval of the same.

As no other modifications were proposed or discussed, I assume that all stormwater concerns referenced in previous correspondence between the City and Camelot Investments (Mr. Brian Stowell) have been addressed.

Ms. Jody Kliska  
City of Grand Junction  
May 20, 1997  
Page 2

I appreciate your verbal approval on-site of these stormwater/irrigation improvements to allow construction to proceed and I look forward to hearing from you in the very near future on the South Camp Road revisions included in the drawings. Thank you for your consideration in expediting these matters.

Sincerely,

BANNER ASSOCIATES, INC.



Patrick M. O'Connor, P.E.  
Project Manager

PMO/rr

cc: Brian Stowell  
Ed McCaffrey  
Phil Hart (LANDesign)

# LANDesign

ENGINEERING • SURVEYING • PLANNING

May 20, 1997

Mr. Gary Doehling  
628 Rood Ave. Suite 3  
Grand Junction, CO 81503

Re: Meeting at TWV site drainage facilities

Dear Gary:

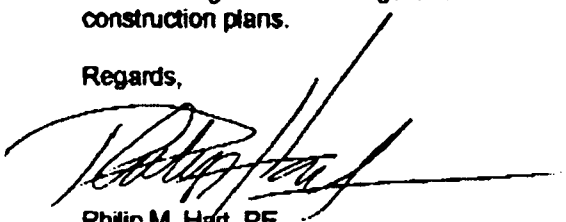
Jeff Crane and I met with Mr. Pat O'Conner of Banner Engineering, Jody Kilska of the City of Grand Junction, Kerie Ashbeck of the City of Grand Junction and Ed McCaffery of McCaffery Construction on the site of Trails West Village Detention and Drainage facility on Monday at 10:00 AM. We discussed the condition of the facility, which has not been completed at this time.

After discussion, we agreed that the design for the detention facility was designed and drawn according to the report submitted to the City and that it is correct and that the construction would be completed according to the plans with 2 exceptions.

1. The pond would be deepened according to new plans completed by Banner Engineering to use it for storage of irrigation water. This is simply an addition to the design and not a change caused by any design or drawing error.
  
2. The 2 12" concrete pipes, which carry the historic flow onto the neighboring property, would be adjusted by removing 2 sections each and directing them into the stilling basin. An addition not required by design standards but a change which the owner and Banner Engineering has elected to do.

The working of the drainage and detention facility will work on the basis of the original design and construction plans.

Regards,



Philip M. Hart, PE  
President





June 4, 1997

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

Mr. Patrick M. O'Connor, P.E.  
Project Manager  
Banner & Associates  
2777 Crossroads Boulevard  
Grand Junction, CO 81506

RE: Trails West Village

Dear Pat:

City engineering staff has reviewed the drawings you prepared for the South Camp Road revisions and for the drainage and irrigation pond revisions. The plans will be approved with the following modifications:

1. The new manhole structure shown for the two 12" RCP's to redirect the flows into the stilling basin be modified to provide a manual control, perhaps slide gates, so the flows into the stilling basin can be controlled. This should alleviate the concerns of the adjacent property owner about receiving more nuisance flows than occurred pre-development.
2. The SWMM manual requires groundcover for erosion control on the exposed areas of the pond. Please show groundcover around the pond.
3. Indicate the finish floor elevations of the lots adjacent to the proposed pond.

Please submit at least four stamped sets of the revised drawings for city approval.

For our meeting on Friday you may want to prepare a cost estimate for the remainder of the work to be done in filings 1 and 2 which includes completion of the pond and the South Camp Road improvements.

Sincerely,

A handwritten signature in cursive script that reads "Jody Kliska".

Jody Kliska  
City Development Engineer

cc: Don Newton  
Kathy Portner ✓

  
**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627

---

June 9, 1997

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

VIA FAX & MAIL

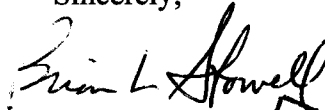
**RE: Trails West Village Filing II**  
**Request for Credit for Transportation Capacity Payment**

Dear Kathy:

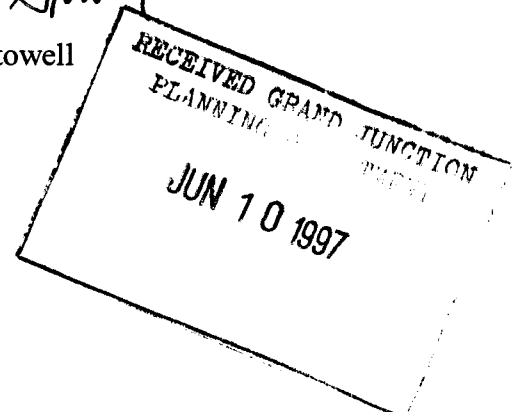
I am writing to request full credit for the transportation capacity payments ("TCP") Camelot owes the City as a part of obtaining subdivision approval for Filing II. This request is based on the fact that Camelot will be making physical improvements to South Camp Road, the cost of which far exceeds the TCP. Off-site improvements for Filing II, mandated by the City, require Camelot to widen over 500 feet of South Camp Road south of Mescalero Avenue. The costs associated with these improvements far exceed the City's TCP for Filing I of \$7,000.

As with the open space fee issue, where a developer provides inventory or actual improvements, the purpose behind the associated impact fees is satisfied and a credit ought to be given. I appreciate your consideration of this request.

Sincerely,



Brian L. Stowell

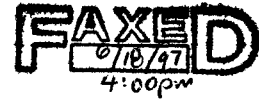


**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627

June 18, 1997

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

VIA FAX & MAIL



**RE: Trails West Village Filing II**  
**Request for Credit for Transportation Capacity Payment**

Dear Kathy:

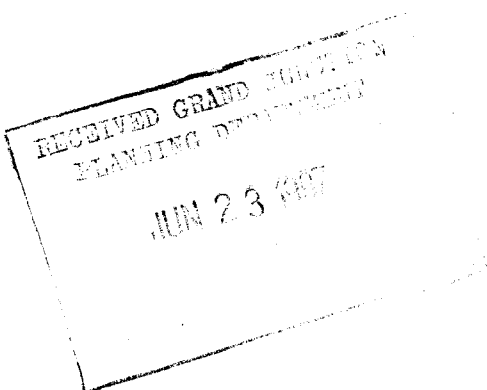
I am writing to supplement my letter dated June 9, 1997 requesting full credit for the transportation capacity payments ("TCP") Camelot owes the City as a part of obtaining subdivision approval for Filing II. This request was based on the fact that Camelot will be making physical improvements to South Camp Road. The cost of the road improvements allocated to Filing II is estimated at \$ 32,090.00 which, as noted in my earlier correspondence, far exceeds the TCP.

I trust this letter completes your file regarding this matter. Please call me right away if it does not. Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Brian L. Stowell".

Brian L. Stowell



CITY OF GRAND JUNCTION  
DEPARTMENT OF PUBLIC WORKS & UTILITIES  
250 NORTH 5TH STREET  
GRAND JUNCTION, CO 81501  
(970) 244-4003

1803230 1216PM 06/24/97  
MONIKA TODD CLK&REC MESA COUNTY CO

TO THE MESA COUNTY CLERK & RECORDER:

THIS IS TO CERTIFY that the herein named Subdivision Plat,

TRAILS WEST VILLAGE, FILING No. TWO

Situated in the SW of Section 18,

Township 1 SOUTH, Range 1 WEST,

of the UTE Meridian in the City of Grand Junction, County of Mesa, State of Colorado, has been reviewed under my direction and, to the best of my knowledge, satisfies the requirements pursuant to C.R.S. 38-51-106 and the Zoning and Development Code of the City of Grand Junction for the recording of subdivision plats in the office of the Mesa County Clerk and Recorder.

This certification makes no warranties to any person for any purpose. It is prepared to establish for the County Clerk and Recorder that City review has been obtained. This certification does not warrant: 1) title or legal ownership to the land hereby platted nor the title or legal ownership of adjoining; 2) errors and/or omissions, including, but not limited to, the omission(s) of rights-of-ways and/or easements, whether or not of record; 3) liens and encumbrances, whether or not of record; 4) the qualifications, licensing status and/or any statement(s) or representation(s) made by the surveyor who prepared the above-named subdivision plat.

Dated this 20 day of June, 1997.

City of Grand Junction,  
Department of Public Works & Utilities

By: James L. Shanks  
James L. Shanks, P.E., P.L.S.  
Director of Public Works & Utilities

Recorded in Mesa County

Date:

Plat Book: 15 Page: 333

Drawer: DD66

g:\special\platcert.doc

June 26, 1997



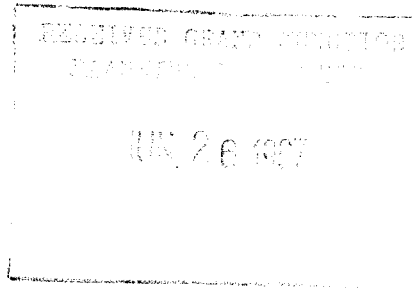
City of Grand Junction, Colorado

250 North Fifth Street

81501-2668

FAX: (970)244-1599

Brian Stowell  
Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623



RE: Trails West Village

Dear Brian:

This letter is a summary of conversations you and your engineer have had with Public Works staff recently regarding the revised plans for Trails West Village filings 1&2.

On the revised plan for South Camp Road some of the handrail has been deleted. It appears handrail is needed on the north side of the intersection with Mescalero and along the box culvert headwalls, as was shown on the original drawings. Please revise the plan as necessary to all railing needed for pedestrian/bike safety. An alternative material for the handrail may be proposed as long as it meets the criteria of being low maintenance and provides safety for pedestrians and cyclists.

Drainage at the end of the curb and gutter section on South Camp Road needs to be addressed. Where will the water go and what will be affected? Show details on the plans for the necessary drainage work.

Although the stormwater detention pond was designed in accordance with the City's Stormwater Management Manual, the design does increase the frequency of discharge onto the downstream property, which is the backyard of a single family residence. The owner of this residence has called the City to express his objection the increased frequency of stormwater discharge onto his property. After discussing this changed condition with your engineer, we believe the frequency of discharge could be returned to near historic frequency by simply restricting the flow into the two 12" RCP pipes at the existing overflow structure, redirecting the outlet to the stilling basin and forcing the minor events to discharge into the detention/irrigation pond where the water would be held until the pond overflows.

Flows out of the existing drainage structure could be regulated by steel plates bolted to the inside wall of the structure over the two 12" openings, as discussed with your engineer. A small opening would need to be maintained at the bottom of one of the pipes to allow the upstream pipe and overflow box to drain into the stilling basin after each storm event. The opening size into one or both of the

pipes would need to be adjustable to be sure the stilling basin will not overflow during minor events. This can be accomplished by slotting the holes used to bolt the steel plate to the wall at the overflow box.

Please revise your drainage plan to show the above or other approved modification to reduce the frequency of discharge onto the adjacent property to at or near the pre-development condition.

Revisions to the construction drawings which reflect the items described above are required prior to sign off of the drawings by the City.

Sincerely,

A handwritten signature in black ink, appearing to read "Jody Kliska". The signature is fluid and cursive, with a large initial "J" and "K".

Jody Kliska, P.E.  
Development Engineer

cc: Don Newton, City Engineer  
Pat O'Connor, Banner & Associates  
Kathy Portner, Community Development

July 14, 1997

BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
805 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

Ms. Jody Kliska  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

RE: Trails West Village Filings #1 and #2

Dear Jody:

This letter is in response to your June 26, 1997 letter to Brian Stowell. Please review the enclosed plans with a revision date of June 30, 1997 (Revision #2). These plans correspond with the City's requested modifications to the stormwater facilities. The current revisions include:

1. Additional handrail (or City approved fence) has been shown around the box culvert at Mescalero Drive (both sides).
2. A swale is shown to direct runoff from the end of the curb and gutter to the stilling basin.
3. As requested by Don Newton (City Engineer), one 12" RCP has been shown to be sealed off (abandoned in-place) and a non-closing slide gate installed on the other 12" RCP. The functioning pipe will be elbowed into the stilling basin as shown. This is slightly different than your requests in the June 26 letter but is in conformance with the direction given most recently by Don Newton in his telephone discussions with me.

Please feel free to contact me should there be further questions or concerns.

Sincerely,

BANNER ASSOCIATES, INC.



Patrick M. O'Connor  
project Manager

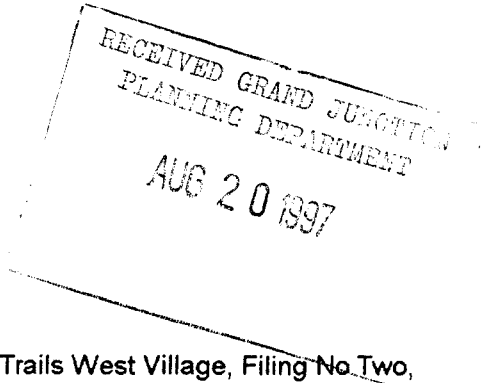
PMO/rr

xc: Brian Stowell

REDLANDS WATER & POWER COMPANY  
2518 MONUMENT ROAD  
GRAND JUNCTION, CO. 81503  
(970) 243-2173  
FAX (970) 256-1320

August 18, 1997

Concept Builders, LLC  
2641 Chestnut Drive  
Grand Junction, Co. 81506



Subject: Letter of Notification for owner of Lot 2 , Block 2 , Trails West Village, Filing No Two, Mesa County, Colorado.

This letter is formal notification that the subject lot and block encroaches on a portion of the right-of-way for Lift No. 2 of the Redlands Water & Power Company (RW&PC). The Plat for the subject subdivision that was filed at the Mesa County Clerk and Records Office in Book 15, Page 333 does not accurately indicate that actual limits of the canal right-of-way. The RW&PC claims a right-of-way in the vicinity of your property of the lesser of 25 feet from canal centerline or the distance from canal centerline to the outer edge of historical evidence of O&M activities (e.g. toe of slope, spoil piles, edge of road plus spoil area, etc.). The RW&PC claims a specific width of 25 feet from centerline immediately adjacent to your property.

If structures are built within the canal right-of-way they will be subject to being destroyed or damaged without cost to the RW&PC during operation and maintenance activities along the canal. To lessen this risk please do not place anything, particularly permanent structures, within the canal right-of-way.

This letter is being sent to you Certified Mail, Return Receipt Requested and a copy of this letter will be recorded at the Mesa County Clerk and Records Office for public record.

If you have any questions please call Redlands Water & Power Company at (970) 243-2173.

Sincerely,

A handwritten signature in black ink, appearing to read "Gregg Strong". The signature is written in a cursive, flowing style.

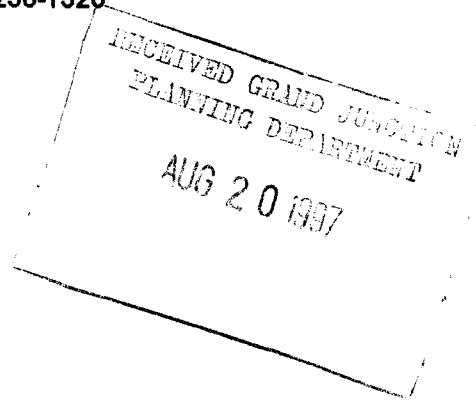
Gregg Strong, Superintendent

GS/bs

cc: City of Grand Junction Planning Commission  
Mike Pelletier, Community Development Department



REDLANDS WATER & POWER COMPANY  
2518 MONUMENT ROAD  
GRAND JUNCTION, CO. 81503  
(970) 243-2173  
FAX (970) 256-1320



August 18, 1997

Kenlot Enterprises, LLP  
0090 Caballo Road  
Carbondale, Co. 81623

Subject: Letter of Notification for owner of Lot 3 , Block 2 , Trails West Village, Filing No Two, Mesa County, Colorado.

This letter is formal notification that the subject lots and block encroaches on a portion of the right-of-way for Lift No. 2 of the Redlands Water & Power Company (RW&PC). The Plat for the subject subdivision that was filed at the Mesa County Clerk and Recorders Office in Book 15, Page 333 does not accurately indicate that actual limits of the canal right-of -way. The RW&PC claims a right-of-way in the vicinity of your property of the lesser of 25 feet from canal centerline or the distance from canal centerline to the outer edge of historical evidence of O&M activities (e.g. toe of slope, spoil piles, edge of road plus spoil area, etc.). The RW&PC claims a specific width of 25 feet from centerline immediately adjacent to your property.

If structures are built within the canal right-of-way they will be subject to being destroyed or damaged without cost to the RW&PC during operation and maintenance activities along the canal. To lessen this risk please do not place anything, particularly permanent structures, within the canal right-of-way.

This letter is being sent to you Certified Mail, Return Receipt Requested and a copy of this letter will be recorded at the Mesa County Clerk and Recorders Office for public record.

If you have any questions please call Redlands Water & Power Company at (970) 243-2173.

Sincerely,

A handwritten signature in black ink, appearing to read "Gregg Strong". The signature is written in a cursive style with a large initial "G".

Gregg Strong, Superintendent

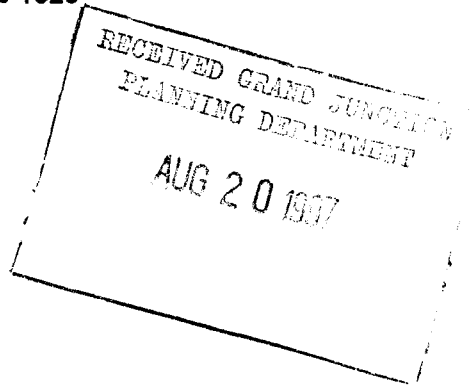
GS/bs

cc: City of Grand Junction Planning Commission  
Mike Pelletier, Community Development Department

REDLANDS WATER & POWER COMPANY  
2518 MONUMENT ROAD  
GRAND JUNCTION, CO. 81503  
(970) 243-2173  
FAX (970) 256-1320

August 18, 1997

Camelot Investments, LLC  
0090 Caballo Road  
Carbondale, Co. 81623



Subject: Letter of Notification for owner of Lot 1 , Block 2 , Trails West Village, Filing No Two, Mesa County, Colorado.

This letter is formal notification that the subject lot and block encroaches on a portion of the right-of-way for Lift No. 2 of the Redlands Water & Power Company (RW&PC). The Plat for the subject subdivision that was filed at the Mesa County Clerk and Records Office in Book 15, Page 333 does not accurately indicate that actual limits of the canal right-of-way. The RW&PC claims a right-of-way in the vicinity of your property of the lesser of 25 feet from canal centerline or the distance from canal centerline to the outer edge of historical evidence of O&M activities (e.g. toe of slope, spoil piles, edge of road plus spoil area, etc.). The RW&PC claims a specific width of 25 feet from centerline immediately adjacent to your property.

If structures are built within the canal right-of-way they will be subject to being destroyed or damaged without cost to the RW&PC during operation and maintenance activities along the canal. To lessen this risk please do not place anything, particularly permanent structures, within the canal right-of-way.

This letter is being sent to you Certified Mail, Return Receipt Requested and a copy of this letter will be recorded at the Mesa County Clerk and Records Office for public record.

If you have any questions please call Redlands Water & Power Company at (970) 243-2173.

Sincerely,

Gregg Strong, Superintendent

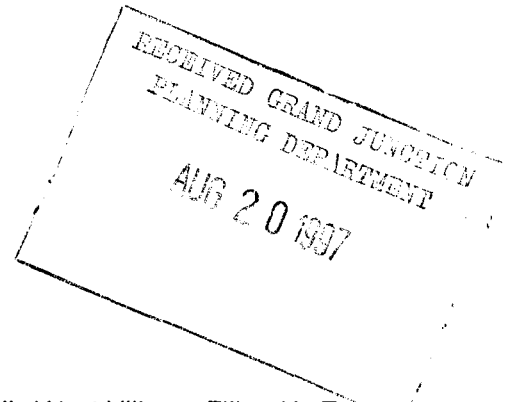
GS/bs

cc: City of Grand Junction Planning Commission  
Mike Pelletier, Community Development Department

REDLANDS WATER & POWER COMPANY  
2518 MONUMENT ROAD  
GRAND JUNCTION, CO. 81503  
(970) 243-2173  
FAX (970) 256-1320

August 18, 1997

Camelot Investments, LLC  
0090 Caballo Road  
Carbondale, Co. 81623



Subject: Letter of Notification for owner of Lot 4 , Block 2 , Trails West Village, Filing No Two, Mesa County, Colorado.

This letter is formal notification that the subject lot and block encroaches on a portion of the right-of-way for Lift No. 2 of the Redlands Water & Power Company (RW&PC). The Plat for the subject subdivision that was filed at the Mesa County Clerk and Recorders Office in Book 15, Page 333 does not accurately indicate that actual limits of the canal right-of-way. The RW&PC claims a right-of-way in the vicinity of your property of the lesser of 25 feet from canal centerline or the distance from canal centerline to the outer edge of historical evidence of O&M activities (e.g. toe of slope, spoil piles, edge of road plus spoil area, etc.). The RW&PC claims a specific width of 25 feet from centerline immediately adjacent to your property.

If structures are built within the canal right-of-way they will be subject to being destroyed or damaged without cost to the RW&PC during operation and maintenance activities along the canal. To lessen this risk please do not place anything, particularly permanent structures, within the canal right-of-way.

This letter is being sent to you Certified Mail, Return Receipt Requested and a copy of this letter will be recorded at the Mesa County Clerk and Recorders Office for public record.

If you have any questions please call Redlands Water & Power Company at (970) 243-2173.

Sincerely,

Gregg Strong, Superintendent

GS/bs

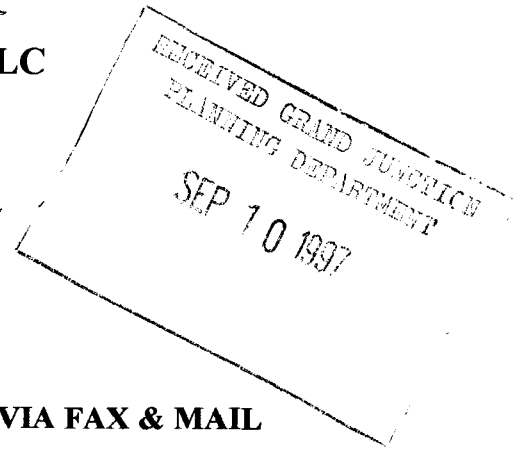
cc: City of Grand Junction Planning Commission  
Mike Pelletier, Community Development Department

  
**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627

September 8, 1997

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

VIA FAX & MAIL



**Re: Trails West Village, Filing II**

Dear Kathy:

I am writing to petition the City for an extension of time to complete the designated improvements set forth in the Development Improvements Agreement for filing II. Specifically, the detention pond and the expansion of South Camp Road remain uncompleted, primarily due to a combination of design changes, disturbances caused by adjacent construction projects and weather delays.

The delays, in part, can be traced back to the City's determination in April of this year that the original detention facilities did not meet City standards. A lengthy redesign process followed and it was not until late July, at least a month into the performance period, that the present design was approved by the City. Efforts were made by McCaffrey Construction to construct the detention facilities during the month of July but Ute Water's line replacement project in South Camp Road caused surface water to repeatedly discharge into the TWV pond, making it all but impossible install the liner. August activity was hampered by an unusual amount of precipitation and the fact that McCaffrey Construction was forced to take on another job with the City of Montrose.

With respect to the South Camp Road improvements, Camelot learned last May that the original design for the improvements was flawed. That redesign process also did not conclude until July. However, since the prevailing logic is that the detention facilities should be completed before starting the South Camp Road improvements, a compounded delay situation has resulted.

For the above reasons, Camelot asks for an extension of time until October 15, 1997 to complete the detention facilities and until April 1, 1998 to complete South Camp Road. These dates anticipate McCaffrey Construction returning to the job site by October 1. If weather permits and all parties agree that it is likely that asphalt can be placed on South Camp Road before the batch plants close in 1997, work will commence on South Camp Road immediately following acceptance of the detention facilities. Otherwise, the South Camp Road work will

begin as early as possible in 1998.

I trust this will be acceptable to the City which remains bonded for all improvements. I look forward to hearing from you and thank you for your cooperation in advance.

Sincerely,

A handwritten signature in cursive script that reads "Brian L. Stowell". The signature is written in black ink and is positioned below the word "Sincerely,".

Brian L. Stowell

cc: Pat O'Connor  
Ed McCaffrey



September 12, 1997

City of Grand Junction, Colorado

250 North Fifth Street

81501-2668

FAX: (970)244-1599

Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623

RE: Trails West Village Filings 1 & 2  
Via Facsimile and U.S. Mail

Dear Brian:

This letter is written in response to your September 8, 1997 letter. In general as proposed in your letter the City will agree to allow you an extension of time to complete the improvements in and for *Trails West* subdivision however the following items must be submitted and in place prior and otherwise approved by the City prior to the expiration of the existing Development Improvements Agreement and Guarantee. The existing agreement expires September 18, 1997.

Please submit as soon as possible:

- A new DIA and Guarantee, and
- Exhibit B prepared in accordance with and reflective of the July 14, 1997 plans prepared by Banner Associates.

A realistic, practical date for completion of all improvements should be set by you with consultation from your contractor and engineer. Your letter provides two dates, one in October and one in April. The City will favorably consider a guarantee and completion date of March of 1998. If you have an alternate date in mind please let me know.

As you know construction of the detention pond and South Camp Road improvements were conditions of approval for the first two filings of the Trails West Subdivision. Those improvements are not yet completed. Also as you know Filing 3 will create additional impacts on both the drainage and traffic flow. Given these facts the improvements to both the detention pond and South Camp Road must be substantially complete before further development may occur. It is therefore my recommendation to the Community Development Department that Filing 3 not be taken to hearing until the improvements on which it is dependent are completed and all other issues, including but not limited to resolution of the technical problems with the Filing 3 plans are satisfactorily resolved.

Mr. Brian Stowell  
September 12, 1997  
page 2

The DIA and guarantee, in a form acceptable to the City, must be received by no later than September 16, 1997. Failure to do so will result in the City calling the outstanding letter of credit and pursuing all other remedies provided for in the improvement agreement or otherwise legally available.

Please do not delay submitting the required documents.

Should you, your engineer or your contractor have any questions about what is required please call me, Kerrie Ashbeck, Kathy Portner or John Shaver.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jody Kliska".

Jody Kliska, P.E.  
Development Engineer

cc: Kathy Portner  
John Shaver  
Kerrie Ashbeck

**facsimile**  
TRANSMITTAL

---

**to:** Kathy Portner  
**fax #:** 1.970.244.1599  
**re:** TWV Filing II DIA  
**date:** September 22, 1997  
**pages:** 10, including this cover page

**FAXED**  
9/22/97  
3:30pm

Kathy:

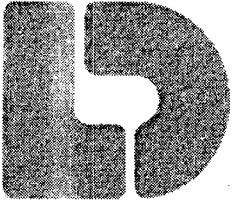
I am attaching a copy of the new DIA containing my signature. The original will follow by mail. Please provide me with a copy of the fully signed DIA for my files together with the appropriate recording information. Thank you.

From the desk of...

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

970-963-0627  
Fax: 970-963-5570





*File  
Copy*

**Lincoln DeVore, Inc.**  
Geotechnical Consultants

1441 Motor St.  
Grand Junction, CO 81505

*FPP-1996-110*

TEL: (970) 242-8968  
FAX: (970) 242-1561

October 27, 1997

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

Attn: Development Engineer

Re: Trails West Subdivision #2

Gentlemen:

This letter is to inform you that Lincoln DeVore, Inc. was requested by McCaffrey Construction to perform compaction testing as well as asphalt testing on the above mentioned property. The work was completed and reports prepared for this testing. Soils compaction reports have been mailed to McCaffrey Construction; however, prepared reports regarding asphalt testing have not been released.

To date McCaffrey Construction's debt of \$4,603.31 for above mentioned tests performed by Lincoln DeVore, Inc. remains due and payable in full. Until this debt is paid by client, above referenced reports remain the property of Lincoln DeVore, Inc.

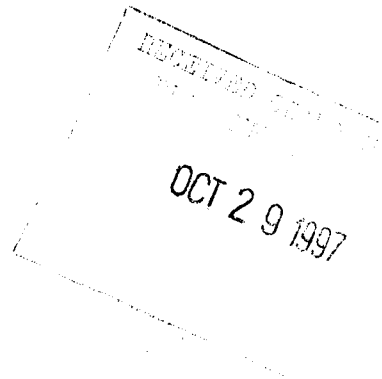
If you have any questions regarding this matter, please feel free to contact our office.

Very truly yours,

LINCOLN DeVORE, INC.  
By:

Edward M. Morris, P.E.  
Branch Manager

EMM/em



EXTRA



City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

November 12, 1997

Pat O'Connor, P.E.  
Banner Associates, Inc.  
2777 Crossroads Blvd.  
Grand Junction, CO 81506

Dear Pat:

It is City staff's understanding that the developer of the Trails West Village Subdivision intends to resubmit the 3rd Filing in December to proceed with further staff review and work towards a Planning Commission hearing schedule. Some time ago, you and I discussed the comments on the project, but I thought it would be helpful to summarize the main issues remaining and to provide a copy of the previous comments for your use in preparing revised plans.

In September, you provided me a copy of a letter from Ed Tolen at Ute Water. The letter states their understanding that an easement for the water line is being provided in tracts to be maintained by the Homeowner's Association. Mr. Tolen's letter also notes Ute Water's concerns over how the tracts are graded to handle runoff in the event of a water line break. As noted in the attached staff comments, the applicant is required to obtain Ute Water's approval of the proposed relocation of the waterline, the site grading and drainage as shown on the plans, and the provision and location of the water line easement. Due to the significance of the relocation of the waterline and the mitigation plans necessary to illustrate how water from a water line break would be conveyed through the development, the City is requiring that Ute Water either sign off on the final plans prior to the project proceeding to Planning Commission, or that Ute Water submit a letter stating their approval of the same based on a current plan review.

Both the City and the previous engineer on the project have estimated the flows anticipated as a result of a water line break. However, as the engineer for this project, Banner and Associates must provide supporting calculations of the anticipated flows, capacity calculations for the conveyance facilities, and a description of how the flows are routed through the site to the outfall. As noted in the comments, the applicant must develop a plan and provide calculations to illustrate that there are facilities designed to convey the flows and to minimize the damage to private property and public infrastructure.

Next, you and I have discussed the drainage report and the grading and drainage plans. Although the City's criteria allows the use of the SCS method utilized in the original report, staff has requested that the report either include an analysis and calculations utilizing the Rational Method in addition to the SCS method presented or replace the

information in the report entirely with the Rational Method analysis only. The grading and drainage plans for this site must be significantly more detailed than for other subdivisions due to the topography on the site and the flow routing necessary to accommodate the potential for a water line break. We discussed the FHA style grading plan, however, just showing one typical lot grading detail is not sufficient information for this site. A grading and drainage plan must be developed for the entire site showing typical grading on each lot (a building envelope for each lot can be assumed from the setbacks) , how grades will tie to the existing topography at the boundaries, lot corner elevations, minimum finish floor elevations, swale grading, etc. Please see the attached comments related to these items.

Finally, it was noted in the response to comments which was submitted at the end of August that there were still some items being resolved with Redlands Water and Power. The resubmittal should include a status on those items. Before the project can proceed to the Planning Commission, the developer will need to submit proof that Redlands Water and Power has approved the plans as most currently proposed and/or submit plans signed by Redlands Water and Power.

Please review and respond to the items described in this letter and in the attached comments (which were originally transmitted to you in response to the initial submittal of the Trails West Village 3rd Filing Final Subdivision) prior to resubmittal of the project. If you have any further questions, please call me at 244-1443. Thank you.

Sincerely,



Kerrie Ashbeck, P.E.  
Development Engineer

cc: Engineering File #FPP-1997-143  
Kathy Portner, Community Development  
Mike Pelletier, Community Development

Trails West Village Subdivision 3rd Filing  
Engineering Department Comments

1. The staff report from the preliminary states that prior to submitting the final plat for approval the applicant will finalize the drainage design and have final approval from Ute Water for the relocation of the water line and easement. Nothing was submitted in the packet received from the applicant from Ute Water. The project cannot proceed to Planning Commission without this approval.
2. A significant issue with the Trails West development has been planning the site for the potential of a break in the 24" Ute Water line. During review for the 1st and 2nd Filings, the applicant was asked to calculate the flows such a break would generate and come up with a mitigation plan for routing the water through the development. The plan at that time only planned for the 1st and 2nd Filings. Now that the 3rd Filing is developing, the applicant must develop a plan and provide calculations to illustrate that there are facilities designed to convey the flows and minimize damage to private property as well as the public infrastructure through the 3rd Filing. Are the swales sized for those flows? Is the grading on the lots designed to keep water from backing up behind the curbs and ponding on the lots? Can the street sections handle the flows? A special street section may be needed over the 24" water line crossings to minimize disruption in the vicinity of the pipe.
3. The soils report recommends the potential for rockfall be assessed. Has this been done?
4. Both the soils report and the drainage report discuss the expansive clay soils present and state that it is critical that positive drainage be maintained. Therefore, it seems appropriate to provide a more detailed grading and drainage plan for the site and the lots themselves to ensure buildings, swales, and lot grading are constructed at proper elevations and are graded to drain. Suggest setting lot corner elevations, showing swales between lots, finish floor elevations, etc.
5. Are any stabilization measures planned for the cut and fill slopes?
6. Exhibit "B" of the development improvements agreement needs to include as-built costs, re-seeding and slope stabilization, as well as other costs which arise as a result of addressing the review comments.
7. The drainage report needs to be revised and expanded. The rational method is the more appropriate method of runoff estimation for a site this size than the SCS method. The SCS method underestimates the precipitation and therefore the runoff. After the analysis by the rational method is complete, the applicant and staff need to meet to discuss the need for on-site detention. It is not clear why areas are provided for detention if they are not to be utilized nor constructed now. Why are they being planned for and who would build them in the future?
8. Why does the report discuss the option for on-site (3rd Filing) ponds and the downstream pond being oversized for 3rd Filing flows if there is to be no detention in the 3rd Filing? If there is detention in the 3rd Filing and it is provided on the tracts shown for that purpose, why is the downstream pond

being sized for the 3rd Filing detention ? If the downstream pond is supposed to take care of 3rd Filing flows, provide the data, calculations, and guarantee to complete the pond and conveyance facilities to the pond with the 3rd Filing.

9. The drainage report needs to more fully explain the path the stormwater is taking and the outfall point(s). The report states that there is a 40 acre off-site basin that contributes runoff across this property. This is historic off-site flow which must continue to be conveyed across the property. The report and plans do not discuss nor show how this is being accomplished. Does this 40 acres include the hillside to the south of the site described in the report, or is it an additional contributing area ? Please show all off-site areas contributing runoff to the 3rd Filing, how much runoff is contributed, where it will enter the site, and how that water is being conveyed across the 3rd Filing. Include the data and calculations in the report as well as any maps at appropriate scales that illustrate the boundaries of the basins if necessary.

10. What is the purpose and concept behind the grading shown on Outlot C?

11. Label more contours on the grading plan, show off-site contours around the perimeter of the site, off-site drainage basin contributions, concentration points, outfall points and flows, how the grading for this site is tying in to adjacent contours, detailed grading for swales, lots, ponds, etc. Relate the design shown on the plans to the narrative in the report describing the path both on-site generated and off-site contributing flows take. What are the conveyance facilities ? How are they sized ? Where is the outfall point, how does the water get there, where does it go from there, is there sufficient capacity ? Provide and cross-reference the supporting calculations. Also describe the path the water from a 24" water line break will take as described above.

12. Is the straw bale barrier intended as temporary erosion protection only ? After the bales disintegrate, how will the water turn the corner and not just continue on to flow into the canal?

13. According to the files from preliminary, nothing indicates that any of the tracts were to be deeded to the City as stated in the dedication language (plat notes 6 & 7) . Only easements were to be granted as far as the record indicates.

14. Lot 16 has a restricted building envelope which may become more restricted by drainage easements when the grading plan is complete and the channel is sized for the off-site flows and water line break flows.

15. As per Community Development's comments, the Ute Water line easement cannot be vacated by the plat and needs to be abandoned prior to approving the new plat.

16. Explain the design for the low point in the sidewalk in the cul-de-sac. Will it be designed as a pedestrian ramp ? Why isn't a sidewalk chase used for the low flows and nuisance flows ? This design may change based on other comments regarding stormwater conveyance.



November 21, 1997

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623

RE: Trails West Village Filings 1 & 2  
Via Facsimile and U.S. Mail

Dear Brian:

This letter is intended to serve as a follow-up to the letter sent to you dated September 12, 1997 from Jody Kliska. As you know, the City accepted a new Development Improvements Agreement (DIA) and a letter of credit for the improvements to South Camp Road and the detention pond associated with the Trails West Village development. Since that letter was issued, there has been substantial progress towards completion of the improvements.

However, due to the paving season coming quickly to an end, the City is requesting that the final paving of South Camp Road be delayed until weather permits in the Spring. The contractor can continue to complete the other improvements such as installation of curb and gutter, sidewalk, the handrail and fence, final grading of drainage facilities, and completion of the detention pond. He must also close up the South Camp Road improvements for the winter which would include placing road base material to the existing edge of asphalt. The contractor may request an inspection when all work, with the exception of the paving (and any other items which must wait for Spring such as landscaping) is completed. At that point, the City will allow you to replace your letter of credit to cover only those items that remain to be completed.

I have sent Banner Associates a letter outlining the technical issues and comments remaining to be addressed for the 3rd Filing. Staff will continue review of the 3rd Filing plans and, once the technical issues are resolved and a guarantee is in place for the paving of South Camp Road in the Spring, the 3rd Filing will be considered for a Planning Commission hearing.

The City appreciates your cooperation in delaying the paving of South Camp Road until Spring when weather permits. Please call me with any questions at (970) 244-1443. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Kerrie Ashbeck", with a long horizontal flourish extending to the right.

Kerrie Ashbeck, P.E.  
Development Engineer

cc: Kathy Portner, Community Development  
Jody Kliska, Engineering  
John Shaver, Administration  
Pat O'Connor, Banner Associates

TRAILS WEST VILLAGE - SOUTH CAMP ROAD

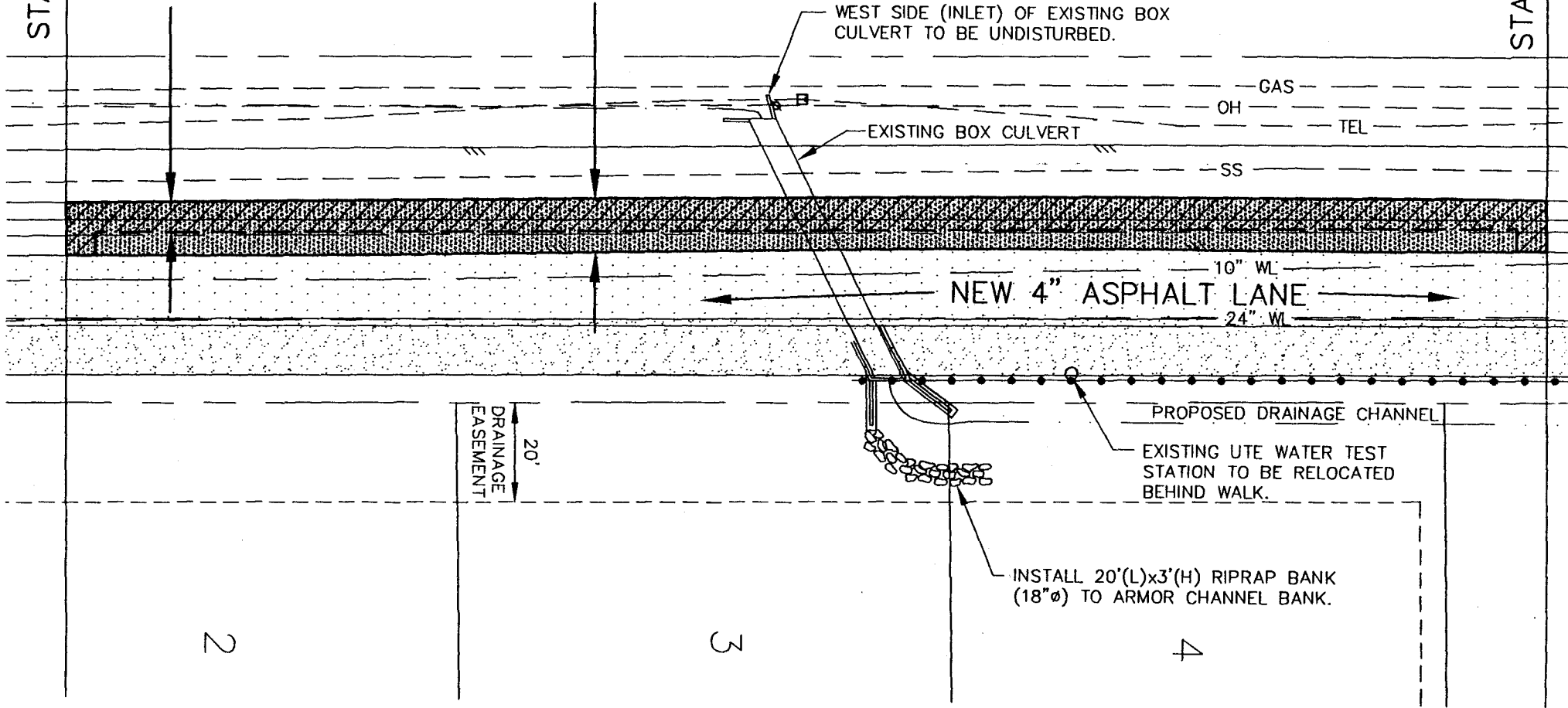
5/14/98 PMO

STA. 6+25.0

STA. 9+25.0

ROTO MILL AS REQ'D  
TO OBTAIN 1 1/2"

1/2 LANE  
OVERLAY



1 1/2" OVERLAY TO MATCH  
PROPOSED 4" ASPHALT GRADE.





JOB NO. TRAILS WEST - SOUTH CAMP ROAD

JOB X-SECTS TO EAST SIDE GUTTER

CALCULATED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

# BANNER

BANNER ASSOCIATES, INC.  
CONSULTING ENGINEERS & SURVEYORS  
2777 CROSSROADS BOULEVARD  
GRAND JUNCTION, CO 81506 • (970) 243-2242

STATION	Gutter Lip	Est. E.O.A. (EDGE ASPH.)	X-SLOPE (12' WIDTH)	ADD (FOR 1.0%) (AT LIP)	CROWN	X-SLOPE (TO LIP) (24' WIDTH)	ADD (FOR 1.0%) (AT CROWN)
4+20.50	4766.57	66.83	2.17%		66.90	1.38%	
5+11.50	4764.43	64.67	2.00%		64.97	2.25%	
5+50	63.77	63.84	0.58%	0.05'	64.14	1.54%	
6+00	62.89	63.01	1.00%		63.23	1.42%	
6+50	61.96	61.97	0.08%	0.11'	62.43	1.96%	
7+00	61.06	60.99	-0.58%	0.19'	61.41	1.46%	
7+50	60.14	60.31	1.42%		60.47	1.38%	
8+00	59.22	59.20	-0.17%	0.14'	59.35	0.54%	0.11'
8+50	58.10	58.02	-0.67%	0.20'	58.25	0.63%	0.09'
9+00	56.96	56.99	0.25%	0.09'	57.15	0.79%	0.05'
9+50	55.89	56.13	2.00%		56.23	1.42%	
9+90.91							
9+96±	54.81	55.10	2.42%		55.29	2.00%	
11+00	52.66	53.05			53.48		
12+00	50.91	51.32			51.75		
13+00	49.13	49.76			50.15		
14+00	47.34	47.69			48.03		

STA 6+25 TO 9+25 REQUIRING FILL AT EDGE OF ROAD TO PROVIDE 1.0% CROSS-SLOPE. PMO 5/14/98

---

**CITY OF GRAND JUNCTION  
FAX TRANSMITTAL**

---

**DATE:** November 25, 1997

**TO:** Pat O'Connor  
Banner Associates

**FAX #:** 243-3810

**FROM:** Kerrie Ashbeck  
City of Grand Junction Engineering 244-1443

**RE:** Trails West Village Subdivision Filings 1 & 2

**# Pages including Cover Sheet:** 1

**COMMENTS:**

I have reviewed the updated Exhibit "B" you faxed to me this morning. Please revise the cost estimate to include the following items: reworking the road base next Spring for paving (and removal of any excess material), the cost of milling along the centerline to match the overlay into the existing centerline, the asphalt necessary for a 2 inch overlay of the existing roadway east of centerline, seeding and stabilization of the detention pond, testing and inspection fees, and the cost of the handrail as well as the fence.

Please submit information and specifications for the fence the developer proposes to use as soon as possible and I will pass it on to Don Newton for review and approval.

I will complete my letter to Alpine Bank as soon as I receive the revised cost estimate. Thanks.



City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

November 26, 1997

Sonya Lopez  
Alpine Bank  
570 32 Road  
Clifton, CO 81520

RE: Letter of Credit for Trails West Village Subdivision Filings 1 & 2

Dear Sonya:

The City is holding a letter of credit for completion of public improvements associated with the Trails West Village Subdivision. The developer is Camelot Investments LLC represented by Mr. Brian Stowell. There has been substantial progress towards completion of the public improvements since the letter of credit was most recently renewed in September. This morning, the City received a revised cost estimate from the developer's engineer for those improvements which remain to be completed to date. The amount of that estimate is approximately \$22,000.00.

The purpose of this letter is to inform you that the City is willing to allow the developer to replace his current letter of credit with a new letter of credit, disbursement agreement, or cash guarantee in the amount of the new Exhibit "B" prepared by Banner Associates Consulting Engineers. The developer will need to execute a new Development Improvements Agreement (D.I.A.) and deposit the new guarantee with the City in order to replace and release his obligations under the previous D.I.A. and letter of credit. It is strongly suggested that the expiration date of any guarantee be sufficient to allow for delays due to springtime construction conditions.

If you have any questions, please do not hesitate to contact me at 244-1443. Thank you.

Sincerely,

A handwritten signature in black ink, appearing to read "Kerrie Ashbeck".

Kerrie Ashbeck  
Development Engineer

cc: Kathy Portner, Community Development  
Brian Stowell, Camelot Investments LLC



November 26, 1997

City of Grand Junction, Colorado

250 North Fifth Street

81501-2668

FAX: (970)244-1599

Brian Stowell  
c/o Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623

RE: Trails West Village Filings 1 & 2  
Via Facsimile and U.S. Mail

Dear Brian:

Per my letter to you dated November 21, 1997, the City has determined that the paving necessary to complete the South Camp Road improvements for the Trails West Village development must be delayed until weather permits in the Spring. During our phone conversation on Monday the 24th, we discussed the possibility of paving yet this Fall if weather permitted and if a guarantee for the cost of the paving improvements was provided until the City accepts the improvements which would likely not be until sometime next year. In either case, we discussed that the City would require a financial guarantee of the improvements whether or not they are completed this Fall. This ensures the improvements will be completed and, in the event the contractor completed the work this Fall under adverse conditions, the City would have funds available to remove and replace the work if necessary in the Spring.

Last year, a significant amount of asphalt work which was done late in the year had to be removed and replaced. Therefore, the City is again stating its position that the paving of South Camp Road be delayed until next Spring when weather permits. This will not only avoid the potential expense to the developer of having to remove and replace all or a portion of the work in the Spring, but also avoids the possibility of only being able to partially complete the milling and paving before the asphalt plants close thus requiring additional traffic control to be maintained by you throughout the winter.

It is my understanding the contractor is placing road base material between the lip of gutter and the existing edge of asphalt and striping the edge of asphalt to delineate the paved roadway as an interim condition until the paving is completed next Spring. If this is the case, there should be no need for flashers, barrels, or other traffic control along the edge of the roadside since there will be a good gravel shoulder and roadway edge delineation.

As we discussed on the phone, the City is requiring that the existing pavement east of the centerline (northbound travel lane) be milled to accommodate a 2" overlay from centerline to tie in at the lip of gutter. This will allow you to place the overlay with the final 2" lift of asphalt on the new widened portion of South Camp Road. The possibility of feathering the asphalt in at the centerline has been discussed. However, in order to get a good join between the new asphalt and the existing roadway, the City is requiring the existing pavement to be milled. The mill and overlay work is necessary to obtain a positive cross-slope on the east side of South Camp Road. As you know, the curb and gutter had to be raised over the box culvert which has created problems in obtaining adequate cross-slope on the roadway. By going out to centerline, enough grade difference can be obtained to minimize the amount of flat and negative cross-slope sections along the roadway adjoining the development. The only other alternatives which help resolve this conflict involve modifications to the box culvert which would likely affect its structural integrity as well as involve significantly more expensive solutions.

I will be contacting Pat O'Connor of Banner Associates to provide some cross-sections of the proposed roadway pavement for use by the contractor and the City. These cross-sections must be reviewed and approved by the City prior to starting the paving operations in the Spring.

Finally, Banner Associates has provided a revised Exhibit "B" which reflects the cost of the improvements remaining to be completed to date. As requested, I am sending a letter to Alpine Bank notifying them that the City will accept a new financial guarantee for the estimated amount. However, before the City will release the current letter of credit and Development Improvements Agreement (DIA), you must execute a new DIA and bring in a letter of credit, check, or disbursement agreement in the amount of the new Exhibit "B".

If you have any questions with regard to this matter, please call me at (970) 244-1443. Thank you.

Sincerely,



Kerrie Ashbeck, P.E.  
Development Engineer

cc: Kathy Portner, Community Development  
John Shaver, Administration  
Pat O'Connor, Banner Associates



**City of Grand Junction, Colorado**  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

December 2, 1997

Ms. Michelle Nau  
Murphy and Associates Realty  
2493 Hwy. 6 and 50  
Grand Junction, CO 81505

**RE: South Camp Road Paving at Trails West Village Subdivision**

Dear Michelle:

Per our phone conversation last week, this letter is intended for your information on the status of the improvements to South Camp Road being completed by the developer of the Trails West Village Subdivision. As you know, the developer has been working on the subdivision's detention pond and the South Camp Road widening for several months. The City has continued to hold a letter of credit from the developer to guarantee completion of the subdivision improvements. However, since August, due to the slow progress on the project, the City has also been holding up the approval of the 3rd Filing until the developer completed South Camp Road and the drainage facilities for the development. For reasons unknown to the City, the developer's progress on these improvements has been slow until very recently.

Since October, the developer has made substantial progress toward completion of the remaining improvements. However, paving operations become marginal at best in the Fall once frost begins to get in the ground and temperatures drop. Typically, paving is not allowed unless the ambient temperature is 40 to 50 degrees and rising (requirements vary from agency to agency) and the ground temperature is in a similar range. Also, the asphalt plants generally shut down for the winter in early December. Last Fall, some contractors paved streets under marginal conditions and a substantial amount of that work had to be removed and replaced in the Spring.

The City is trying to avoid having a similar situation occur this year. Developers have been asked not to pave public streets in the last few weeks of November. While we can have daytime temperatures in excess of 60 degrees in the fall and winter, the temperature is generally not maintained for a sufficient period of time to warm the ground and provide desirable paving conditions. At the request of the City, the Trails West Village developer was required to delay paving of South

Camp Road until Spring of 1998. The City has accepted a new letter of credit and Development Improvements Agreement from the developer to guarantee the paving will be completed when weather permits in the Spring.

In the interim, the developer has been asked to place compacted road base material, to match grade, in between the edge of the existing asphalt and the edge of the new gutter. This will provide a gravel shoulder until the paving can be completed and will minimize traffic control measures through the winter. The City has also requested that asphalt "cold patch" material be placed at the streets intersections to provide a temporary paved radius for turning on and off the residential streets onto South Camp Road. It is the City's opinion that these measures will provide a safe and functional roadway and ingress/egress into the subdivision during the winter months until paving can be done under desirable conditions in the Spring.

The City, too, is anxious to see this portion of South Camp Road and the subdivision improvements completed, however not at the expense of allowing paving under marginal conditions. This time of year, the weather can change so quickly the work may be interrupted when it is only partially completed. It was deemed better to stop the work for the winter at a reasonable and functional point rather than risk the potential expense and inconvenience of partially or poorly completed work which would need to be re-done in the Spring.

Thank you for your inquiry and please call me at 244-1443 if I can be of further assistance.

Sincerely,



Kerrie Ashbeck, P.E.  
Development Engineer

cc: File # FPP-1997-143

Kathy

June 1

RECEIVED GRAND JUNCTION  
PLANNING DEPARTMENT  
DEC 04 1997

Ed

2163 Buffalo Dr.  
Grand Jct. CO 81503  
December 3, 1997

City Council Members  
250 North 5th Street  
Grand Junction, CO 81501

Dear City Council Member,

I am writing on behalf of Wingate's Safety Committee. We are a group of parents concerned about the traffic patterns and pedestrian pathway systems on South Camp Road. There are three potentially dangerous situations that need the immediate attention of the council.

The first concerns the Trails West Subdivision. Children living there must walk to Wingate rather than being bused. Although an extended shoulder has been added to the road in front of this development, there is no connecting pathway or safe crossover to the school. As families are already moving into the area, we feel that this situation is hazardous and requires an immediate action plan.

The second concern is the safety hazard that the existing pedestrian pathways cause secondary to their outflow patterns. Canyon View's sidewalk ends right at the entrance to Wingate's parking lot. Our school has experienced ongoing problems with students safety in the parking area, partially caused by the "place" where Canyon View's responsibility to the public abruptly ended. Likewise the pedestrian pathway on the south side of the school ends on a steep hill that feeds into Buffalo Drive. Although flashing yellow lights are now in place on Buffalo Drive, this intersection needs to be clearly marked as a pedestrian crosswalk so that drivers will always be on the lookout for children.

Development in this area is proceeding at a rapid pace. The City and County Government need to act at once to insure that a continuous pedestrian pathway, extended shoulders and safe crossovers are integrated into the initial development plan. South Camp is one of the most beautiful drives in our city/county/state. Why not think in terms of making this Grand Junction's "in city" scenic drive, ultimately complete with a pedestrian/bike pathway linking the River Front Trail to the Monument? Certainly acting before the area is totally developed is a more economical and politically correct method of assuring safe passage for our citizens.



PAGE 2

Finally, the recent bond issue provides for a few new schools and expansions at older ones. Particularly with new construction, there should be an automatic procedure for communication and action between the city or county and the school district providing for the installation of safe roads and walkways. Foresight, rather than fatalities, should spur us into action.

We are grateful to all of you council members who give so much of your time to making our city a better place to live. Thank you for listening to our concerns and please let us know what we can do to make South Camp safer now. You can reach me at 245-7560.

Sincerely,



Pat Riley  
Wingate Safety Committee Chair

cc: Scott Harrington, Community Development Director  
Jim Shanks, Public Work Director  
Mark Relph, Public Works Manager

FPP-1996-110



**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-0627



February 25, 1998

Ms. Jodi Kliska  
City of Grand Junction  
Public Works & Utilities  
250 North 5th St.  
Grand Junction, CO 81501

*VIA MAIL*

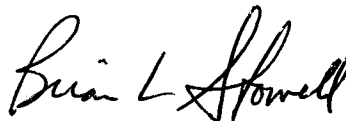
**Re: Trails West Village**

Dear Jodi:

Enclosed, please find a check in the amount of \$2,281.86 for the 1997 inspection/permit fees for Trails West Village Filings I & II, invoice # S0001192. For our accounting records, we will need a breakdown of exactly what the \$2,281.86 consists of and to which filing each amount belongs.

Please feel free to contact me with any questions or comments regarding this request and thank you in advance for your cooperation.

Sincerely,



Brian L. Stowell

SPIECKER, HANLON & GORMLEY, L.P.

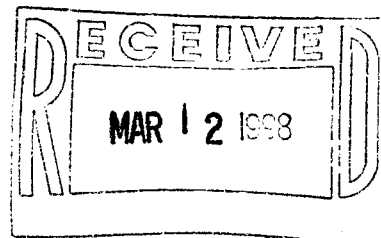
ATTORNEYS AT LAW

FRANK F. SPIECKER (RETIRED)  
CLAY E. HANLON  
JOHN P. GORMLEY

TELEPHONE: (970) 243-1003  
FACSIMILE: (970) 243-1011

March 12, 1998

Dan E. Wilson  
Grand Junction City Attorney  
250 N. 5th Street  
Grand Junction, CO 81501



Re: Trails West Subdivision Improvement Agreement/  
Grand Junction Concrete Pipe Company

*(original) To John S.  
copy to Planning  
file*

Dear Dan:

Pursuant to our telephone conversation on March 11, 1998, you requested that I write you a letter setting forth the amounts due and owing to Grand Junction Concrete Pipe Company for materials supplied concerning the infrastructure improvements to Trails West Subdivision. The total principal amount of the outstanding invoices concerning Trails West Subdivision is \$17,284.79. I have attached copies of the invoice summary sheets and backup up invoices for the charges. This amount would not include appropriate interest to which Grand Junction Concrete Pipe Company might be entitled pursuant to Colorado law and/or agreement.

It is my understanding that you may be exercising the City's right to draw upon the line of credit or bond provided by the owners of Trails West Subdivision. Grand Junction Concrete Pipe Company would appreciate your including their unpaid invoices in any draw request you make. Grand Junction Concrete Pipe Company will provide any release required by the City of Grand Junction or the bank or bonding company upon receipt of payment.

If you have any additional questions or concerns, please do not hesitate to contact me.

Very truly yours,

SPIECKER, HANLON & GORMLEY, L.L.P.

A handwritten signature in dark ink, appearing to read "John P. Gormley".  
John P. Gormley

JPG:jmd  
Enclosures

cc: Les McPherson  
GRAND JUNCTION CONCRETE PIPE COMPANY

23311 MCCAFFREY CONSTRUCTION      \*\* CRED LIMIT EXCEEDED \*\*      AMOUNT DUE      OVER 30      OVER 60      OVER 90  
 970/240-8055      13,635.14      1,075.10      .00      11,930.16

VOICE	DATE		CHARGE	CREDIT	BALANCE	DISCOUNT
99	1/00/00	ADJ-	185.11			
99	2/28/98	ADJ-	37.69		222.80 †	
72671	11/17/97	INV.	972.32			
72671	2/27/98	PAYMENT		498.78	473.54 †	
72693	11/17/97	INV.	2,784.60		2,784.60 †	
72787	11/18/97	INV.	302.08		302.08 †	
72793	11/18/97	INV.	1,967.15		1,967.15 †	
72799	11/18/97	INV.	19.02		19.02 †	
72949	11/19/97	INV.	1,118.99		1,118.99 †	
73160	11/20/97	INV.	13.79		13.79 †	
73252	11/21/97	INV.	665.73		665.73 †	
73408	11/24/97	INV.	1,006.23		1,006.23 †	
73632	11/25/97	INV.	1,036.31		1,036.31 †	
73830	11/26/97	INV.	431.64		431.64 †	
73888	11/26/97	INV.	859.24		859.24 †	
74110	12/02/97	INV.	1,251.84		1,251.84 †	
76790	1/13/98	INV.	809.99			
76790	2/27/98	ADJ-ST-TX		23.59	786.40 †	<i>Order Ref.</i>
78045	1/30/98	INV.	144.35		144.35 †	<i>Order Ref.</i>
78193	2/02/98	INV.	144.35		144.35 †	<i>Order Ref.</i>
78905	2/11/98	INV.	123.60		123.60 †	<i>Blair Truck Stop</i>
78925	2/11/98	INV.	283.48		283.48 †	<i>5.50</i>
			<b>** T O T A L **</b>		<b>13,635.14</b>	<b>**</b>





March 13, 1998

Brian Stowell  
c/o Camelot Investments, LLC  
0090 Caballo Road  
Carbondale, CO 81623

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

Re: Trails West Village Filings 1 & 2  
via Facsimile and U.S. Mail Return Receipt Requested

Dear Brian:

As you know, in September 1997 the City granted an extension of time to complete the improvements necessitated by the approval of the *Trails West Village* subdivision. The improvements requiring completion at that time included the South Camp Road widening, the detention pond, other drainage improvements as shown on the final plans and other miscellaneous items which had been identified during the walk-through conducted on April 7, 1997. In April, the City conducted a final inspection and walk-through of the subdivision with the general contractor's representative Ed McCaffrey. Mr. McCaffrey was given a copy of the "punch list" of items needing to be completed, repaired and/or replaced. The list included the South Camp Road improvements and the detention pond. A number of other items were included as you can see on the attached photocopy of the punch list.

Since September 1997, there has been limited progress made toward completion of the South Camp Road improvements and the detention pond, but those improvements, and others, are still not complete. It is my understanding that you hoped to pave South Camp Road last Fall but were advised by the City to delay paving until Spring due to inclement weather conditions in late November. Even though there may be a legitimate reason for the paving having been delayed, I have seen no progress toward completion of any of the other items which could have been completed over the winter months; instead it appears that site work has stopped altogether.

The attached list represents the outstanding public improvements remaining to be completed, repaired and/or replaced in Filings 1 and 2. The list was prepared after a field inspection on Friday March 6, 1998. An additional item which is not required by the City but was represented to be constructed in the approved plan, and is not yet constructed, is the subdivision irrigation system. The City has received complaints that the irrigation system within the subdivision is incomplete. Please understand that in the future all of those complaints will be referred to you.

The Development Improvements Agreement (DIA) and guarantee on file with the Community Development Department expires on April 1, 1998. Given the unpredictability of Spring construction conditions and the very short time remaining to complete the improvements described on the attached list, the City will allow one additional extension of the agreement and guarantee. The extension shall be only for a sufficient amount of time to complete all of the improvements. If you choose to extend the agreement and guarantee, in a form acceptable to the

Brian Stowell  
March 13, 1998  
page 2


City, such must be received by no later than March 27, 1998. To be acceptable the agreement must provide for completion by no later than August 1, 1998.

Failure to extend or have the improvements completed by March 27, 1998 will result in the City calling the outstanding letter of credit and pursuing all other remedies provided in the agreement or otherwise legally available.

Please call me or the Assistant City Attorney, John Shaver, should you have any questions. If you would like to walk through the project with me and/or the City's development inspector for further information on or explanation of the items identified on the attached list, please call me at (970) 244-1443.

Thank you in advance for your timely attention to this matter.

Sincerely,



Kerrie Ashbeck, P.E.  
Development Engineer

cc: Michael Drollinger, Development Services Supervisor  
John Shaver, Assistant City Attorney  
Don Newton, City Engineer  
Pat O'Connor, Banner Associates, Inc.

Attachments



**Final Inspection Checklist**  
Town of Grand Junction Subdivision

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (303) 244-1599

Date: 11-7-17

**Streets**

Pavement

REPAIR CRACKS AND PATCHES  
REPAIR CURBS, GUTTERS, AND SIDEWALKS

Concrete

REPAIR BROKEN CURBS

Manholes

REPAIR MANHOLE; BROKEN RING MANHOLE 1-5

Signs

INSTALL CITY STREET NAME SIGNS STOP SIGNS, ETC. - SEE NOTES

Lighting

Site Grading

REPAIRS TO DRAINAGE FACILITIES PER SITE PLAN INCORPORATE

Other

REPAIR OF SIDEWALK INLET

REPAIR MANHOLE - WORKING TO REMOVE - 2100 GOLF COURSE COURT

REPAIR BROKEN CURB

REPAIR BROKEN CURB

**Utilities & Drainage**

Water Lines

Sewer Lines

Inlet Structures

Detention Facilities

REPAIR DETENTION AS PER CITY SPEC - RE-DESIGN DETENTION FACILITY PER

OUTLET STRUCTURES PER CITY SPEC - PER SITE PLAN

Inspected by:

[Signature]  
City Development Engineer

Developer or Representative:

[Signature]  
[Initials]

Final Acceptance of the Streets and Drainage Facilities will be made when the above items have been corrected and inspected. Please call 244-1591 when ready for final acceptance.



**TRAILS WEST VILLAGE FILINGS 1 & 2**  
**Inspection Punch List Items**

**South Camp Road:**

1. Paving needs to be completed including cutting a clean edge along the existing asphalt and milling to obtain a minimum overlay of 2" at centerline. An option to milling at centerline is to overlay the entire roadway width to build up sufficient crown to achieve a minimum cross slope of 1.00% on the east half of the road. As the developer was notified last Fall, it is not acceptable to feather the asphalt into the existing crown at centerline. Banner and Associates is required to turn in a paving plan with centerline grade, as-built flowline grade, and cross-sections with cross-slope labeled to the nearest 100th and calculated from centerline to existing lip of gutter. The plan must be approved by the City prior to paving.
2. Striping of South Camp Road in accordance with the plans must be completed after paving.
3. Stop sign/street name signs at the intersection of South Camp Road and Altamira Avenue and South Camp Road and Mescalero Avenue must be set.
4. Railing along the back of walk from the box culvert under South Camp Road and at the intersection with Mescalero as shown on the plans needs to be installed. A metal hand rail as detailed on the plans will be required at the box culverts in order to anchor into the concrete headwalls. Along the remainder of the area shown to have handrail, if the developer wants to propose an alternate type of rail, Banner and Associates or the contractor is required to submit proposed specifications. The City Engineer must approve any alternate to the handrail detail shown on the plans prior to construction..
5. Provide road base at the south end of the curb return at Altamira Avenue and at the north end of the sidewalk in accordance with the plans to protect the ends of the concrete from erosion and provide a smooth transition to existing grade.
6. Complete all grading shown on the plans for South Camp Road, the detention pond, and drainage swales. This includes the swale from the north end of the South Camp Road improvements along the north property line to the stilling basin, the swale between lots 3 and 4 in Filing 1, and the channel along South Camp Road. Much of the overlot grading is complete, but finish grading and removal of excess material remains to be done. All of these areas must be reseeded and stabilized.

**Pavement:**

1. The City inspector has marked the asphalt edge along the gutter in various locations along Montero Street where the pavement reveal is missing (edge of pavement doesn't meet lip of gutter). A minimum 1 foot wide patch is required.

2. At the northeast corner of the intersection of Altamira Avenue and Altamira Court a concrete fillet was removed and the area needs to be patched with asphalt after the old concrete forms are removed.
3. See comments above regarding South Camp Road paving.

Concrete:

1. The crosspan on Altamira Avenue needs to be removed and replaced. Sections of the pan have a differential in elevation which blocks the flow of water across the pan and causes a puddle in the street.
2. The ramp at the northwest corner of the intersection of Altamira Avenue and Altamira Court needs to be removed and reconstructed to City standards.
3. In conjunction with items #1 and #2, the flowline of the fillet on the northwest corner does not coincide with the crosspan flowline and will require reconstruction. The fillet and associated monolithic sidewalk near the curb return need to be removed and reconstructed so that the west flowline of the gutter on Altamira Court and the north flowline of the gutter on Altamira Avenue intersect at the PI. Prior to reconstruction of this area, an intersection detail must be prepared and submitted to the City for review and approval to ensure the new pan and fillet will drain properly.
4. The ramp at the northwest corner of the intersection of Altamira Avenue and Montero Street needs to be removed and reconstructed to City standards.

Manholes/ Inlets:

1. Clean out all manholes and storm sewer inlets. The developer is responsible for keeping all inlets and manholes clean throughout build-out of the project until such time as the City issues a final acceptance of the improvements.
2. Storm sewer MH B-1 is catching sediment. Clean out, remove the bell on the inlet pipe, form the invert and grout to be flush with the inlet box. Remove the concrete grade ring, lower inverted ring and weld.
3. Set sanitary sewer MH A-2 to grade and grout.
4. Replace broken ring on sanitary sewer MH A-5.

Grading and Drainage:

1. Complete 1' diversion ditch at end of Montero Avenue and along north property line as shown on the plans.

2. Provide road base at the end of curb and gutter on Montero Avenue for erosion protection.

3. Detention pond stabilization has not been done. Submit seed mix/spec for detention pond, channel, and swale stabilization. Reseeding must be completed upon finish grading of these areas.

4. The detention pond outlet works and stilling basin must be completed in accordance with the final plans prepared by Banner Associates. The modifications made so far to the outlet pipes are poorly constructed and incomplete.

5. There is a low berm which has been graded at the rear of the lots along the detention pond. The berm blocks runoff from the rear of the yards. It is the City's understanding from speaking with Banner Associates that the berm was constructed as a temporary measure to prevent erosion of the sides of the pond until the pond is seeded and stabilized. The temporary berm needs to be modified to allow the adjoining lots to drain. The berm must be removed upon completion and stabilization of the detention pond.

**Miscellaneous :**

1. The developer and builders are responsible for keeping all streets clean through out the build-out of the development and until such time as the City issues a final acceptance of the streets for maintenance.

2. Street signs are needed at the intersections of Montero Street and Altamira Avenue and at Montero Court and Montero Street.

3. As noted above the stop sign/street name signs at South Camp Road and Altamira Avenue and Mescalero Avenue need to be set in place - one post has been placed in a conduit in the concrete (not pounded and set into place) and one has been anchored to a fire hydrant. All sign posts must be trimmed off so that no excess post extends above the top of the signs.

4. The area along the pavement edge at the intersection of Altamira Avenue and Montero Street needs to be backfilled with roadbase to create a shoulder to support the edge of pavement. When Filing 3 develops, the developer will be required to complete the concrete work for the full intersection.

5. The City will be conducting ongoing inspections of the site to identify any further items which require repair or reconstruction due to damage or neglect during the build-out of the development. The developer remains responsible for all public improvements until such time as the City issues a letter of final acceptance of the public improvements within the public right-of-way.



AMERICAN CONSULTING ENGINEERS COUNCIL of COLORADO

# BANNER

BANNER ASSOCIATES, INC. • CONSULTING ENGINEERS & SURVEYORS  
2777 CROSSROADS BOULEVARD • GRAND JUNCTION, CO 81506 • (970) 243-2242  
FAX: (970) 243-3810

## FAX TRANSMISSION

DATE: 4/9/98

TIME: 9:30 A.M.

### PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: KERRIE ASHBECK

FIRM: CITY OF GRAND JUNCTION

PHONE #: \_\_\_\_\_

COPIES TO: BRIAN STOWELL

FAX #: 244-1599

FROM: PAT O'CONNOR

## MESSAGE

ENCLOSED IS THE "AS-CONSTRUCTED" INFORMATION FOR SOUTH CAMP ROAD ALONG TRAILS WEST SUBDIVISION. THE PROBLEM WITH X-SLOPE EXISTS APPROXIMATELY FROM STA 6+25 TO STA 9+25. I SUGGEST MILLING THIS SECTION TO A 1" OR 1 1/4" DEPTH AT CENTERLINE AND BUILDING UP THE EXISTING EAST EDGE OF ASPHALT AS INDICATED AND REQUIRED TO GIVE THE 1.0% X-SLOPE. I HAVE DISCUSSED THIS WITH DAVE VERBLE AT ELAM. IF NECESSARY, LET'S ALL MEET TO FINALIZE THE REQUIREMENTS. PLEASE CALL.

TOTAL NUMBER OF PAGES SENT, INCLUDING THIS COVER: 2

PLEASE CALL (970)243-2242 IF YOU DO NOT RECEIVE ALL PAGES.

BAI JOB NO: 8351-09-02

JOB NO. TRAILS WEST - SOUTH CAMP ROAD

JOB X-SECTS TO EAST SIDE GUTTER

CALCULATED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

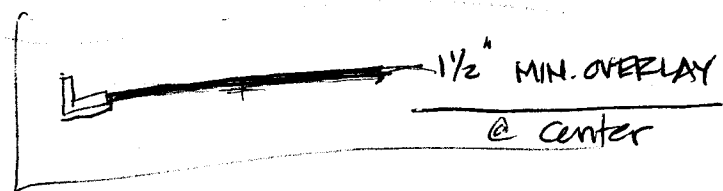
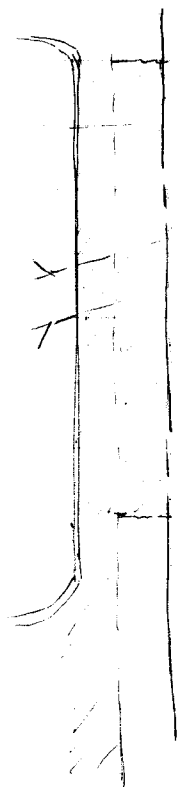
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

# BANNER

BANNER ASSOCIATES, INC.  
CONSULTING ENGINEERS & SURVEYORS  
2777 CROSSROADS BOULEVARD  
GRAND JUNCTION, CO 81506 • (970) 243-2242

STATION	GUTTER LIP	ENTR. ELEV. (EDGE ASPH.)	X-SLOPE (12' WIDTH)	ADD (FOR 1.0%) (AT LIP)	CROWN	X-SLOPE (TO LIP) (24' WIDTH)	ADD (FOR 1.0%) (AT CROWN)
4+20.50	4766.57	66.83	2.17%		66.90	1.38%	
5+11.50	4764.43	64.67	2.00%		64.97	2.25%	
5+50	63.77	63.84	0.58%	0.05'	64.14	1.54%	
6+00	62.89	63.01	1.00%		63.23	1.42%	
6+50	61.96	61.97	0.08%	0.11'	62.43	1.96%	
7+00	61.06	60.99	-0.58%	0.19'	61.41	1.46%	
7+50	60.14	60.31	1.42%		60.47	1.38%	
8+00	59.22	59.20	-0.17%	0.14'	59.35	0.54%	0.11'
8+50	58.10	58.02	-0.67%	0.20'	58.25	0.63%	0.09'
9+00	56.96	56.99	0.25%	0.09'	57.15	0.79%	0.05'
9+50	55.89	56.13	2.00%		56.23	1.42%	
9+90.91							
9+96 <sup>+</sup>	54.81	55.10	2.42%		55.29	2.00%	
11+00	52.66	53.05			53.48		
12+00	50.91	51.32			51.75		
13+00	49.13	49.76			50.15		
14+00	47.34	47.69			48.03		

STA	GUTTER UP	CROWN	X-SLOPE 24' WIDTH
4+20.50	4766.57	66.90	1.38%
5+11.50	64.43	64.97	2.25%
5+50	63.77	64.14	1.54%
6+00	62.89	63.23	1.42%
6+50	61.96	62.43	1.96%
7+00	61.06	61.41	1.46%
7+50	60.14	60.47	1.38%
8+00	59.22	59.35	0.54%
8+50	58.10	58.25	0.62%
9+00	56.96	57.15	0.79%
9+50	55.89	56.23	1.42%
9+96 <sup>f</sup>	54.81	55.29	2.00%
11+00	52.66	53.48	3.42%
12+00	50.91	51.75	3.50%
13+00	49.13	50.15	4.25%
14+00	47.34	48.03	2.88%



1/4" 300'  
2x aggregate size

DAVE  
VERBUE



City of Grand Junction, Colorado

250 North Fifth Street

81501-2668

FAX:(970)244-1599

May 4, 1998

Pat O'Connor, P.E.  
Banner Associates, Inc.  
2777 Crossroads Blvd.  
Grand Junction, CO 81506

RE: Trails West Village Subdivision

Dear Pat:

The City received the as-built information and proposed design you provided for South Camp Road and the crossspan on Altamira Avenue. The cross-slopes you have calculated for South Camp Road from centerline to the lip of gutter are acceptable. As we have discussed, in order to achieve those cross-slopes and create a smooth transition up and over the box culvert, it will be necessary to mill the asphalt at the centerline to achieve a minimum 1 1/2" overlay of the existing asphalt. The overlay will tie into the new 4" HBP asphalt section along the widened portion of South Camp Road adjacent to the development. The overlay is to be completed with the final lift over the new asphalt. The width of the area to be milled needs to be as wide as is necessary to obtain a minimum 1 1/2" overlay over the existing asphalt. The extent of the overlay will need to include transition areas leading up to and away from the section over the box culvert. Please provide a plan view with stationing to delineate the limits of the area to be overlaid. In addition, as you are aware, some asphalt removal will be required to obtain a clean edge to tie into the existing asphalt.

The crossspan on Altamira Avenue needs to be removed in its entirety. The City does not want a join line in the crossspan which will lend itself to differential settlement from the rest of the crossspan. The flowline of the crossspan needs to tie into an elevation set at the PI in the apron. An elevation needs to be set at the middle of the return to drain out to the PI (the PI in the apron becomes the point at which the flows in the curb and gutter and the crossspan come together then flow north into the flowline of the curb and gutter on Altamira Court). Please provide the necessary spot elevations at the PI, the middle of the return, and the end of the crossspan to drain the crossspan and apron properly. Please label the flowline grades on the crossspan and in the apron.

Please call me at 244-1443 if you have further questions. Thank you for preparing the information related to these items which are on the punch list for completion of Filings 1 and 2.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kerrie Ashbeck', written in a cursive style.

Kerrie Ashbeck, P.E.  
Development Engineer

cc: FPP-1997-143





AMERICAN CONSULTING ENGINEERS COUNCIL of COLORADO

# BANNER

BANNER ASSOCIATES, INC. • CONSULTING ENGINEERS & SURVEYORS  
2777 CROSSROADS BOULEVARD • GRAND JUNCTION, CO 81506 • (970) 243-2242  
FAX: (970) 243-3810

## FAX TRANSMISSION

DATE: 4/13/98

TIME: 4:00P.

### PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: KERRIE ASHBECK - DEVELOPMENT ENGINEER

FIRM: CITY OF G.J. 244-1599

PHONE #: \_\_\_\_\_

COPIES TO: BRIAN STOWELL (FAX 963-5570)

FAX #: 244-1599

FROM: PAT O'CONNOR

## MESSAGE

KERRIE, HERE IS DESIGN FOR REPLACEMENT OF BAD RAMP AND PAN AT TRAILS WEST  
SUBDIVISION (INTERSECTION OF ALTAMIRA DR. + ALTAMIRA COURT) - AS REQUESTED.  
I WILL MAIL ORIGINALS TO YOU ALSO. PLEASE LET ME KNOW YOUR COMMENTS.  
THANK YOU FOR YOUR QUICK REVIEW AND APPROVAL OF THE SOUTH CAMP X-SECT AND  
OVERLAY INFO I SENT LAST WEEK.

TOTAL NUMBER OF PAGES SENT, INCLUDING THIS COVER: 3

PLEASE CALL (970)243-2242 IF YOU DO NOT RECEIVE ALL PAGES.

BAI JOB NO.: 8351-09-02

ANNEX 11  
ZAL WALKWAY COMPOSITE & WALL

TRAILS WEST VILLAGES - SOUTH CAMP ROAD DESIGN

(AUG 2001-2000)

ICE DAM LINE

STATION	T.B.O.W. DESIGN	LIP OF GUTTER DESIGN	EXIST. EDGE OF ASPHALT	X-SLOPE	EXIST. SLOPE TO CROWN	X-SLOPE TO LIP
5+11.50	64.97	64.39	64.64	2.08%		(CURB RETURN - APT. MIRA)
5+50	64.30	63.72	63.84	1.00%		
6+00	63.43	62.85	62.92	0.58%		
6+50	62.56	61.98	61.96	-0.17%		
7+00	61.69	61.11	61.01	-0.83%		
7+50	60.83	60.25	60.16	-0.75%		
7+90	60.13*	59.55	<sup>59.58</sup> 59.4	-1.25%		(N. SIDE EXIST. BOX CULVERT)
8+00	59.90	59.32	59.18	-1.17%		
8+50	58.76	58.18	58.04	-1.17%		
9+00	57.61	57.03	56.95	-0.67%		
9+38	<del>56.74</del> 56.74*	<del>56.16</del> 56.16	56.24	<del>2.00%</del> +0.67%		(AIR/VAC LIO)
9+50	56.47	55.89	56.02	1.08%		
9+90.91	55.53	54.95	55.18	1.92%		(CURB RETURN - MASCALDES)

-1.74%

-2.29%

# TRAILS WEST VILLAGE - SOUTH CAMP ROAD DESIGN

\* GIVEN BLEBS TO MATCH EXISTING STRUCTURES.

	STATION	T.B.O.W. DESIGN	LIP OF GUTTER DESIGN	EXIST. EDGE OF ASPHALT	X-SLOPE
	5+11.50	64.97	64.39	64.64	2.08%
-1.97%	5+50	64.21	63.63	63.84	1.75%
	6+00	63.23	62.65	62.92	2.25%
	6+50	62.24	61.66	61.96	2.50%
-1.51%	7+00	<del>61.49</del> 61.26	60.91	61.01	0.83%
	7+50	60.73 <del>60.27</del>	60.15	60.16	0.08%
	7+90	60.13*	59.55	59.4	-1.25%
	8+00	59.89	59.31	59.18	<del>3.92%</del>
-2.40%	8+50	58.69	58.11	58.04	-0.58%
	9+00	57.49	56.91	56.95	0.33%
	9+38	56.58*	56.00	56.24	2.00%
	9+50	56.34	55.76	56.02	2.17%
-1.97%	9+90.91	55.53	54.95	55.18	1.92%

1% MIN

150' - 200'

-1.08% 12"

# TRAILS WEST VILLAGES - SOUTH CAMP ROAD DESIGN

\* GIVEN ELEV'S TO MATCH EXISTING STRUCTURES.

	STATION	T.B.O.W. DESIGN	LIP OF GUTTER DESIGN	EXIST. EDGE OF ASPHALT	X-SLOPE	CROWN ELEV	CROSS-SLOPE FROM CROWN
	5+11.50	64.97	64.39	64.64	2.08%		
-1.97%	5+50	64.21	63.63	63.84	1.75%	64.20	
	6+00	63.23	62.65	62.92	2.25%	63.25	
	6+50	62.24	61.66	61.96	2.50%	62.37	2.96%
-1.51%	7+00	<del>61.49</del> 61.26	60.91	61.01	0.83%	61.40	2.04%
	7+50	<del>60.73</del> 60.27	60.15	60.16	0.08%	60.36	<del>2.07%</del> 0.88%
	7+90	60.13*	59.55	59.4	-1.25%		
	8+00	59.89	59.31	59.18	<del>3.92%</del> -1.08%	<del>59.25</del> 59.25 (NEED +0.30) FOR 1.00%	-0.25%
-2.40%	8+50	58.69	58.11	58.04	-0.58%	58.20 (NEED +0.15)	0.38%
	9+00	57.49	56.91	56.95	0.33%	57.15	1.00%
	9+38	56.58*	56.00	56.24	2.00%		
	9+50	56.34	55.76	56.02	2.17%	56.14	
-1.97%	9+90.91	55.53	54.95	55.18	1.92%		

TRAILS WEST VILLAGES - SOUTH CAMP ROAD DESIGN

STATION	T.B.O.W. DESIGN	LIP OF GUTTER DESIGN	EXIST. EDGE OF ASPHALT	X-SLOPE	CROWN ELEV	X-SLOPE FROM CROWN
5+11.50	64.97	64.39	64.64	2.08%		
5+50	64.30	63.72	63.84	1.00%	64.20	2.00%
6+00	63.43	62.85	62.92	0.58%	63.25	1.67%
6+50	62.56	61.98	61.96	-0.17%	62.37	1.63%
7+00	61.69	61.11	61.01	-0.83%	61.40	1.21%
7+50	60.83	60.25	60.16	-0.75%	60.36	0.46%
7+90	60.13*	59.55	59.4	-1.25%		
8+00	59.90	59.32	59.18	-1.17%	59.25	-0.29%
8+50	58.76	58.18	58.04	-1.17%	58.20	0.08%
9+00	57.61	57.03	56.95	-0.67%	57.15	0.50%
9+38	<del>56.58</del> 56.74*	<del>56.00</del> 56.16	56.24	<del>2.00%</del> +		
9+50	56.47	55.89	56.02	1.08%	56.14	1.04%
9+90.91	55.53	54.95	55.18	1.92%		

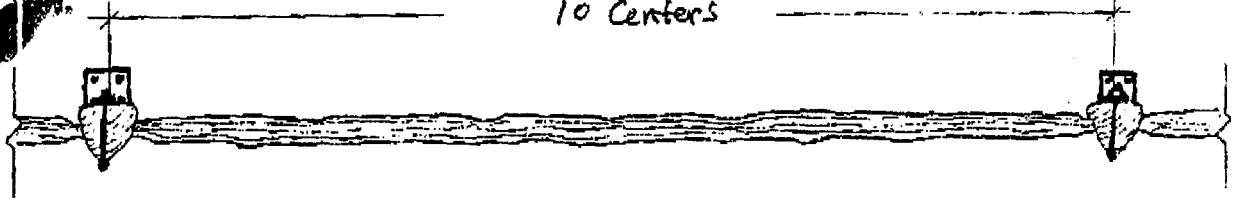


24

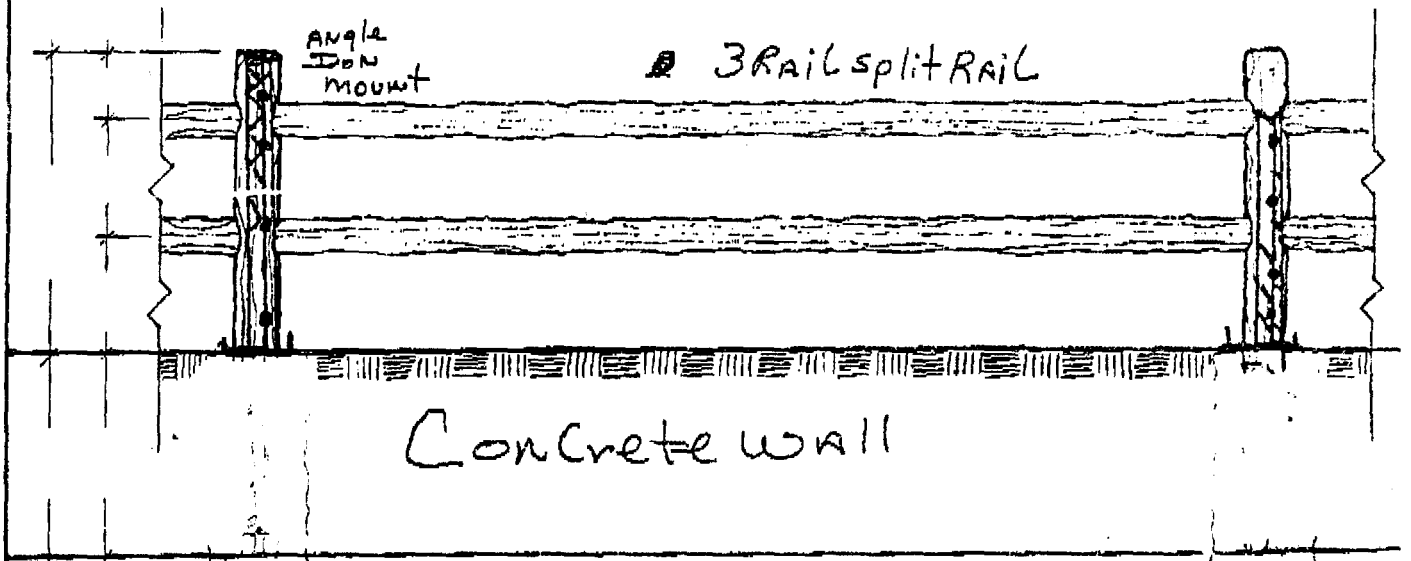


American Fence Association

10' Centers

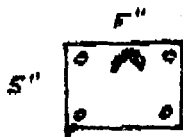


PLAN VIEW



FRONT VIEW

Mount Detail



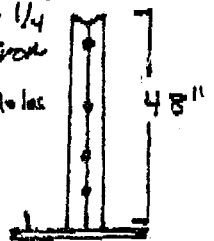
weld on Angle Iron

**SPLIT RAIL FENCE DETAIL**

STYLE: 2 RAIL

NTS

2" x 2" x 1/4  
Angle Iron  
4 - 1/2" Holes

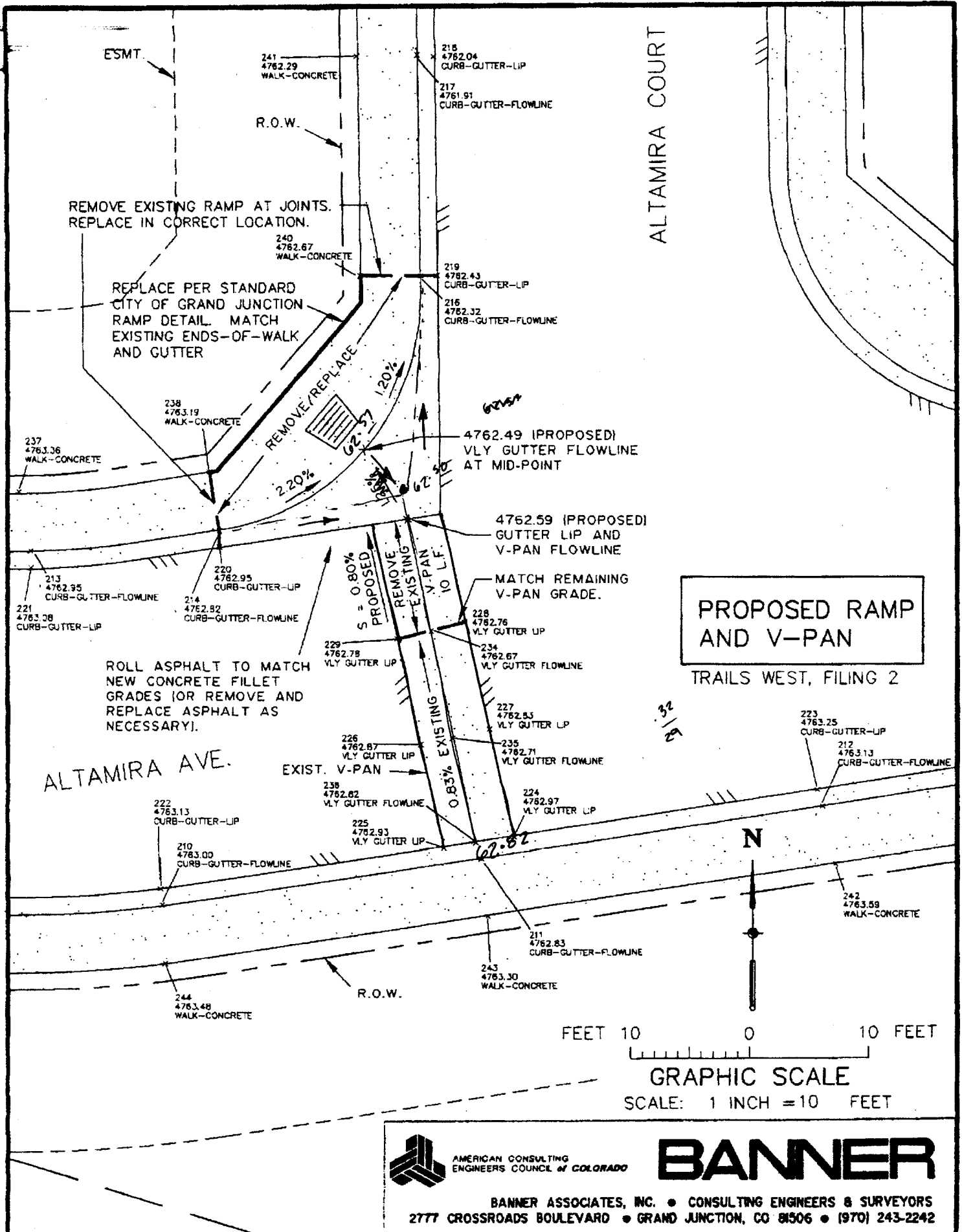


5" x 5" x 1/4  
Plate with  
4 Holes

Angle Bolts

Copyright © AFA 1999

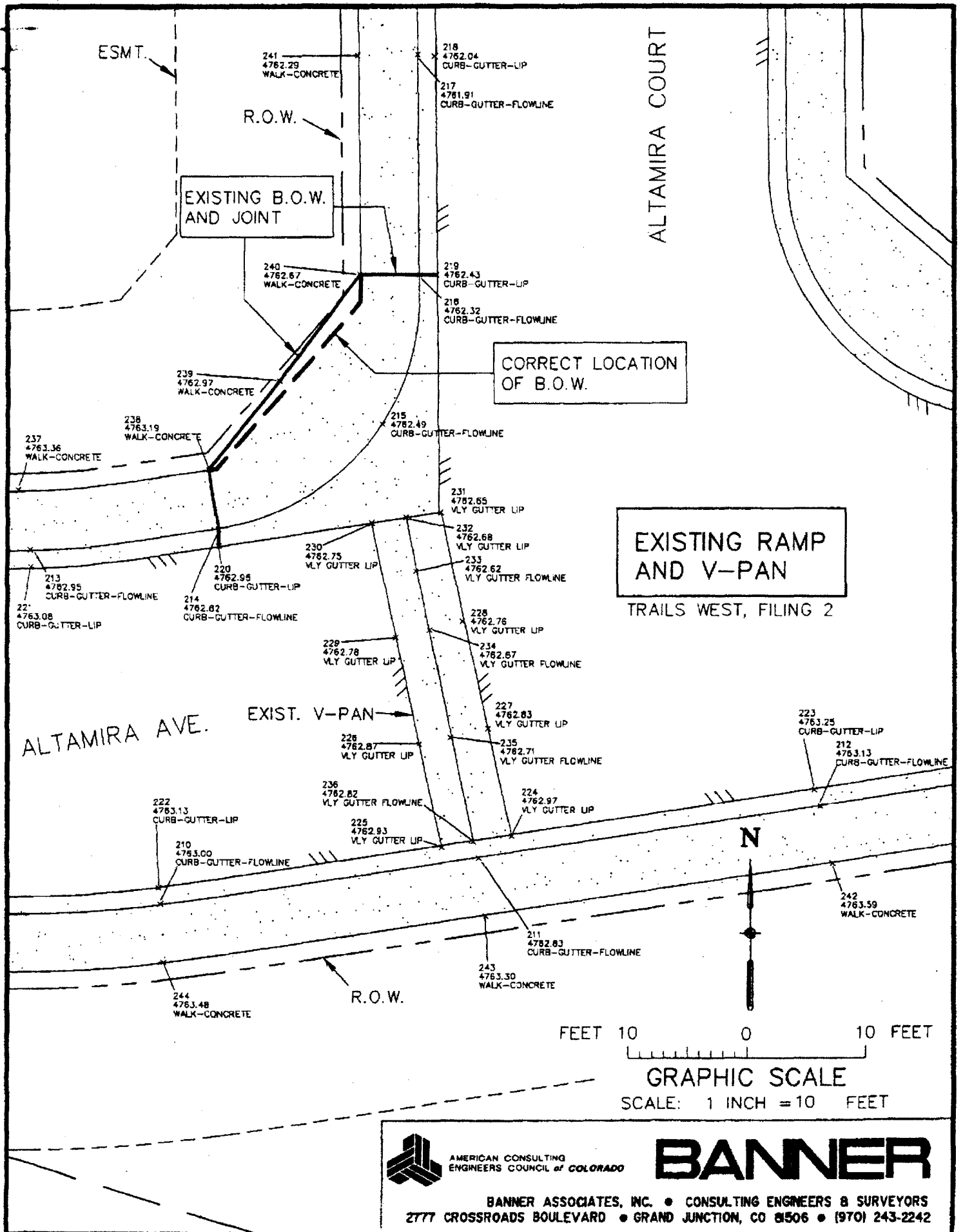
SPECIFICATIONS			PROJECT
COMPONENT	DIMENSIONS	MATERIAL	Trails West Village
BACK RAILS	10' X X		OWNER/GEN. CON.
POSTS	3 RAIL X	Cedar	SUBMITTED BY
PICKETS	X X		Taylor Fence of GJ
FOOTING	DIA X DEEP		DRAWING NO.
NAILS			DATE 6/17/98 W-21
TOP DESIGN			



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2777 CROSSROADS BOULEVARD • GRAND JUNCTION, CO 81506 • (970) 243-2242

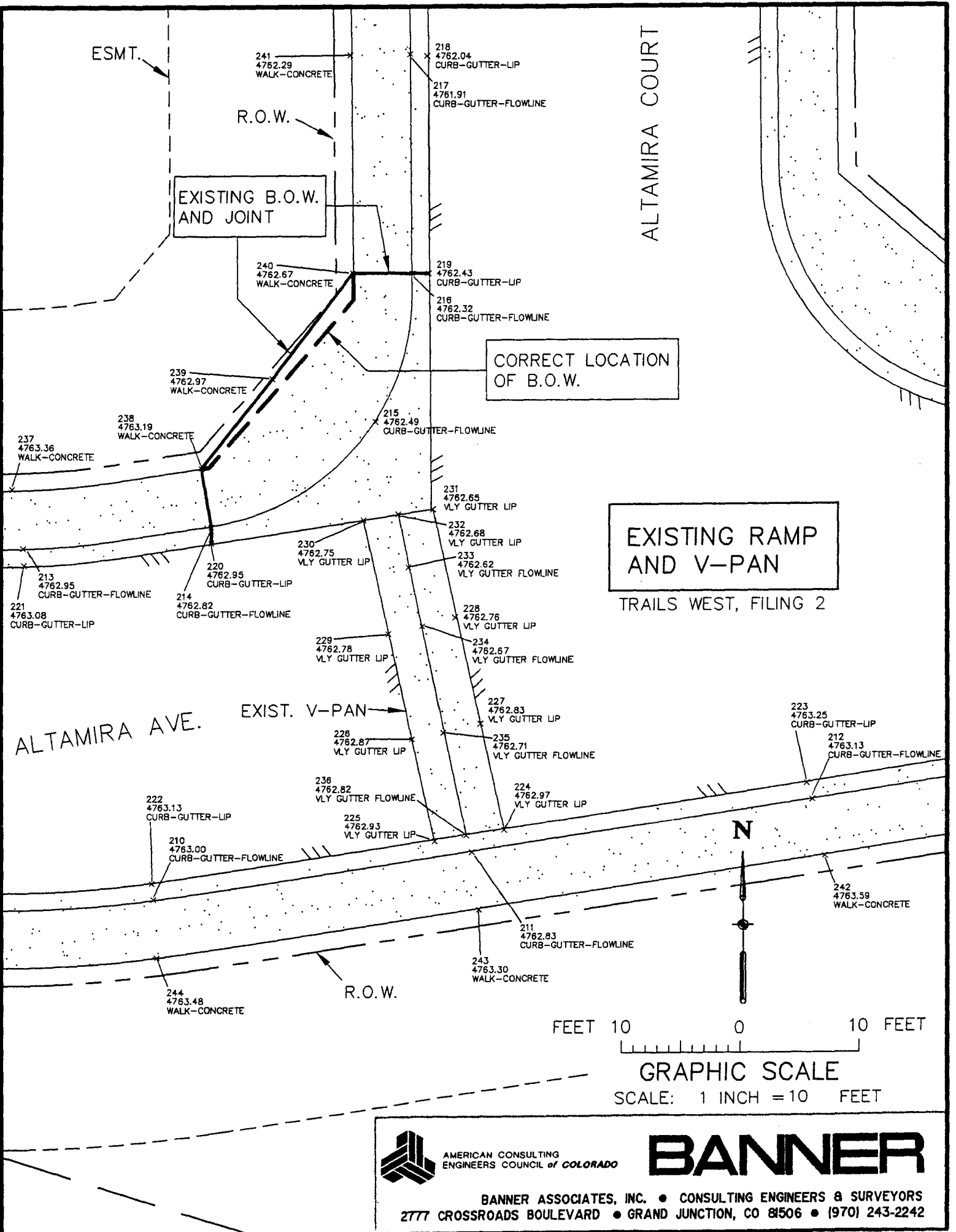


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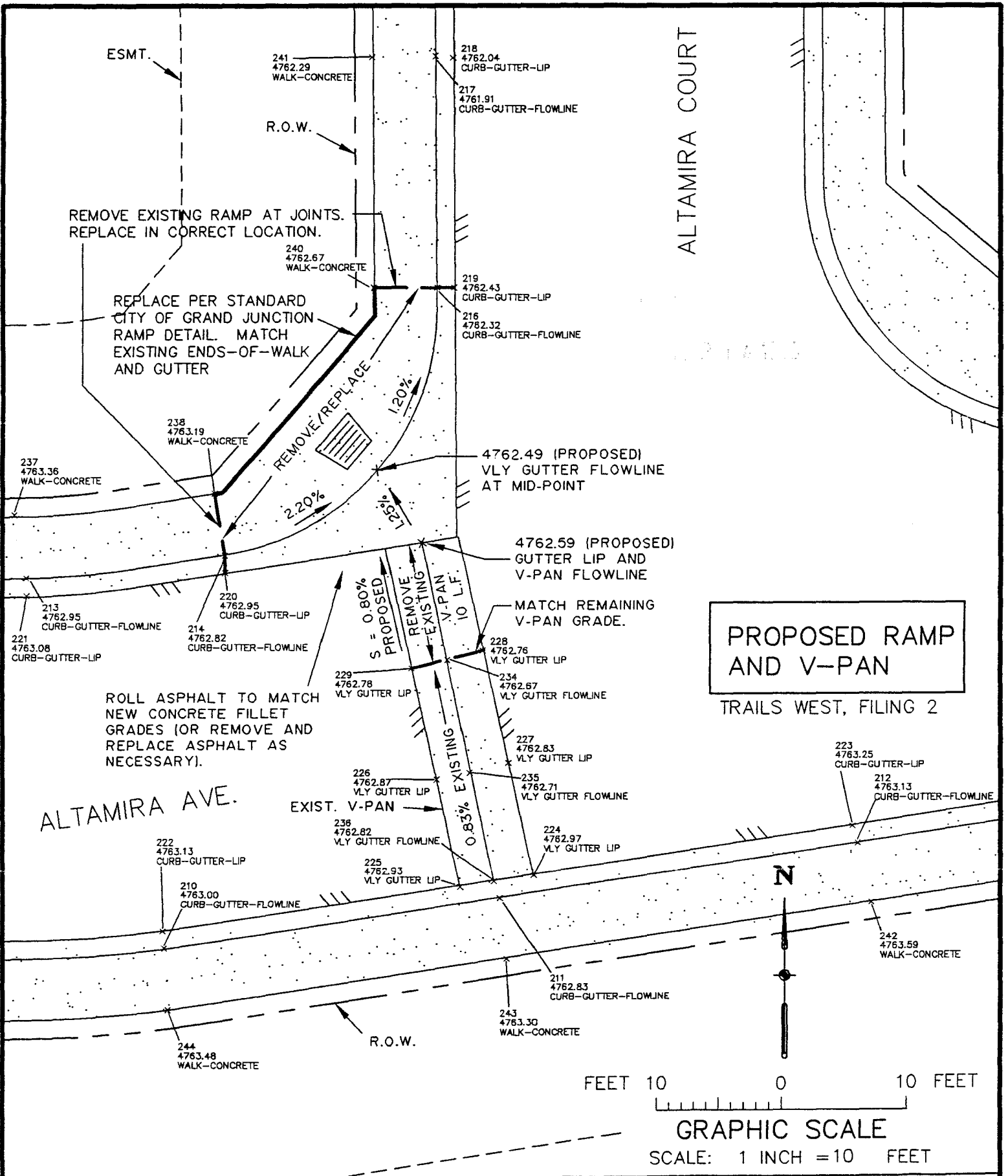




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ALTAMIRA COURT

**PROPOSED RAMP  
AND V-PAN**

TRAILS WEST, FILING 2

ALTAMIRA AVE.

N

FEET 10 0 10 FEET

GRAPHIC SCALE  
SCALE: 1 INCH = 10 FEET



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250-0156  
office cell phone  
Home 243-4890

June 2 98

Kerrie Ashbrook

KERRIE: The HOME OWNERS FOR TRAILS WEST  
Subdivision would like A ~~2~~<sup>2</sup> RAIL SPIKE RAIL  
CEDAR FENCE Along South Camp road. A METAL FENCE  
should be placed AT the box CULVERTS AS WELL

PLEASE NOTE YELLOW IS SPIKE RAIL AND RED  
IS METAL.

IF

IF you have any QUESTIONS please CALL.

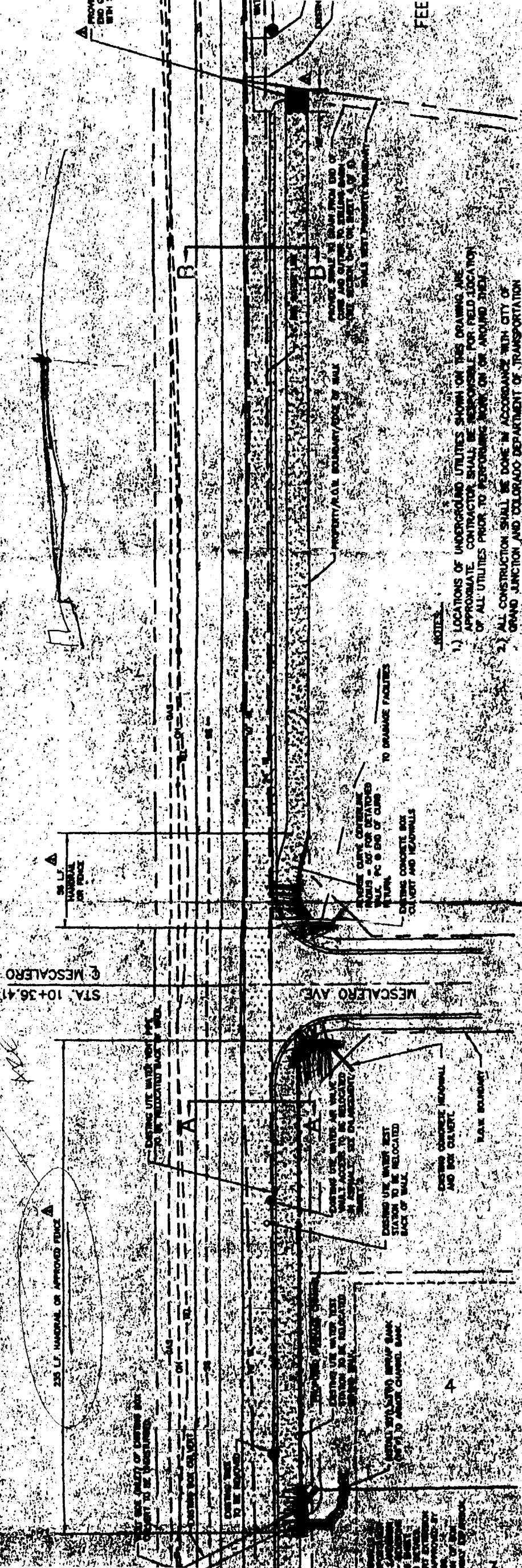
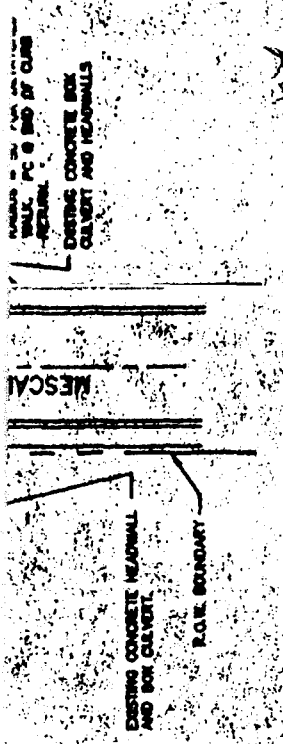
Tony Berry, President  
TRAILS WEST Village HOA

- 1) ALL EXISTING SIGNS TO BE REMOVED AND RELOCATED. CONTACT RICK REPLY AT CITY TRAFFIC SERVICES (PHONE 244-1573) PRIOR TO PLACEMENT OF SIGNS, STRIPING, MARKINGS OR SIGNAL LAMPS.
- 2) ALL LETTERS, ARROWS AND SYMBOLS SHALL BE IN CONFORMANCE WITH THE STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS ADOPTED BY THE FEDERAL HIGHWAY ADMINISTRATION.
- 3) PAINT STRIPING MUST BE APPLIED AT A MINIMUM THICKNESS OF 15 MILS WITH APPLICATION OF GLASS BEADS OF 9-7 LBS./GALLON.
- 4) ALL PERMANENT MARKINGS SUCH AS ARROWS, ONLY LEGEND, PREFERENTIAL AND BIKELANE MARKINGS MUST EITHER BE AN APPROVED TAPE SUCH AS 3M OR THERMOPLASTIC PAINT.

# PROVEMENTS - STRIPING PLAN

SEE SHEET 2 AND 4 FOR TYPICAL ROADWAY CROSS-SECTIONS

*ROUGH*  
 100' 1/2" CULVERT (11 IN. DIA.)  
 IN 220' HANDRAIL



### NOTES

- 1) LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS DRAWING ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATION OF ALL UTILITIES PRIOR TO PERFORMING WORK ON OR AROUND THEM.
- 2) ALL CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH CITY OF GRAND JUNCTION AND COLORADO DEPARTMENT OF TRANSPORTATION

# NTS - UTILITY LOCATIONS (APPROXIMATE)

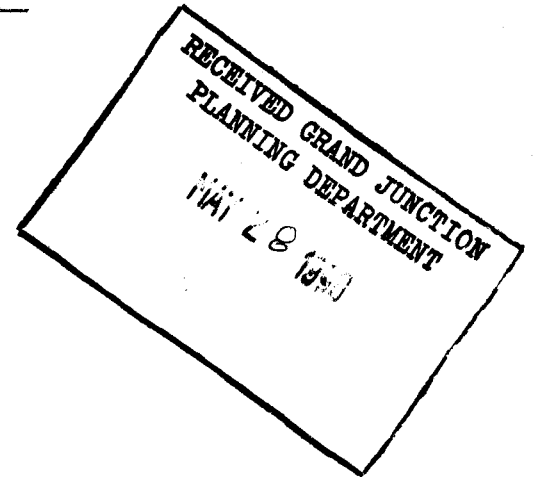
**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970) 963-0627

May 23, 1996

Planning Commission  
City of Grand Junction  
250 N. 5th St.  
Grand Junction, CO 81501-2668

City Council  
City of Grand Junction  
250 N. 5th St.  
Grand Junction, CO 81501-2668



**Re: Trails West Village/File #FPP-96-110**

Members of the Planning Commission and City Council:

Camelot Investments LLC is the developer of Trails West Village which is currently awaiting final plat approval for Filings I & II. I am writing to petition the City, pursuant to Section 5-4-6(E) of the Zoning and Development Code, for waiver of the parks/open space fees that have been allocated to this project in the amount of \$9,450. Specifically, I am requesting the City of Grand Junction to accept in lieu thereof 1.86 acres of Trails West Village lands dedicated to public recreational use. 0.75 acres of this total consists of a 20' wide, nearly 2,000' long trail and the balance comprises the land underlying the Redlands canal and service road, to be conveyed to the City in fee simple. Both tracts will be dedicated as trail easements for public, non-motorized recreational use. Each and every one of the criteria listed at Section 10-1-1B.2. of the Code are satisfied if the City accepts land in lieu of fees, primarily because of the benefits gained by the public through the dedications. It should be noted that the Redlands canal right-of-ways have been designated as desired public recreational corridors according to the Multi-Modal Plan adopted by the City and Mesa County.

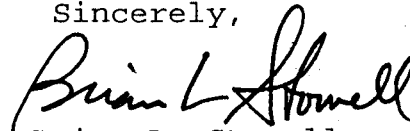
The average sales price for vacant land of comparable size in the Redlands area is \$55,753 per acre. A copy of the most recent Redlands area comps is attached hereto. Clearly, the fair market value of the dedicated lands exceeds the cash payment that would be required.

I am told this is an unprecedented request. I sincerely believe it is a justifiable one. *Trails West Village*

distinguishes itself as a residential subdivision by promoting access to, and integration with, the area's surrounding trail system. The conveyance and dedication of the above-referenced trails manifests this premise and fulfills the spirit of the City's parks/open space fee policy. To require Camelot to pay cash on top of the dedications would constitute double-dipping and serve to discourage further dedications of critical inventory.

In light of the above, I am respectfully asking the Planning Commission to recommend, and the City Council to accept, waiver of the parks/opens space fees for this project. Thank you for your consideration of this request.

Sincerely,



Brian L. Stowell

Brian L. Stowell

cc: Ms. Kathy Portner (hand delivered in fax form)  
Mr. Shawn Cooper

05/23/96 11:22

SOLD VACANT LAND

LIST #	ADDRESS	AR	LIST PRICE	SALE PRICE	OFFMKDT	MT	ACREAGE
*95 3436	316 DAKOTA CT	07	39,900	37,950	01/03/96	145	1.33
*94 1948	2215 RED CANYON CT	07	47,500	46,750	12/19/95	597	1.36
*94 1935	316 DAKOTA DR	07	48,500	48,500	04/04/96	704	1.05
*94 1340	IND VALL DR L	07	57,500	55,500	01/16/96	669	1.54
*94 1233	ROOSEVELT CT	07	57,500	56,500	02/22/96	706	1.25
*94 1336	INDEP VALLEY	07	57,500	56,500	01/30/96	683	1.53
*96 0264	2033 BASELINE DR	07	59,900	58,000	02/16/96	37	1.86
*95 4478	0 INDEPEND VALL	07	58,500	58,500	03/25/96	738	1.13
*94 1990	304 DAKOTA DR E.	07	59,500	59,500	12/20/95	580	1.23
*96 1171	2030 ROOSEVELT CT	07	60,500	60,500	03/29/96	28	1.43
*94 1989	306 DAKOTA DR E.	07	61,000	61,000	03/13/96	682	1.13
*94 1972	2214 BURRO CANYON	07	66,500	66,500	03/05/96	674	1.74
*95 5148	665 LINCOLN CT	07	67,500	67,500	12/15/95	1	1.12

TOTAL LISTINGS SOLD SINCE 12/1/96

AVERAGE SALES PRICE \$55,773.00

June 3, 1996

To: Kathy Portner, Planning Supervisor

From: Tim Woodmansee, Property Agent *Tim W.*

At your request, I have reviewed data provided by Camelot Investments LLC pertaining to the value of the following public trails easements to be dedicated with the platting of Trails West Village:

- Easement #1. A 20 foot wide easement across Outlot A and Outlot B, consisting of approximately 0.753 acres;
- Easement #2. Tract B of Trails West Village Filing No. One consisting of approximately 0.630 acres. This Tract B is also being dedicated as a Canal & Utility Easement;
- Easement #3. A 12 foot wide easement consisting of approximately 0.066 acres that provides a connection between the 20 foot wide easement across Outlot A and Tract B of Trails West Village Filing No. One;
- Easement #4. Tract A of Trails West Village Filing No. Two consisting of approximately 0.243 acres. This Tract A is also being dedicated as Canal, Utility and a 14 foot wide multi purpose easement.
- Easement #5. Tract B of Trails West Village Filing No. Two consisting of approximately 0.481 acres. This Tract B is also being dedicated as a Canal & Utility Easement.

I have also conducted my own research of the market for sales of comparable properties and have arrived at a value estimate which differs substantially from Camelot's. Based upon my investigation and analysis of data, I have concluded that the market would support a value of the subject easements as follows:

Easement #1:	0.753 acres	x \$7,500	x 100%	=	\$ 5,650 (Rounded)
Easement #2:	0.630 acres	x \$7,500	x 33%	=	\$ 1,560 (Rounded)
Easement #3:	0.066 acres	x \$7,500	x 100%	=	\$ 500 (Rounded)
Easement #4:	0.243 acres	x \$7,500	x 33%	=	\$ 600 (Rounded)
Easement #5:	0.481 acres	x \$7,500	x 33%	=	\$ 1,200 (Rounded)
Total Estimated Value				=	\$ 9,510 (Rounded)

The accompanying report describes the approaches to value and the conclusions derived by application in this assignment. Please do not hesitate to call if you have any questions.



05/23/96 11:22

SOLD VACANT LAND

LIST #	ADDRESS	AR	LIST PRICE	SALE PRICE	OFFMKDT	MT	ACREAGE
*95 3436	316 DAKOTA CT	07	39,900	37,950	01/03/96	145	1.33
*94 1948	2215 RED CANYON CT	07	47,500	46,750	12/19/95	597	1.36
*94 1935	316 DAKOTA DR	07	48,500	48,500	04/04/96	704	1.05
*94 1340	IND VALL DR L	07	57,500	55,500	01/16/96	669	1.54
*94 1233	ROOSEVELT CT	07	57,500	56,500	02/22/96	706	1.25
*94 1336	INDEP VALLEY	07	57,500	56,500	01/30/96	683	1.53
*96 0264	2033 BASELINE DR	07	59,900	58,000	02/16/96	37	1.86
*95 4478	0 INDEPEND VALL	07	58,500	58,500	03/25/96	738	1.13
*94 1990	304 DAKOTA DR E.	07	59,500	59,500	12/20/95	580	1.23
*96 1171	2030 ROOSEVELT CT	07	60,500	60,500	03/29/96	28	1.43
*94 1989	306 DAKOTA DR E.	07	61,000	61,000	03/13/96	682	1.13
*94 1972	2214 BURRO CANYON	07	66,500	66,500	03/05/96	674	1.74
*95 5148	665 LINCOLN CT	07	67,500	67,500	12/15/95	1	1.12

TOTAL LISTINGS SOLD SINCE 12/1/96

AVERAGE SALES PRICE \$55,773.00



1225 South 7th St.  
 Grand Junction, Colorado 81501-7791  
 (970) 242-5370 • FAX (970) 245-7716

# INVOICE

34347

**Camelot Investments LLC**

0090 Caballo Road

Carbondale, CO 81623

Invoice Date	<b>6/3/98</b>
Customer Number	<b>3050</b>
Job Number	<b>395736</b>
Customer Order Number	
Location of Work	<b>South Camp Road</b>
Date of Work	<b>thru 5/27/98</b>

TERMS: DUE 10TH OF MONTH FOLLOWING INVOICE DATE. 1.5% per month (18% annual rate) charged on past due accounts. Buyer agrees to pay reasonable attorney fees and costs in the event of default.

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT
1780 SY	Final shape roadbase	\$ 1.10	\$ 1,958.00
1 LS	Mill	2,188.00	2,188.00
475 TN	Asphalt paving (actual tonnage = 520 ton)	33.00	15,675.00
1 LS	Pavement marking	1,500.00	1,500.00
1 LS	Compliance testing	500.00	500.00
2-1/2 Days	Traffic control	500.00	1,250.00
	<b>Total Amount Due</b>		<b>\$ 23,071.00</b>

Please pay from invoice. THANK YOU



**Final Inspection Checklist**

**TRAILS WEST I&Z Subdivision**

Date: 7/29/98

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (303) 244-1599

**Streets**

Pavement

Concrete

Manholes / Inlets

• Keep clean - developer responsible until acceptance  
• Concrete collars around manholes not in pavement & raise to grade

Signs

Lighting

Site Grading

and swales see item #6 on list attached to 3/13/98 letter  
S. Camp

Other

Remove old white edge line on S. Camp

→ see also items #1 under grading & drainage 3/13/98 letter

**Utilities & Drainage** #3, #4

Water Lines

Sewer Lines

Inlet Structures

see above

Detention Facilities

see above

Outlet Structures

see above

**AS BUILTS, TEST PACKAGE** SEE PACKET

Inspected by:

Developer or Representative:

\_\_\_\_\_  
City Development Engineer

**Final Acceptance of the Streets and Drainage Facilities will be made when the above items have been corrected and inspected. Please call 244-1591 when ready for final acceptance.**

MEMORANDUM

TO: City Council

FROM: Kathy Portner *KP*  
Tim Woodmansee *TW*

DATE: August 5, 1996

RE: Trails West land value

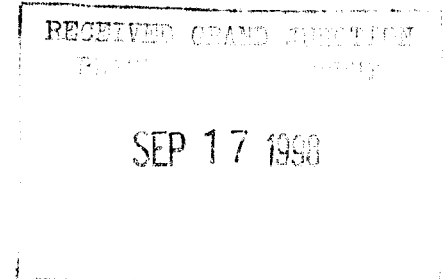
The value calculated for the lands proposed to be dedicated in lieu of parks and open space fees in Trails West Village was based on a fee-simple value. The advice of the City Attorney is that the value should be calculated on an easement value because an easement is all that is really needed to maintain the existing trail and provide the proposed connection.

The total value calculated by the City Property Agent for the trail along the abandoned canal and the connecting trail is \$6,150 (fee-simple value). The easement value is estimated to be between 90% and 100% of the fee-simple value. At 90%, the value of the easement would be \$5,535.

September 16, 1998

BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
605 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

Kerrie Ashbeck, P.E.  
Development Engineer  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

**RE: Trails West Village Subdivision, Filings 1 & 2**

Dear Ms. Ashbeck:

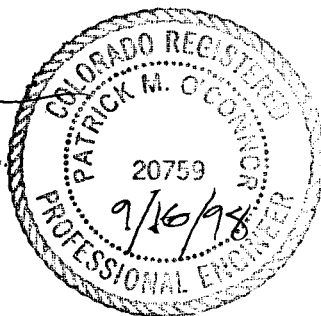
I hereby certify that I am a licensed engineer in the State of Colorado. To the best of my knowledge, information, and belief, the domestic water system, sanitary sewer system, roadways, and stormwater management system for the above-referenced project were constructed in conformance with the plans provided originally by Landesign Consultants dated April 22, 1996 and with revisions to the stormwater detention area and South Camp Road provided by Banner Associates, Inc. (BAI). The BAI plans are dated 5/16/97 with revisions on 6/30/97 and 11/04/97 for South Camp Road and dated 6/20/97 with revisions on 6/20/97 and 6/30/97 for the detention pond area. Revisions for the detention pond area were established at the request of City of Grand Junction engineering staff.

This belief is based on occasional observance of construction of the project and on the "As-Constructed" drawings to be submitted. Verification data for the drainage swales illustrated on the original grading plan by Landesign is incomplete at this time as they are not final. Information regarding final grading will be provided by September 30, 1998. The detention pond and stilling basin were constructed in general conformance with the original design and the City's requested revisions. Site grading is in general conformance with the overlot grading plan (sheet 9 of 22).

With regards to the statements herein, the project, in my professional opinion, is in compliance with applicable laws, codes, and ordinances.

Sincerely,

Patrick M. O'Connor, P.E.  
Senior Project Manager



cc: Brian Stowell

November 2, 1998

BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
605 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

Kerrie Ashbeck, P.E.  
Development Engineer  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

**RE: Trails West Village Subdivision, Filings 1 & 2 - Overlot Grading**

Dear Ms. Ashbeck:

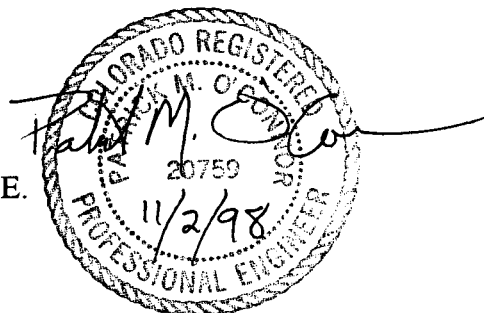
I hereby certify that I am a licensed engineer in the State of Colorado. To the best of my knowledge, information, and belief, the overlot grading and stormwater management systems for the above-referenced project were constructed in conformance with sheet 9 of 22 (Overlot Grading) plans provided originally by Landesign Consultants dated April 26, 1995 and with revisions to the stormwater detention area provided by Banner Associates, Inc. (BAI). The BAI plans are dated 6/20/97 with revisions on 6/20/97 and 6/30/97 for the detention pond area. Revisions for the detention pond area were established at the request of City of Grand Junction engineering staff.

This belief is based on occasional observance of construction of the project and on the "As-Constructed" drawings. Verification data for the drainage swales is illustrated on the original overlot grading plan by Landesign. The detention pond and stilling basin were constructed in general conformance with the original design and the City's requested revisions. Site grading is in general conformance with the overlot grading plan (sheet 9 of 22). Construction conformance of domestic water, sanitary sewer, and roadways was addressed in my letter dated September 16, 1998.

With regards to the statements herein, the project, in my professional opinion, is in compliance with applicable laws, codes, and ordinances.

Sincerely,

Patrick M. O'Connor, P.E.  
Senior Project Manager



cc: Brian Stowell



November 16, 1998

City of Grand Junction  
Public Works Department  
250 North 5TH Street  
Grand Junction CO 81501-2668  
FAX: (970) 256-4022

Patrick M. O'Connor, P.E.  
Banner Associates, Inc.  
2777 Crossroads Blvd.  
Grand Junction, CO 81506

Dear Mr. O'Connor:

The City has received and reviewed the as-built overlot grading plan, detention pond plan, and your letter certifying the drainage facilities for the Trails West Village Subdivision Filings 1 and 2. In general, certification of drainage facilities includes field surveying the as-built condition and submitting a statement that the facilities conform to the original design. If the field condition differs from the original design described in the drainage report and illustrated on the final approved plan set, either field modifications must be made to match the original design, or a workable alternate design must be prepared, approved, and constructed. If an alternate design is constructed, the as-built plans and the drainage report must be revised to reflect the field condition and it must be illustrated that the purpose and intent of the original design has been achieved via the alternate design. Data, calculations, maps, and other documentation supporting assumptions and/or alternate designs must be submitted as part of the certification.

The plans and certification you have submitted to date do not clearly and completely describe, support, nor show how the as-built condition compares with and/or varies from the original design. An addendum or update to the drainage report needs to be done to illustrate the capacity of the swales which run between the lots and along South Camp Road as well as the capacity and operation of the detention pond. The configuration of the swales as constructed is shown on various cross-sections but there are no calculations of the swale capacity and how the as-built capacity compares to that of the original design. Similarly, the detention pond calculations need to include the volume based on the release rate of the outlet structure as it is constructed and in relation to the final pond grading including the irrigation storage.

Landesign's original plan set includes a grading and drainage plan, in addition to the overlot grading plan, showing the swale configuration, drainage sub-basins, etc. Their drainage report includes swale capacity calculations, descriptions and quantification of off-site flows, runoff calculations, pond volume calculations, sub-basin descriptions, etc. You have stated that you have a copy of the original drainage report and a full plan set from Landesign. Please review all of this information and use it in preparing the as-built drawings and your certification of the as-built drainage facilities. Again, your certification is a comparison of the original design to the as-built condition. The purpose of the certification is to ensure the drainage facilities have either been constructed per the original design or, if the as-built condition is different than the original design, it must be

Page 2  
Patrick M. O'Connor  
Trails West Village  
November 16, 1998

shown that the as-built condition functions in an equivalent fashion and/or meets the City's design criteria.

The certification and as-built plans need to be clear as to what changes from the original design have been made, what the basis for those changes has been, and what impact those changes have had on the drainage facilities serving the development. It must be shown that the as-built drainage facilities adequately convey the historic upstream flows and that adequate conveyance and detention of the developed site flows is provided in conformance with the City's SWMM criteria. The flows as identified in the original drainage report must be used. However, if you believe the flows as calculated in the original report are in error (or any other errors were made in assumptions and/or calculations) the new drainage report can include documentation of any such errors and provide the corresponding calculations, maps, etc. to support the as-built design.

The City Utility Engineer has reviewed the as-built drawings for the sewer lines and has found them to be acceptable. Upon receipt of your revised certification including accompanying narrative, calculations, and as-built grading and drainage plans, the City Engineering staff will again review those items. The subdivision is not eligible for acceptance by the City until the drainage certification, all as-built drawings, and the compilation of test results are turned in and approved by the City. Your office should have a copy of the SSID manual which outlines the procedure and documents required for project close-out and City acceptance. However, I have enclosed a copy of the applicable checklists from the City's SSID manual pertaining to project close-out for your use. Also, any outstanding punch list items must be completed (removal of old white edge line on South Camp Road, detention pond seeding) and an executed drainage easement for the swale on Lot 6 of Block 2 must be received and approved prior to final acceptance of the subdivision. It is my understanding that the developer is finalizing these items and intends to enter into an agreement with the Homeowner's Association regarding the pond seeding which is to be done in the Spring.

If you have any questions, please call me at 244-1443. The files in the City Community Development Department and the Engineering Department have copies of the plans and drainage report for Trails West Village Filings 1 and 2 should you need to obtain them.

Thank you for your prompt attention to this matter.



Sincerely,

A handwritten signature in black ink, appearing to read "Kerrie Ashbeck", with a long horizontal flourish extending to the right.


Kerrie Ashbeck, P.E.  
Development Engineer

cc: File #FPP-1996-110  
Michael Drollinger, Community Development  
John Shaver, Assistant City Attorney

Kerrie A.

  
**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-6379



January 8, 1999

Mr. Michael T. Drollinger  
City of Grand Junction  
Community Development Department  
250 North 5th St.  
Grand Junction, CO 81501-2688

**VIA FAX & MAIL****Re: Trails West Village Filing III**

Dear Michael:

Pat O'Connor called me this morning to confirm that Camelot's application has been pulled from the January 12, 1999 agenda. I still have not heard from anyone at the City directly regarding this matter, despite having left several messages.

Michael, I am confused and chagrined. It is my understanding that the decision to pull the application was made by the engineering department based on perceived trivial deficiencies in Banner's response comments as well as Camelot's failure to provide the City with a written easement for a drainage swale and failure to complete the revegetation of the common areas. I am basing this on conversations with Pat O'Connor since at no time have I received any direct communication (and nothing in writing) from the City concerning this important matter.

I leave the alleged deficiencies to be discussed between Banner and your office. According to Pat, he delivered everything as requested. He believes that the questions concerning the front lot setback and drainage retention location either involve a legitimate dispute over provisions in the Code or can be resolved very simply, now or during final plat. In any event, they are not grounds for preventing Camelot's application to go to a hearing.

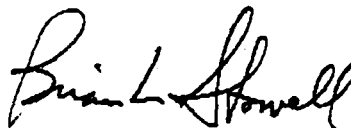
Regarding the remaining items under the DIA, at no time did either Kerrie Ashbeck, Rick Dorris or you indicate that proceeding to a hearing on filing III was conditioned upon the Hahns executing a written easement for the stormwater drainage swale cutting through their property or revegetation of the common area. Those items have always been discussed in the context of completion of the DIA. The pre-conditions the City insisted upon were completion of the physical drainage improvements (beyond what was called for in the approved plans) and certification of their capacities by Banner Associates, along with as-builts. It is my understanding that these items were provided to the City on or before December 30, 1998.

~~Michael, pulling~~ Camelot's Filing III application off the January 12, 1999 planning commission agenda and forcing Camelot to re-submit its preliminary plat application for a third time will cause Camelot substantial injury. I will not take the time in this letter to detail the ~~number of investors~~, lenders, builders, realtors and the like who will be adversely affected. As I pointed out to you before, timing is critical for this project and another month's (or more) delay will be catastrophic. And for what?

You know that I have endeavored, in spite of my recent health problems, to meet the substance of the City's drainage concerns, most of which are outside the scope of the plans that were originally approved for filing nos. I & II. Camelot has proceeded in good faith. It is highly arbitrary and unfair to once again pull its application of the commission agenda at this late date without having first given proper notice of new conditions the City considers to be prerequisites to going to a hearing.

I am asking you, or whoever made the decision, to reconsider.

Sincerely,



Brian L. Stowell

**RESPONSE OF DEVELOPER TO SUMMARY OF COMMENTS PRESENTED TO  
DEVELOPER AT JANUARY 12, 1999 MEETING AT CITY HALL**

January 21, 1999

**FILING 1 & 2 AS-BUILTS**

- The executed drainage easement for the new swale configuration on Lot 6, Block 2 has been drafted and is attached in its draft form for the City's review. Developer has received assurance from the owners of the affected lot that they will execute the easement upon the satisfaction of three conditions, two of which have already been met. A letter is attached describing the status of this matter.
- The requested mylars, two sets of sealed prints and a 3.5" disk of Filing 1 and 2 grading and drainage as-builts are attached.
- 3 bound and sealed copies of the revised Preliminary Drainage Report Addendum (dated 1/22/99) showing calculations, swale details and maps describing and documenting the revised off-site basin contributions and flow routing through Filings 1, 2 and 3 are attached.

**FILING 3**

Drainage

- The location for detention pond and outfall is shown on sheet 4 of 5 of the preliminary plat, grading and drainage plan. The revised preliminary drainage report showing the pond will work is attached.
  - Redlands Water and Power will not permit developed flows in its canal. Therefore, the flows overtopping the ditch will be routed back to the street and discharged at historic flow rates.
  - The City agreed at our January 12 meeting that further discussion about the major drainage basin and how Filing No. 3 fits within the basin may be deferred until final plat. Information regarding the major basin, however, is included in the Revised Drainage Report Addendum.

Sewer

- Written approval from Redlands Water and Power for the sewer alignment adjacent to the canal is attached.

Ute Water Line Break

- The proposed flow routing and conveyance facilities are shown in the corresponding section of the Revised Drainage Report Addendum.

- Calculation of flows with street and swale capacities are shown in the corresponding section of the Revised Drainage Report Addendum. These flows and estimated effects have been discussed with Rick Dorris of the City of Grand Junction and Ed Tolen of Ute Water. Estimated effects include a possible encroachment of the 100 c.f.s. flow against 3 structures (Lots 2 & 6, Block 2, Filing 1 and Lot 4, Block 1, Filing 1) at a depth of less than 0.3 feet assuming a 50/50 split of the flow down the two main corridors.

#### Site Design

- The curve widening requirements are duly noted on sheet 1 of 5 of the preliminary plan.
- Tracts A, B, C and F will be dedicated to Ute Water at final plat, with the Trails West Village Homeowners' Association, Inc. being responsible for maintaining the surface area of the tracts. This obligation can be imposed through the protective covenants.
- Tracts A, B, C and F will remain undisturbed except for incidental disturbance caused by construction activity. Any areas disturbed will be revegetated with natural seed grass. Developer will stub out irrigation or provide temporary irrigation to these tracts, but will seek to implement a revegetation plan that will ultimately not depend on irrigation but upon natural precipitation. Tract D will be disturbed and developed as a private park for the benefit of the homeowner's association. The park will involve minimal landscaping. Tract E will remain undisturbed and in its native state. Tract G will be disturbed to allow for a detention area. Tract G will be revegetated with natural seed grass. Developer will stub out irrigation or provide temporary irrigation to this tract, but will seek to implement a revegetation plan that will ultimately not depend on irrigation but upon natural precipitation.
- Redlands Water and Power Company will not permit fencing within its declared easement area along the canal. Therefore, any perimeter fences will have to be constructed outside this easement.
- Given the unique topography of Filing No. 3, the lots on the hillside east of Montero Court are given additional design effort shown on sheet 5 of 5 of the Preliminary Plan. This drawing illustrates construction feasibility for these lots in two possible scenarios, among others that may exist. One cross-section (and the enlarged grading plan) shows a typical lot grading for a multi-level home with the rear wall acting as a retaining structure and a minimally disturbed rear yard at or near existing grade. The second cross-section shows a possible terraced retaining wall in the rear yard. Each scenario is feasible to construct without adversely affecting drainage on the adjacent lots, even in a situation where adjacent neighbors might desire different scenarios. The Developer is willing to require individual grading and drainage

RESPONSE OF DEVELOPER TO SUMMARY OF COMMENTS PRESENTED TO  
DEVELOPER AT JANUARY 12, 1999 MEETING AT CITY HALL

January 21, 1999

p. 3


plans (prepared by a licensed engineer and approved by the City) to be submitted by the builders. This requirement would be noted on the Final Plat and/or in the Protective Covenants or through the Design Control Committee review process already in place as an adjunct of the homeowner's association. The Developer may also elect to perform site grading himself prior to the sale of those specific lots.

- Developer believes that the 75 foot lot width requirement recently raised by the City applies explicitly to the location of the principal structure to be built on the lot and not at the front yard setback. This particular plan has been through final plat submittal as well as two preliminary plat submittals (and a hearing) and this issue was never raised. The developer has heard mixed reports from several different City agents concerning this issue with the general impression being that the City understands that the conservative interpretation has not been consistently followed in many City residential projects and may have limited viability in this case. Therefore, Developer submits its lot configuration without revision but remains open to discuss the City's concerns in this regard.



**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-6379



January 22, 1999

Ms. Kerrie Ashbeck, P.E.  
City of Grand Junction  
Department of Public Works  
250 North 5th St.  
Grand Junction, CO 81501-2688

**VIA FAX & MAIL**

**Re: Trails West Village Filing III**

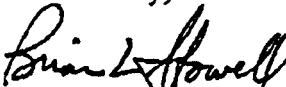
Dear Kerrie:

I am writing to advise you as to the status of Camelot's efforts to obtain an executed, written easement from Richard and Connie Hahn, the owners of Lot 6, Block 2, Filing No. 1 for the recently expanded drainage swale through their property. I presented the Hahns with an easement in the form that will be attached to the response comments being filed with the City today. On January 21, 1999 the Hahns responded in writing that they would execute the easement upon the satisfaction of the following three (3) conditions: 1) that the easement reflect a maximum depth of 6 inches below existing grade; 2) that they receive confirmation that the sum of \$2,200 had been escrowed with Meridian Land Title (to guarantee certain re-grading and re-sodding); and 3) that their mortgagee approve the easement.

It is Camelot's view that the maximum depth concern is a contract and site construction issue and therefore, more appropriately resolved through the escrow. Camelot has deposited the above-requested sum with Meridian Land Title and established an escrow. By copy of this letter, Camelot is advising the Hahns of the same.

Camelot has no control over the mortgagee approval, but will work with the Hahns to bring that remaining item to closure.

Sincerely,



Brian L. Stowell

cc: Rick and Connie Hahn  
Tony Perry  
Pat O'Connor

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BANNER ASSOCIATES, INC.  
2777 Crossroads Boulevard  
Grand Junction, Colorado 81506  
(303) 243-2242  
FAX (303)243-3810  
605 East Main, Suite 6  
Aspen, Colorado 81611  
(303) 925-5857

January 15, 1999

Brian Stowell  
Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623

**RE: Trails West Village - Filing 3**

Dear Mr. Stowell:

I met with Gregg Strong of Redlands Water and Power (Redlands) today to discuss issues concerning the canal company which have been brought out during the subdivision review process. Mr. Strong's signature below will attest that he is in concurrence with the contents of this letter.

The following issues were discussed:

1. Redlands does not want fences constructed within their easements or R.O.W.'s. Any fences constructed should be outside of these boundaries and installed at the homeowners's discretion.
2. Redlands does not want to accept developed stormwater runoff into their canal. They prefer the discharge be directed back into the street. This will require that a detention pond be installed within Filing 3, probably at the backs of Lots 14 and 15. They are currently in the process of developing a formal policy regarding stormwater acceptance in general, but it will not be immediately available.
3. Redlands will allow the sanitary sewer line to be located parallel to the canal and within their easement as long as it is a minimum of 20' from the centerline of the canal on the upslope (south) side. Locating the sewer in the center of the 20' easement shown would be an acceptable location which would provide this minimum distance.

Sincerely,



Patrick M. O'Connor, P.E.  
Senior Project Manager - Banner Assoc., Inc.



Gregg Strong  
Superintendent - Redlands Water and Power


PMO





**CAMELOT INVESTMENTS LLC**

0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-6379



January 19, 1999

Mr. Ed Tolen  
Ute Water Conservancy District  
560 25 Road  
Grand Junction, CO 81505

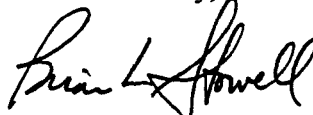
**Re: Trails West Village Filing No. III/Preliminary Plat**

Dear Ed:

I am writing to confirm Ute Water's position that it will accept fee ownership, through plat dedication, of Tracts A, B & C, Trails West Village, Filing No. 3. Maintenance of the surface area of the same tracts, to the extent such maintenance is required, will be the responsibility of the homeowner's association.

If you concur with the above, I would ask that you, or the appropriate Ute Water representative, sign on the space provided below. Thank you for your cooperation in advance.

Sincerely,



Brian L. Stowell

cc: Pat O'Connor

Accepted: 

Ute Water Conservancy District

Jim Shanks, Public Works Director  
City of Grand Junction  
250 North 5th Street  
Grand Junction, CO 81501

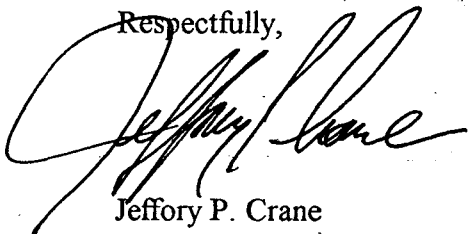
Re: Credit for Transportation Capacity Payment  
Trails West Village Subdivision; File #FFP-96-110

Dear Mr. Shanks:

Camelot Investments respectfully requests a credit for the Transportation Capacity Payment of \$500.00/Lot for the proposed 42 lots within Filings 1 and 2 of Trails West Village. The estimated cost of \$62,000.00 for improvements to South Camp Road well exceed the \$21,000.00 required by the Transportation Capacity Payment.

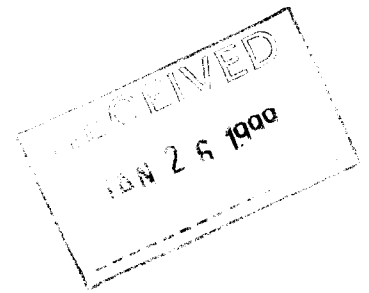
If I can be of any further assistance in this matter, please contact me at your earliest convenience. Until then I remain,

Respectfully,



Jeffery P. Crane  
Project Manager

  
**CAMELOT INVESTMENTS LLC**  
0090 CABALLO RD.  
CARBONDALE, COLORADO 81623  
(970)963-6379



January 22, 1999

Ms. Kerrie Ashbeck, P.E.  
City of Grand Junction  
Department of Public Works  
250 North 5th St.  
Grand Junction, CO 81501-2688

**VIA FAX & MAIL**

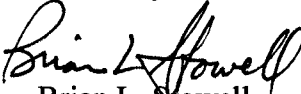
**Re: Trails West Village Filing III**

Dear Kerrie:

I am writing to advise you as to the status of Camelot's efforts to obtain an executed, written easement from Richard and Connie Hahn, the owners of Lot 6, Block 2, Filing No. 1 for the recently expanded drainage swale through their property. I presented the Hahns with an easement in the form that will be attached to the response comments being filed with the City today. On January 21, 1999 the Hahns responded in writing that they would execute the easement upon the satisfaction of the following three (3) conditions: 1) that the easement reflect a maximum depth of 6 inches below existing grade; 2) that they receive confirmation that the sum of \$2,200 had been escrowed with Meridian Land Title (to guarantee certain re-grading and re-sodding); and 3) that their mortgagee approve the easement.

It is Camelot's view that the maximum depth concern is a contract and site construction issue and therefore, more appropriately resolved through the escrow. Camelot has deposited the above-requested sum with Meridian Land Title and established an escrow. By copy of this letter, Camelot is advising the Hahns of the same.

Camelot has no control over the mortgagee approval, but will work with the Hahns to bring that remaining item to closure.

Sincerely,  
  
Brian L. Stowell

cc: Rick and Connie Hahn  
Tony Perry  
Pat O'Connor

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## MEMORANDUM

---

Date: January 26, 1999

To: Connie Hahn  
Mesa County Engineering Dept.

From: Kerrie Ashbeck   
City of Grand Junction Engineering Dept.

Re: Trails West Village Subdivision

Attached please find the narrative from the most recent drainage report addendum for Filing 3 which also includes a discussion of stormwater conveyance facilities in Filings 1 and 2. Banner Associates has delineated the limits of the off-site and on-site drainage basins contributing flow through Filings 1 and 2. The attached map shows the contributing basin, the off-site and on-site 100 year flows, and the swale capacities. The City has the entire report including all associated calculations that are summarized in the table on the map. Please let me know if you would like copies of additional information from the report. Also, the Community Development Department will copy the entire report for a fee equivalent to the copying cost.

Please call me at 244-1443 if you have questions or if I can be of further assistance. Thank you.

**REVISED  
PRELIMINARY  
DRAINAGE REPORT**

---

**TRAILS WEST VILLAGE**

**FILING THREE**

**CITY OF GRAND JUNCTION**

---

Prepared For:

**CAMELOT INVESTMENTS**  
0090 Caballo Road  
Carbondale, Colorado 81623

January 1999

**BANNER**

---

Banner Associates, Inc. • Consulting Engineers & Surveyors  
2777 Crossroads Blvd., Grand Junction, Colorado 81506  
Phn: (970)243-2242 • Fax: (970)243-3810

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SECTION 3 - 24" UTE WATER LINE BREAK (IMPACTS TO SWALES)	

# REVISED PRELIMINARY DRAINAGE REPORT TRAILS WEST VILLAGE FILING THREE

## GENERAL

This report is offered to provide additional information regarding storm runoff produced by Trails West Village. It is also meant to address comments expressed by the City of Grand Junction engineering staff concerning the ability of Filings 1 and 2 (as-constructed) to convey historic and developed runoff from Filing 3 and contributing offsite basins. This report contains information regarding flows carried by storm sewers and swales in the interior portions of Filings 1 and 2.

There are 3 major sections contained within this report. Section 1 addresses stormwater travelling through Filings 1 & 2 from offsite basins including historic flows from Filing 3. Section 2 provides calculations for historic and developed runoff from Filing 3, including stormwater detention calculations to restrict developed release rates to historic levels. Section 3 shows flowrates and swale capacities for all three Filings given a catastrophic failure of the 24" Ute Water line running through the development.

Historic offsite flows impacting Filings 1 and 2 have been analyzed as have capacities of the existing main drainage routes constructed in these filings. Differences were found between results of this analysis and those of a previous report prepared by others in the design stages of the first two filings. This report was prepared to show that the existing stormwater system (after much reconstruction and retrofitting) is capable of conveying flows as required.

This report is not meant to dispute or recreate all of the information provided in the previous report (prepared by Landesign, dated April, 1996). It is meant only to clarify the amount of flow affecting the internal storm sewers and associated overflow swales provided in Filings 1 and 2.

As discussed at length with the City of Grand Junction engineering staff, developed flows from Filing 3 will be limited to historic rates (as was assumed in the Landesign report) to eliminate the need for reanalysis of the accepting detention pond and outlet works in Filing 1.

## SECTION 1 - OFFSITE IMPACTS TO FILINGS 1 & 2

### RUNOFF

This report does not dispute developed internal flows, or the quantification of offsite flows calculated by earlier studies, for Filings 1 and 2. It is suggested however, that the assumption by Landesign stating there would be 100 CFS of offsite flow entering Filing 2 (through Filing 3) which would split equally into two 50 CFS flows is incorrect. It appears Landesign considered the 100 CFS calculated in a previous (12/09/95) study by Lincoln-DeVore to flow through Filing 3. This is not possible given that the basin producing this flow discharges to South Camp Road, south of Filing 3 (as seen on attached Exhibit "A" in the appendix). South Camp Road does not have a roadside ditch on the east side along the Gorski property immediately south of Trails West Village. The roadway, in-fact, slopes to the west and does not even have a centerline crown in this area. Flows from southern offsite basins would therefore be diverted to the west side of South Camp Road and not impact the internal drainage routes (channels A, B, and C - Exhibit "A") of Trails West.



This report provides clarification and reanalysis of offsite basins impacting Filings 1 and 2. This analysis is summarized here, and can be seen in more detail on Exhibit "A" and in the calculations enclosed in the appendix.

Offsite Basin Area - 27.8 acres (Total - affecting internal swales)

Total offsite 100 year Runoff (Historic) - 32.3 CFS

<u>Channel</u>	<u>Affected Basin Area (Offsite)</u>	<u>Offsite Flow (CFS)</u>	<u>Previous Onsite Developed Flows (By Others) - (CFS)</u>	<u>Total Potential 100 Year Runoff (CFS)</u>
A	7.8 ac. (28%)	9.0	6.8	15.8
B	10.5 ac. (38%)	12.3	12.3	24.6
C	27.8 ac. (100%)	32.3	24.4	56.7

Runoff was calculated by several methods including independent analysis of each sub-basin versus a percentage of total (shown above). Comparisons were made analyzing the offsite historic and onsite developed runoff as one basin versus separating onsite and offsite (shown above). Other methods of flow estimation (including SCS-TR55) were also compared with the end result of these comparisons all showing reasonably similar results.

### CHANNEL CAPACITIES

Capacities were calculated using HAESTAD METHODS FLOWMASTER software, field surveyed record-data for the channels, and coefficients provided by tables in the Grand Junction SWM manual. Storm sewer capacities are shown also and included in the total capacity (as discussed with City engineering staff) for the indicated drainage route.

<u>Channel</u>	<u>Capacity (CFS)</u>	<u>Associated Storm Sewer Capacity (CFS)</u>	<u>Total Capacity for Selected Route</u>
A	45.7	8	53.7
B	23.1	8	31.1
C	56.1	17	73.1
D	308.7	N/A	308.7

### CONCLUSIONS

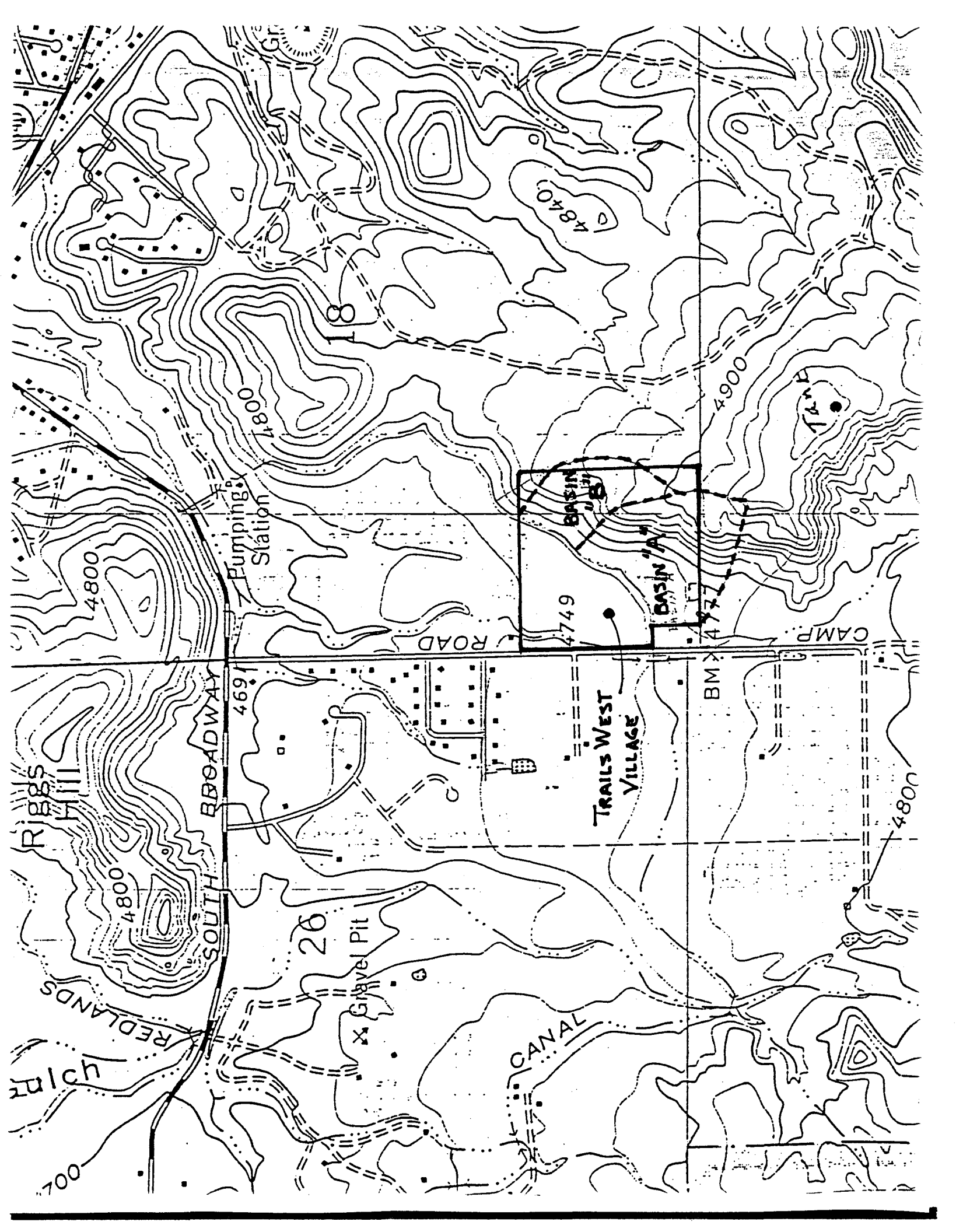
Existing finish-graded swales and storm sewers have the capacities to carry proposed 100-year flows as seen on the chart below.

Developed runoff for Filing 3 (as determined in the July 1998 Banner report) will be detained and released at rates not exceeding historic as opposed to earlier proposals to route excess flows to the

Filing 1 stormwater facility. This will eliminate the requirement of reanalysis for the existing detention pond and outlet works, which have already been accepted by the City of Grand Junction.

<u>Channel</u>	<u>Proposed Q<sub>100</sub></u>	<u>Capacity</u>	
A	15.8	53.7	o.k.
B	24.6	31.1	o.k.
C	56.7	73.1	o.k.
D	235.0*	308.7	o.k.

\* From previous reports by Landesign and Lincoln-DeVore



CHANNEL	OFFSITE Q 100 (CFS)	FILING 1 & 2 DEVELOPED Q 100 (CFS)	TOTAL Q 100 (CFS)	SWALE CAPACITY (CFS)	STROM PIPE CAPACITY (CFS)	TOTAL CAPACITY (CFS)	Q 100< CAPACITY
A	9.0	6.8	15.8	45.7	8	53.7	YES
B	12.3	12.3	24.6	23.1	8	31.1	YES
C	32.3	24.4	56.7	56.1	17	73.1	YES
D	235.0*	N/A	235.0	308.7	N/A	308.7	YES

\* AS DETERMINED BY PREVIOUS STUDIES BY OTHERS

NOTE:  
SWALE CAPACITIES SHOWN ARE FOR A TYPICAL CROSS-SECTION ALONG THE CHANNEL LENGTH AND ARE CONTAINED WITHIN THE GIVEN DRAINAGE EASEMENT. CAPACITIES INCREASE RAPIDLY WITH SOME ENCROACHMENT OUTSIDE OF EASEMENT.

NOTE:  
CONTOURS ARE APPROXIMATE ONLY AND WERE DIGITIZED FROM U.S.G.S. QUAD SHEETS AND 1980 MESA COUNTY ORTHOPHOTOS.

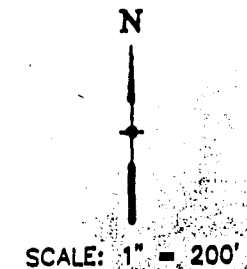


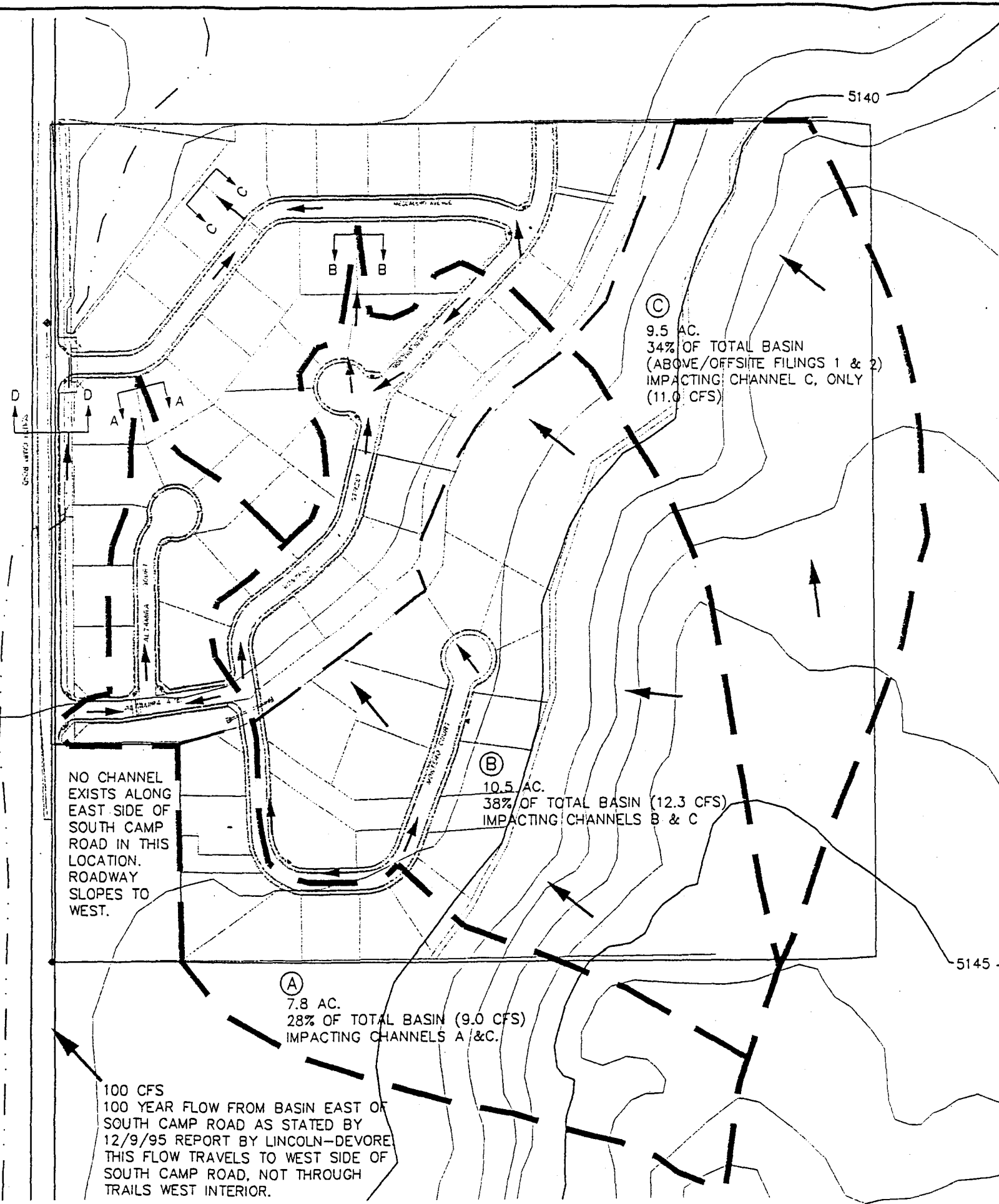
EXHIBIT "A"  
OFFSITE BASINS IMPACTING  
FILINGS 1 & 2 - TRAILS WEST VILLAGE



AMERICAN CONSULTING  
ENGINEERS COUNCIL of COLORADO

**BANNER**

BANNER ASSOCIATES, INC. • CONSULTING ENGINEERS & SURVEYORS  
2777 CROSSROADS BOULEVARD • GRAND JUNCTION, CO 81506 • (970) 243-2242



SECTION 3 - 24" UTE WATER LINE BREAK  
IMPACT TO SWALES

## GENERAL

This section is included to address City of Grand Junction review comments concerning a possible break in the 24" Ute water line existing within Trails West Village. This analysis is based on a number of generalized assumptions:

- 1.) The break would be complete and allow unrestricted flow to discharge from a hydraulically "clean" end-of-pipe.
- 2.) The break would occur somewhere in the vicinity of Filing 3, but would split into equal parts at the intersection of Altamira Avenue and Montero Court. Flows produced in the first two filings along the 2 major drainage routes would each be half of the total.
- 3.) Flows are analyzed for the same cross-sections utilized in the stormwater analysis.

Illustrations included in the appendix show the calculated flow from the break, the overall routing and the resultant depths of flow based on the above assumptions. Street capacities are given in the Section 2 Appendix. These flow depths indicate an encroachment outside of some of the dedicated stormwater easements and against some of the adjacent structures (usually a garage) to minimal depths generally under 0.3' in depth. Cross-section plots are followed by printouts of the cross-section worksheet and rating tables to provide depths of flow for other various flowrates. All information was based on field surveys of the existing swales and analyzed by Haestad methods Flowmaster software.

Results of this generalized analysis were discussed with Rick Dorris of the City of Grand Junction Engineering Department and Ed Toland of Ute Water.

Table  
Rating Table for Irregular Channel

Project Description	
Project File	c:\haestad\fmw\tw1.fm2
Worksheet	TWV - LOTS 6,7 BLK 2, FIL 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data	
Channel Slope	0.015000 ft/ft

Input Data			
	Minimum	Maximum	Increment
Water Surface Elevation	95.70	96.05	0.05 ft

Rating Table		
Water Surface Elevation (ft)	Wtd. Mannings Coefficient	Discharge (cfs)
95.70	0.025	22.38
95.75	0.025	25.70
95.80	0.025	29.28
95.85	0.025	33.23
95.90	0.025	37.56
95.95	0.025	42.29
96.00	0.025	47.43
96.05	0.025	52.99

TWV - lots 6,7 blk 2 fil 1  
Worksheet for Irregular Channel

Project Description	
Project File	c:\haestad\fmw\twv1.fm2
Worksheet	TWV - LOTS 6,7 BLK 2, FIL 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data				
Channel Slope	0.015000 ft/ft			
Water Surface Elevation	96.07	ft		
Elevation range: 95.05 ft to 96.07 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	96.07	0.00	18.00	0.025
3.00	95.11			
6.00	95.05			
9.00	95.15			
13.00	95.71			
18.00	96.07			

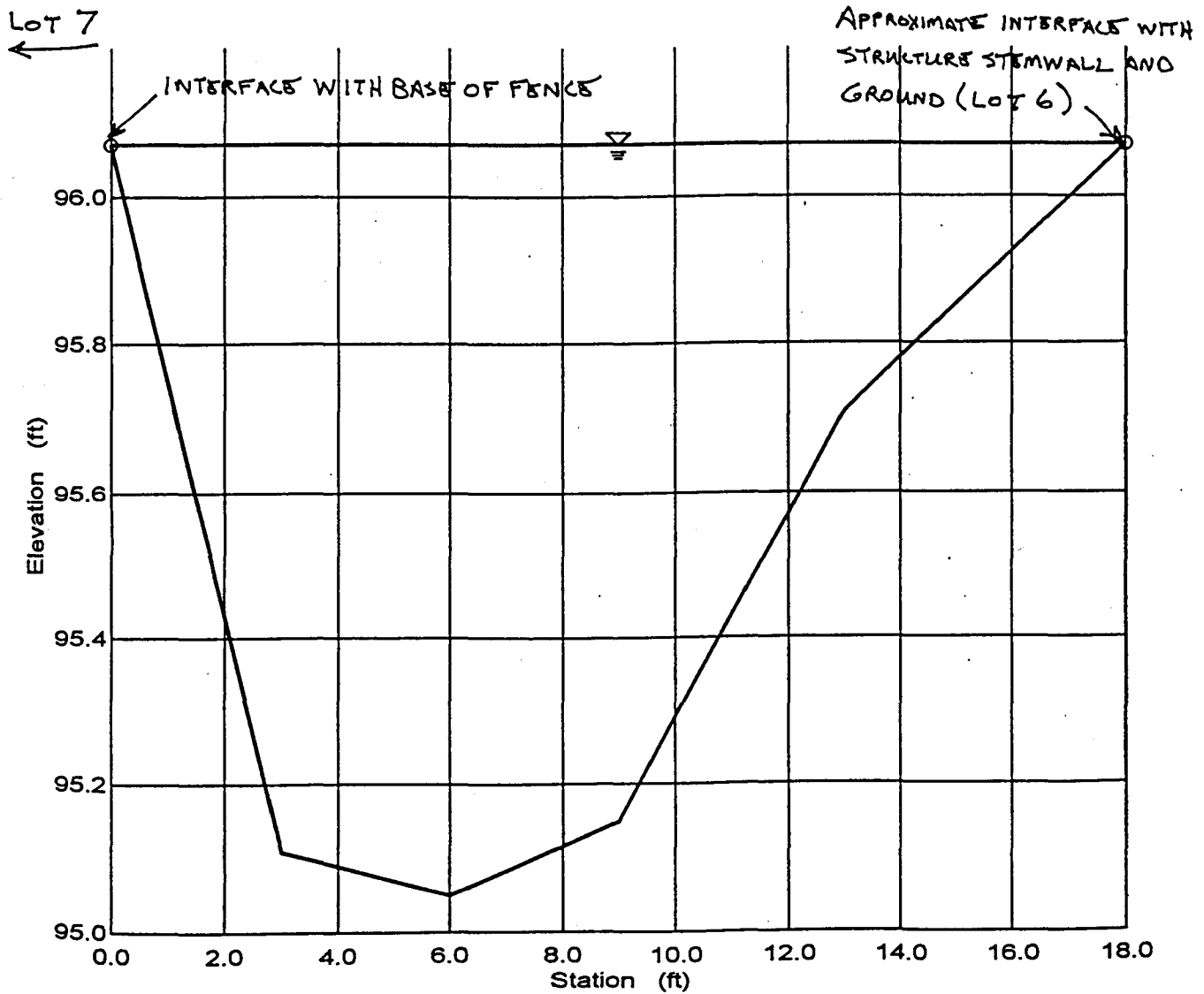
Results		
Vtd. Mannings Coefficient	0.025	
Discharge	55.34	cfs
Flow Area	10.78	ft <sup>2</sup>
Wetted Perimeter	18.20	ft
Top Width	18.00	ft
Height	1.02	ft
Critical Depth	96.14	ft
Critical Slope	0.010696	ft/ft
Velocity	5.13	ft/s
Velocity Head	0.41	ft
Specific Energy	96.48	ft
Froude Number	1.17	
Flow is supercritical.		



**CHANNEL "B"**  
**Cross Section for Irregular Channel**

Project Description	
Project File	c:\haestad\fmw\tw1.fm2
Worksheet	TWV - LOTS 6,7 BLK 2, FIL 1
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data	
Wtd. Mannings Coefficient	0.025
Channel Slope	0.015000 ft/ft
Water Surface Elevation	96.07 ft
Discharge	55.34 cfs




CHANNEL	ESTIMATED FLOW (CFS)	SWALE CAPACITY (CFS)	STORM PIPE CAPACITY (CFS)	TOTAL CAPACITY (CFS)	SWALE CAPACITY EXCEEDED
A	50	45.7	8	53.7	NO
B	50	23.1	8	31.1	YES
C	100	56.1	17	73.1	YES
E	100	275.0	N/A	275.0	NO

NOTE:  
SWALE CAPACITIES SHOWN ARE FOR A TYPICAL CROSS-SECTION ALONG THE CHANNEL LENGTH AND ARE CONTAINED WITHIN THE GIVEN DRAINAGE EASEMENT. CAPACITIES INCREASE RAPIDLY WITH SOME ENCROACHMENT OUTSIDE OF EASEMENT.

NOTE:  
CONTOURS ARE APPROXIMATE ONLY AND WERE DIGITIZED FROM U.S.G.S. QUAD SHEETS AND 1980 MESA COUNTY ORTHOPHOTOS.

N  
SCALE: 1" = 100'  
JAN 22, 2011

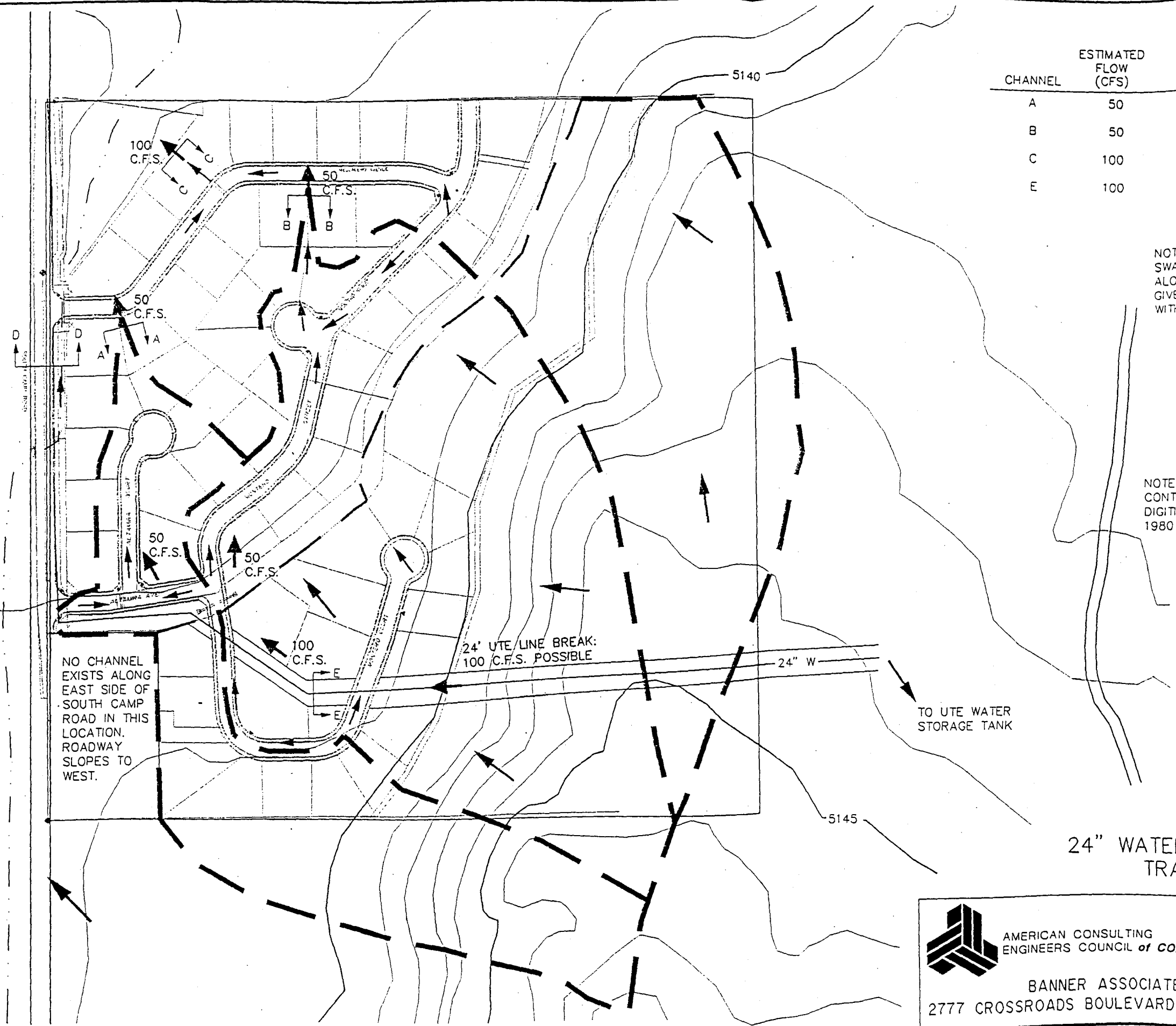
EXHIBIT "B"  
24" WATER LINE BREAK IMPACT ON  
TRAILS WEST VILLAGE



AMERICAN CONSULTING ENGINEERS COUNCIL of COLORADO

**BANNER**

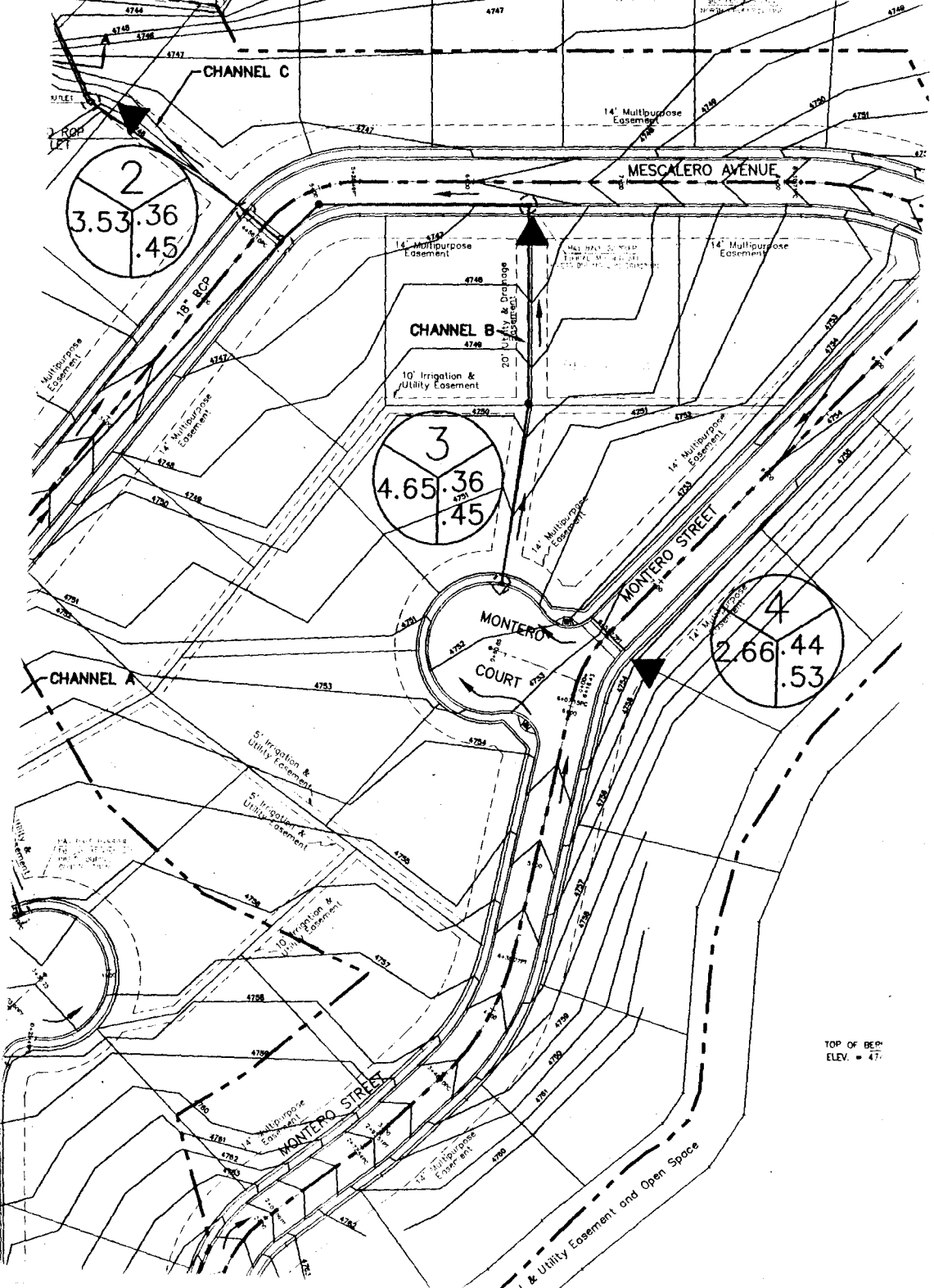
BANNER ASSOCIATES, INC. • CONSULTING ENGINEERS  
2777 CROSSROADS BOULEVARD • GRAND JUNCTION, CO



NO CHANNEL EXISTS ALONG EAST SIDE OF SOUTH CAMP ROAD IN THIS LOCATION. ROADWAY SLOPES TO WEST.

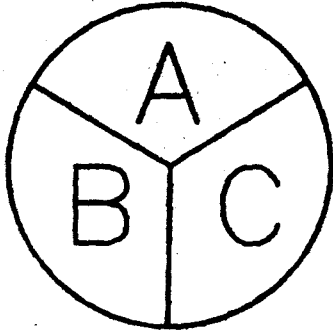
24' UTE LINE BREAK:  
100 C.F.S. POSSIBLE

TO UTE WATER STORAGE TANK



FROM PLAN SET  
 PREPARED BY  
 LANDesign  
 "TRAILS WEST VILLAGE  
 SUBDIVISION"  
 7/3/96 PHIL  
 HART

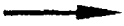
# LEGEND



A = BASIN DESIGNATION  
B = AREA (AC.)  
C = RUN OFF COEFFICIENTS  
2 YEAR  
100 YEAR



= HAY BALE BARRIER



= FLOW ARROW



= DESIGN POINT

CHANNEL A = TRAPAZOIDAL CHANNEL  
SIDE SLOPES= 4:1  
BOTTOM WIDTH= 1'  
DEPTH=1.4'  
SLOPE= 2.3%

CHANNEL B = TRAPAZOIDAL CHANNEL  
SIDE SLOPES= 4:1  
BOTTOM WIDTH= 1'  
DEPTH=1.54'  
SLOPE= 1.5%

CHANNEL C = TRAPAZOIDAL CHANNEL  
SIDE SLOPES= 4:1  
BOTTOM WIDTH= 1'  
DEPTH=2.34'  
SLOPE= 0.75%

PP 1995-157  
FPP 1997-143-#3  
PP 1997-060-#3  
FPP 96-110



May 5, 1999

Brian Stowell  
Camelot Investments LLC  
0090 Caballo Road  
Carbondale, CO 81623

City of Grand Junction, Colorado  
250 North Fifth Street  
81501-2668  
FAX: (970)244-1599

RE: Trails West Village Subdivision Filings 1 and 2

Dear Mr. Stowell:


A final inspection of the streets and drainage facilities in Trails West Village Filing 1 and 2 was conducted on April 7, 1997; again on July 29, 1998; and the City Engineer, Don Newton conducted a follow-up inspection on April 21, 1999. As a result of the most recent final inspection, a letter containing the list of items remaining to be completed was given to your representative, Tony Perry on April 21, 1999. These items were since reinspected on May 4, 1999 and found to be satisfactorily completed.

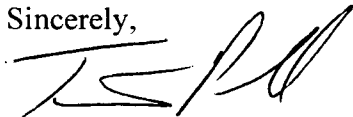
"As Built" record drawings for the streets, utilities, and drainage facilities, including a certification of the detention pond and outlet structure, were received from Banner Associates in January 1999. These documents have been reviewed and found to be acceptable.

In light of the above, the streets, sewer, and drainage improvements within the public right-of-way are accepted for future maintenance by the City of Grand Junction subject to a warranty period of one year after the date of substantial completion. The date of substantial completion is May 4, 1999. Your warranty obligation for all materials and workmanship for a period of one year beginning with the date of substantial completion will expire upon final acceptance by the City.

If you are required to replace or correct any defects which are apparent during the period of the warranty, a new acceptance date and extended warranty period will be established by the City.

Thank you for your cooperation in the completion of the work on this project.

Sincerely,  
  
Kerrie Ashbeck, P.E.  
City Development Engineer

Sincerely,  
  
Trenton Prall, P.E.  
City Utility Engineer

cc: Don Newton  
Doug Cline  
Walt Hoyt

Jerry-O'Brien  
Tony Perry, Monument Realty  
File #FPP-1996-110



April 21, 1999

Tony Perry  
Monument Realty  
759 Horizon Drive  
Grand Junction, CO 81506

City of Grand Junction  
Public Works Department  
250 North 5TH Street  
Grand Junction CO 81501-2668  
FAX: (970) 256-4022

RE: Inspection of Trails West Village Filings 1 and 2

Dear Tony:

As a result of our inspection of the Trails West development this morning, I have identified the following items that need to be corrected prior to acceptance of the public streets and utilities by the City of Grand Junction:

1. Adjacent to the storm drain inlet on Montero Court, a section of the curb, gutter and sidewalk has settled below grade and does not drain. In addition, the storm inlet grate and frame is set too high and will need to be lowered to provide the necessary drainage capacity at the curb opening. This will require removal of the top portion of the inlet box in order to achieve the proper curb opening. The City Standard inlet detail (see copy attached) requires that the inlet grate be set 7 1/2 inches below the top of curb. Correction will required replacement of one section of curb, gutter and sidewalk on each side of the storm drain inlet after the inlet grate has been lowered.
2. The first section of curb, gutter and sidewalk adjacent to the storm drain inlet on Mescalero Avenue has settled below grade and does not drain to the inlet. This section of concrete will need to be replaced.
3. Adjacent to the storm drain inlet on Altamira Court, the face of curb is damaged and needs to be patched with non-shrink grout. Also there are two bolts protruding out of the inside wall of the inlet box that need to be cut off flush with the inside wall.
4. The Ute Water excavation in Mescalero Avenue has not been properly patched. Walt Hoyt, City Construction Supervisor, will contact Ute Water about replacing this asphalt patch.
5. A standard "No Outlet" sign will need to be installed at the entrance to Altamira Court.
6. In order to prevent erosion during rainstorms, I would recommend that the drainage channels which discharge into the storm water detention pond be seeded or lined with sod or cobble rock. This is not a requirement for City acceptance, however, it would help prevent erosion damage due to storm water flows. If these channels are lined, the channel bottoms will need to be excavated to a depth equal to the thickness of the lining material in order to maintain the cross-sectional area and drainage capacity in each channel.

Please call if you have any questions or need additional information regarding the above items. For construction related issues and concrete form/placement inspections please call Walt Hoyt at 260-0184. Upon completion of the items listed above please call me at 244-1559 to schedule a re-inspection of the subdivision.

Thank you for your efforts in completing the storm water detention pond and in finishing the remaining items necessary for City acceptance of the public facilities.

Sincerely,

J. Don Newton  
City Engineer

RECEIVED GRAND JUNCTION  
CITY ENGINEER

APR 22 1999

xc: Kerrie Ashbeck, Walt Hoyt, Max Vaughn, Kathy Portner, Brian Stowell

## Outline of requirements for recording Trails West Filing #1

1. Revised Development Improvements Agreement and guarantee for the remaining improvements.
2. Final copy of CCRs to be recorded, incorporating all legal comments.
3. Proof of formation of the Homeowner's Association.
4. Open Space fees: Total for filings 1 and 2 is \$9,450. A credit of \$6,150 was approved. \$78.57 per lot is required. Filing 1, with 28 lots, requires payment of \$2,199.96.
5. School impact fee of \$292 per unit payable at time of building permits.
6. Transportation capacity payment of \$500 per unit payable at time of building permits. Letter requesting credit for improvements to S. Camp Road must be provided prior to recording.
7. The plat does not dedicate a trail easement along the active canal as required. I have several other comments on the plat, specific to canal and pedestrian easements, that I have noted on the plat. City Engineering staff must also review the plat for technical requirements. I would also like legal staff to review the plat. Please provide 2 additional blue-line copies to the City.
8. Once the plat is approved we need 2 additional full-size mylar copies and one reduced 11" x 17" mylar copy of the signed plat.

**From:** Rick Dorris  
**To:** SwingleRL@aol.com  
**Date:** 7/6/2005 10:03:44 AM  
**Subject:** Re: Trails West Village

Roger,

We'll get this worked out. I'm on vacation this Friday and next week and will contact you after July 11th.

A few items to think about.

The Trails West detention basin was designed to be "on line" with the drainage channel that originates on the monument. It would have been better for the consulting engineer to have designed it "off-line." Our standards don't prohibit "on-line" designs however. This drainage channel has a significant amount of flow in a 100-year storm event. The Redlands Grove Engineer estimated that around 150 cubic feet per second could reach your pond and their site. The 150 CFS should go into the detention basin. The way the sediment pond is constructed (dam in main channel to detention basin and ditch around to the west), a significant amount of this flow would be directed in the new little ditch. A couple of things would definitely happen. The new little ditch would become a lot wider and deeper, we're talking feet here and the redirected flow could flood the existing house on Redlands Grove and possibly new houses yet to be constructed.

Our heavier rain storms typically come in August. To avoid any liability, I suggest removing the dam in the main channel to the detention basin and damming up the new ditch dug around the west. This will restore the original flow path through the detention basin.

Generally speaking, the City doesn't have any problem with the Trails West sedimentation basin constructed upstream of the detention basin. Any re-routing of the flow must be Engineered by an Engineer licensed in the State of Colorado and submitted to Community Development for review.

I don't know if the sediment load is lighter or heavier now than it was before Canyon Rim was developed. It should be lighter because they made some significant improvements from the old historic situation. We can investigate this.

Thanks,

Rick Dorris  
Development Engineer  
City of Grand Junction  
250 N. 5th Street  
Grand Junction, CO 81501  
voice 970-256-4034  
fax 970-256-4031  
email: rickdo@gjcity.org

>>> <SwingleRL@aol.com> 7/4/2005 1:49 PM >>>

Rick Dorris, Engineer -- City of Grand Junction  
Referencing your recent e-mail to Ron Lappi and Ron's response, I am looking forward to meeting with you to review Trails West Village storm water flow through our irrigation pond area. It was certainly not our intent, and I do not believe we have changed, the major storm water flow that might occur from a flood condition.



It clearly was and is our intent to minimize the impact of sediment flowing to our pond.

We created a sediment pond a couple of years ago when we dredged our pond (at a total cost to our HOA residents of \$6,500). The City of Grand Junction declined to help with this effort. We were told we would not need a permit. That sediment pond collected over 40 cubic yards over the past two years as Canyon Rim housing development continued and the City Park, south of Wingate School, were constructed. Until all houses in Canyon Rim are landscaped, I assume we will still be the depository for a good deal more runoff and, therefore, sediment. It baffles us why Canyon Rim, the new park next to the Wingate School and Redlands Grove do not have a catch basin for storm water -- like we have.

As the City has a major involvement in the design of all of the above referenced projects, we would appreciate your understanding and help in achieving both objectives (1) our sediment concern and (2) ensuring that any flood water passes through our irrigation pond area without damage to any residential property -- either in Trails West Village or Redlands Grove.

Specifically, you could immediately help us confirm my rough calculation that the spillway from our sediment pond over to our main irrigation pond is below the level of high point of the grassy area next to the small overflow trench running north. Therefore, when and if water rises to a level above the small trench, storm water should be flowing over into our main irrigation pond.

I will call for a time when we can get together. I would suggest it would be helpful to meet at the area in question. I trust we can amicably work together for a mutually agreeable solution to the concerns you raised to Ron Lappi.

Roger Swingle  
2228 Mescalero Ave.  
248-9380

CC: Rick Dorris

**From:** <SwingleRL@aol.com>  
**To:** <rickdo@gjcity.org>  
**Date:** 7/16/2005 11:10:11 AM  
**Subject:** Trails West Village

Rick Dorris,

After reviewing the two options mentioned in your July 6, 2005 e-mail of (1) reverting to the old design or (2) re-designing to an off-line storm water system, we decided the latter would be cost prohibitive for our small 59 unit HOA.

So, as suggested in your e-mail we have dammed up the little ditch that was routed around our irrigation pond and removed the dam in the main channel. We managed to get several resident volunteers to help move dirt and rocks over the last several days.

We will test how well this works by filling our sediment pond over this weekend. Then we all can observe and confirm that the water flows through the original path next week -- and not through the little ditch.

Bob Lillie, President of TWV-HOA and I meet with Mark Barshund, Cliff Anson and the Redlands Grove engineer yesterday Friday 7-16 regarding the above. We had four volunteers this morning (Sat.) removing more dirt in the spillway between our sediment pond and the main pond. Therefore, more dirt has been removed after Mark saw what we had done yesterday Friday PM.

My belief is that, as the City is partially responsible for approving the "on-line" storm drainage irrigation pond, a cost sharing for dredging the pond as needed should be considered. After we had a special assessment to cover the initial lined pond dredging a few years ago, we have proposed to the HOA full membership (and received approval) for \$25 per property (59 X \$25 = \$1,475) per year to help pay for future dredging operations. The entire Board of Directors has not meet to review this proposal but the city's willingness to consider the above request would go along way to taking the current negative feeling regarding both the developer of TWV and the City for approving the design.

We are looking forward to reviewing what we have done with you and the above proposal.

Regards,  
Roger Swingle, Member TWV BOD

**CC:** <Mbllil5@aol.com>

**From:** Rick Dorris  
**To:** SwingleRL@aol.com  
**Date:** 7/25/2005 8:51:00 AM  
**Subject:** Re: Trails West Village

Roger,

thanks for the reply. I haven't been ignoring you, still trying to dig out from vacation. Sounds like TWV has reverted back to the original design which should work like it was intended. I'll stop by when I am out in the area and look at it.

Unfortunately the City can't participate in cleaning the TWV detention basin. There are literally hundreds of them around the valley. It wasn't the City's choice to design an on-line pond; it was the Developer's and his Engineer. This is a private system to be maintained by the HOA. The only time we will maintain a detention basin is if the HOA has let it go to a point of being a significant problem. Then, we will maintain it and back charge the HOA or the homeowners individually. TWV is taking the appropriate action by increasing assessments to cover the cost of the work.

Have a good week.

Thanks,

Rick Dorris  
Development Engineer  
City of Grand Junction  
250 N. 5th Street  
Grand Junction, CO 81501  
voice 970-256-4034  
fax 970-256-4031  
email: rickdo@gjcity.org

*FTP- 1996-110  
Put in planning files.*

>>> <SwingleRL@aol.com> 7/16/2005 11:10 AM >>>

Rick Dorris,

After reviewing the two options mentioned in your July 6, 2005 e-mail of (1) reverting to the old design or (2) re-designing to an off-line storm water system, we decided the latter would be cost prohibitive for our small 59 unit HOA.

So, as suggested in your e-mail we have dammed up the little ditch that was routed around our irrigation pond and removed the dam in the main channel. We managed to get several resident volunteers to help move dirt and rocks over the last several days.

We will test how well this works by filling our sediment pond over this weekend. Then we all can observe and confirm that the water flows through the original path next week -- and not through the little ditch.

Bob Lillie, President of TWV-HOA and I meet with Mark Barshund, Cliff Anson and the Redlands Grove engineer yesterday Friday 7-16 regarding the above. We had four volunteers this morning (Sat.) removing more dirt in the spillway between our sediment pond and the main pond. Therefore, more dirt has been removed after Mark saw what we had done yesterday Friday PM.

My belief is that, as the City is partially responsible for approving the "on-line" storm drainage irrigation pond, a cost sharing for dredging the pond as needed should be considered. After we had a special assessment to cover the initial lined pond dredging a few years ago, we have proposed to the HOA full membership (and received approval) for \$25 per property (59 X \$25 = \$1,475) per year to help pay for future dredging operations. The entire Board of Directors has not met to review this proposal but the city's willingness to consider the above request would go along way to taking the current negative feeling regarding both the developer of TWV and the City for approving the design.

We are looking forward to reviewing what we have done with you and the above proposal.

Regards,  
Roger Swingle, Member TWV BOD

December 20, 2005

Mr. Ken Sublett  
Trails West Homeowners Association  
413 Montero Street  
Grand Junction, CO 81503

Reference: Trails West Subdivision, Detention Basin and Sedimentation

Dear Mr. Sublett,

This letter is intended to provide history about the design of the Trails West detention basin, address sedimentation problems, and direct the HOA how to restore the area to properly handle run off from the drainage channel.

#### PROJECT HISTORY

Filings 1 and 2 of Trails West Village were constructed in 1996 about 2 years before I arrived at the City so my knowledge is based on what I can determine from the files. Landesign, a local consulting Engineering firm, initially designed the project. It appears that the Developer switched to Banner Engineering (now Vista Engineering) during construction.

Landesign designed the detention basin on-line with the historic drainage channel. This channel originates on the Monument, travels along the west side of South Camp then crosses to the east side of South Camp a few hundred feet south of Mescalero. The 100-year flow in this channel is 350 cubic feet per second (CFS) but most of that won't cross under South Camp to the east side. Another local Engineer recently estimated that about 150 CFS would cross.

Apparently Banner modified the design of the detention basin to also be an irrigation storage basin. I have not tried to determine if the pond is working as designed. I suspect it is not.

#### SEDIMENTATION PROBLEM

The detention basin was designed on-line with a drainage channel that will carry sediment. The basin will by default collect sediment and that sediment will sooner or later have to be removed. This design meets the City's requirements both then and now. It is common to design detention basins on-line with drainage channels; in fact they are meant to attenuate peak run off. This detention basin was designed to attenuate peak run off only from Trails West and could have been constructed off-line. This would have reduced the sediment load. It was the Developer's, and his Engineer's, choice to design the detention basin on-line with the drainage channel. This design meets City requirements. The property is owned by Trails West and benefits Trails West, and was a condition of approval of the subdivision. The Trails West HOA is responsible for maintenance, including sediment removal, of this detention basin in perpetuity.

Sediment shouldn't be near as big a problem as previously because development upstream has significantly improved the situation.

#### HOA MODIFICATIONS AND NECESSARY MITIGATION

I talked to, or emailed, Roger Swingle a few months ago about the changes made to the detention basin. The HOA had dug a sediment basin, blocked the inlet path to the detention basin, and dug a narrow ditch around the west side of the detention basin. This effectively cut off the detention basin and routed storm flow north around the detention basin potentially endangering the existing house at 2203 Avenal Ct. (new address). I told Roger that the HOA needed to remove the dam and fill in the ditch. On a mid-October visit, I discovered the HOA has removed part of the dam and installed a couple of dirt plugs in the ditch on the west side. There is still a sedimentation basin. The current state of affairs will still divert significant flow around the detention basin towards 2203 Avenal. A sediment basin is not a problem provided the dam to the detention basin is completely removed and the area graded so the detention basin accepts the entire 100 year flow. The City's file number is FPP-1996-110 if you care to research the design.

I hope this letter clarifies the situation. I will be happy to meet with you on site to clarify the problem. Please notify me at 256-4034 when the detention basin mitigation has been completed. Call if you have any questions.

Sincerely,



Rick Dorris, PE, CFM  
City Development Engineer

Cc: Tim Moore, Public Works Manager  
Mark Relph, Public Works and Utility Director

**From:** Rick Dorris  
**To:** SwingleRL@aol.com  
**Date:** 1/27/2006 1:36:22 PM  
**Subject:** Re: Storm Water

Roger,

I visited the site again to retrieve a tool I left. It appears the channel, just below the box culvert was originally lined with rock to control erosion. Using a backhoe to clean out the channel may remove the river cobble and create a mess by increasing erosion.

As we previously discussed, it is the HOA's decision how to maintain the channel and fix the detention/irrigation basin. My entire point in getting involved was to notify those involved that the drainage path had been modified and that the HOA may have assumed liability by doing so. See my previous letter to Ken Sublett.

It appeared on our field visit a couple of weeks ago that the slope down into the detention/irrigation basin from the railroad tie is higher than the as-built grading plan showed. You mentioned building a berm to the west of the channel to keep the water from traveling around the pond to the west. I was concerned that this would cause the water to be deeper to the east and I mentioned that the finished floor of 2210 Mescalero doesn't appear much higher than the railroad tie. I recommended hiring an Engineer to determine the best course of action. I also stated that maintenance of the pond is the HOA's responsibility and not the City's. Because it isn't the City's responsibility, the City doesn't have to approve of the solution. As you stated, it is the HOA's responsibility to determine the best course of action for themselves.

My intuition, without any survey information or Engineering analysis to base it on, is that the channel should be regraded from the outlet of the box culvert at Mescalero to the surface of the detention/irrigation basin. Rock, with a geotextile (fabric), or other erosion protection should then be properly designed and installed on the new surface. I realize this is an expensive endeavor for the HOA. Again, hiring an Engineer to determine the best solution could end up saving money in the long run.

This email is not intended to be contentious but to briefly summarize my findings and recommendations from our field visit.

Good luck with this project and have a good day.

Thanks,

Rick Dorris  
Development Engineer  
City of Grand Junction  
250 N. 5th Street  
Grand Junction, CO 81501  
voice 970-256-4034  
fax 970-256-4031  
email: rickdo@gjcity.org

FRP-1996-110

>>> <SwingleRL@aol.com> 1/27/2006 12:45:05 PM >>>  
Board Of Directors + Campbell + Dorris,

Just to bring everyone up to speed on the one outstanding issue from the City, Rick Dorris called 1-25-05 and advised that the City is responsible to clean out the sediment in the culvert under Mescalero. However, they will not do so until we remove sediment from the downstream channel down to a level to

the concrete at the base of et culvert. I have contacted Yvette and Lyle Campbell at 2204 Mescalero Ave as the area we need to clean out will be partially on their property. Plus they along with Myles Brown perform the maintenance in this channel so they will need to have an input on what is done.

My thoughts are to meet with Rich Arcand and Myles Brown and decide what makes sense from a HOA common ground vantage point and then meet with the Campbell's before we hire a contractor to move dirt. We will need to move dirt for this task, plus opening the spillway, plus building the East-west berm, plus move some railroad ties and rocks into the spillway plus filling in the little north running small trench.

I spoke to Rick Dorris about our intent to make the width of the sediment removal in outlet of the culvert the same width as the "front wide" bucket on a backhoe. Rick, if this not sufficient we need you to tell us before we do this work. We will attempt to accomplish this work no sooner than March 15, 2005. So we need you response by March 15 if you have any problem with this plan. We will assume that no response from the City will be the City's concurrence with the above. We do not want to rehire a contractor after we completed this effort this spring. This would be an unacceptable expense to our HOA.

Roger Swingle  
248-9380



May 23, 2007

Richard Arcand, President  
Trails West Homeowners Association  
2229 Mescalero Ave.  
Grand Junction, CO 81503

HPP-1996-110

Reference: Trails West Subdivision, Detention Basin and Sedimentation

Dear Mr. Arcand,

This letter is responding to the May 15, 2007 letter received from several owners in the subdivision. It will provide history about the design of the Trails West detention basin, address sedimentation problems, and establish responsibility for maintenance. I wrote Mr. Ken Sublet on the same matter on December 20, 2005. The majority of this letter is taken from that letter.

Filings 1 and 2 of Trails West Village were constructed in 1996 about 2 years before I arrived at the City so my knowledge is based on what I can determine from the files. Landesign, a local consulting Engineering firm, initially designed the project. It appears that the Developer switched to Banner Engineering (now Vista Engineering) during construction.

Landesign designed the detention basin on-line with the historic drainage channel. This channel originates on the Monument, travels along the west side of South Camp then crosses to the east side of South Camp a few hundred feet south of Mescalero. The 100-year flow in this channel is 350 cubic feet per second (CFS) but most of that won't cross under South Camp. Another local Engineer recently estimated that about 150 CFS would cross.

Apparently Banner modified the design of the detention basin, at the Developer's request, to also be an irrigation storage basin. I have not tried to determine if the pond is working as designed.

The detention basin was designed on-line with the drainage channel which carries sediment. The basin will by default collect sediment as the moving water slows down. That sediment must sooner or later be removed. This design meets the City's requirements both then and now. It is common practice to design detention basins on-line with drainage channels; in fact they are meant to attenuate peak run off and lessen flooding impact downstream. Recent design techniques for detention basins on major channels include concrete sedimentation basins upstream to facilitate sediment removal. The City will be happy to work with the Trails West HOA if the HOA desires to design (must be designed by a Colorado licensed Professional Engineer) and construct a sedimentation basin. The design and construction would be the expense of the HOA, the City will review the design for no cost.

This detention basin was designed to attenuate peak run off only from Trails West and could have been constructed off-line. That would have reduced, but not eliminated, the sediment load. It was the Developer's, and his Engineer's, choice to design the detention basin on-line with the drainage channel. This design meets City requirements. The detention basin is owned by the Trails West HOA, benefits the Trails West subdivision, and was a condition of approval of the subdivision. The Trails West HOA is responsible for maintenance, including sediment removal, of this detention basin in perpetuity. Failure to remove the sediment reduces the detention basins ability to function and could create financial responsibility for downstream flooding.

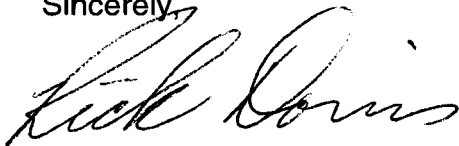
The City is responsible for removing sediment in the culverts in the public streets. I believe the street department removed sediment from the culvert under Mescalero in late 2005.

Sediment shouldn't be near as large a problem as in past years due to the greatly improved drainage design of the Canyon Rim Subdivision. This subdivision significantly reduced the sediment load in the channel by controlling erosion on the east side of South Camp.

The City is aware that 413 South Camp has been sold and the new owner's intent is development. A few meetings have been conducted with the Design team but as of today no Preliminary Plan has been submitted. This development, when it happens, will further help the situation by taking a portion of the flow in the channel and routing it to the west. The City can't legally force this developer to re-route the entire channel to the west because there is significant flow that historically crosses under South Camp and travels through the Trails West Subdivision.

The City is sympathetic with the Trails West HOA and realizes this is a significant expense; however, the responsibility for maintenance of the detention basin lies with the HOA. I hope this letter clarifies the situation.

Sincerely,

A handwritten signature in cursive script that reads "Rick Dorris".

Rick Dorris, PE, CFM  
City Development Engineer

Cc: Tim Moore, Public Works and Planning Manager  
Laurie Kadrach, Acting City Manager  
Jim Doody, Mayor

Grand Junction City Engineer May 15, 2007  
250 N. 5th St.  
Grand Junction, CO 81501  
Rick Dorris

Subject: 413 South Camp Rd. - Redlands Place and Trails West Village

Dear Mr. Dorris;

The Trails West Village (TWV) subdivision is located within the City limits and is the just to the east of the new Development proposed for the Sutton farm property off South Camp Road. TWV has a combination storm water and irrigation detention pond. This design was approved by the City without due consideration of the ongoing expense to TWV homeowners. I am an impacted resident of TWV.

I believe that the proposed new subdivision provides an opportunity for the City to correct its previously approved design flaw for TWV. The problem being encountered by the Homeowners Association (HOA) is simply that storm drainage from outside our geographic boundaries carries in an excessive quantity of sediment that requires periodic dredging at great expense to our HOA. The latest estimate received for dredging in 2007 was for \$25,000. Compare that to last year's actual HOA total expense of \$11,440 and you can understand our concern and outrage. Many strongly feel that this cost is a stealth tax caused by the City. It is considered "stealth" as no homeowner was aware of this cost prior to purchasing their home.

We were led to believe in the past that when the Sutton property was developed our sediment buildup problem would be eliminated from upstream water flow. Indication is now that this will not happen. Therefore, we recommend that, as previously indicated by the City, the Sutton Property design be modified in one of two ways to correct the City's previous error as follows: (1) Run a storm water ditch parallel and along side Redlands Canal to the west ... or increase the size of the Canal; or (2) Extend the drainage channel on the west side of South Camp Road along the front of the new Development and then connect to the planned ditch/pipe on the north side of the planned development to carry storm water west.

If the above is not acceptable to the City, then we ask that the City reimburse TWV for least one-half of our recurring actual cost of dredging due to the City's approval of our flawed pond design.

Thank you for your consideration in addressing this issue. We are looking forward to a prompt response.

Sincerely,

*Patricia J. Solare* 436 Montero St.  
S.J. CO 81503

Copies: City Council, GJ Community Planning Div.; River City Consultants

RF  
MAY 21 2007  
COMMUNITY DEVELOPMENT  
DEPT.

### FINAL APPROVAL CHECKLIST

- \* o 1. Development Improvements Agreement (DIA) # *must include all filing 2 improvements as well as those not completed on filing 1*
  - \* o 2. Improvements Guarantee (type used: \_\_\_\_\_) #
  - o 3. Final Plans #
  - \* o 4. Articles of Incorporation of HOA
  - \* o 5. CC&Rs *- 1st Supplemental or reference on plat if those already recorded*
  - \* o 6. Plat ←
  - \* o 7. Disk of Plat *supply blue line copy first of latest version for review prior to submitting the mylar & copies*
  - o 8. UCC Approval
  - \* o 9. TCP Credit Request ✓ *OK PER TODAY 6-20-97*
  - o 10. City Surveyor Certificate ✓ *SIGNED 6-20-97*
  - \* o 11. 2 full size mylar copies and one 11" x 17" reduced mylar copy *(see #6 note)*
- # : Minimum required for commencement of construction

### FEES

\* Open Space Fees - \$ 78.57/lot x 14 = \$ 1099.98

✓ \* TCP - \$ OK /lot - *need letter requesting credit for South Camp improvements.*

School Impact Fee - \$ 225 /lot - *payable at time of building permit*

*Sewer fees \$7,175*

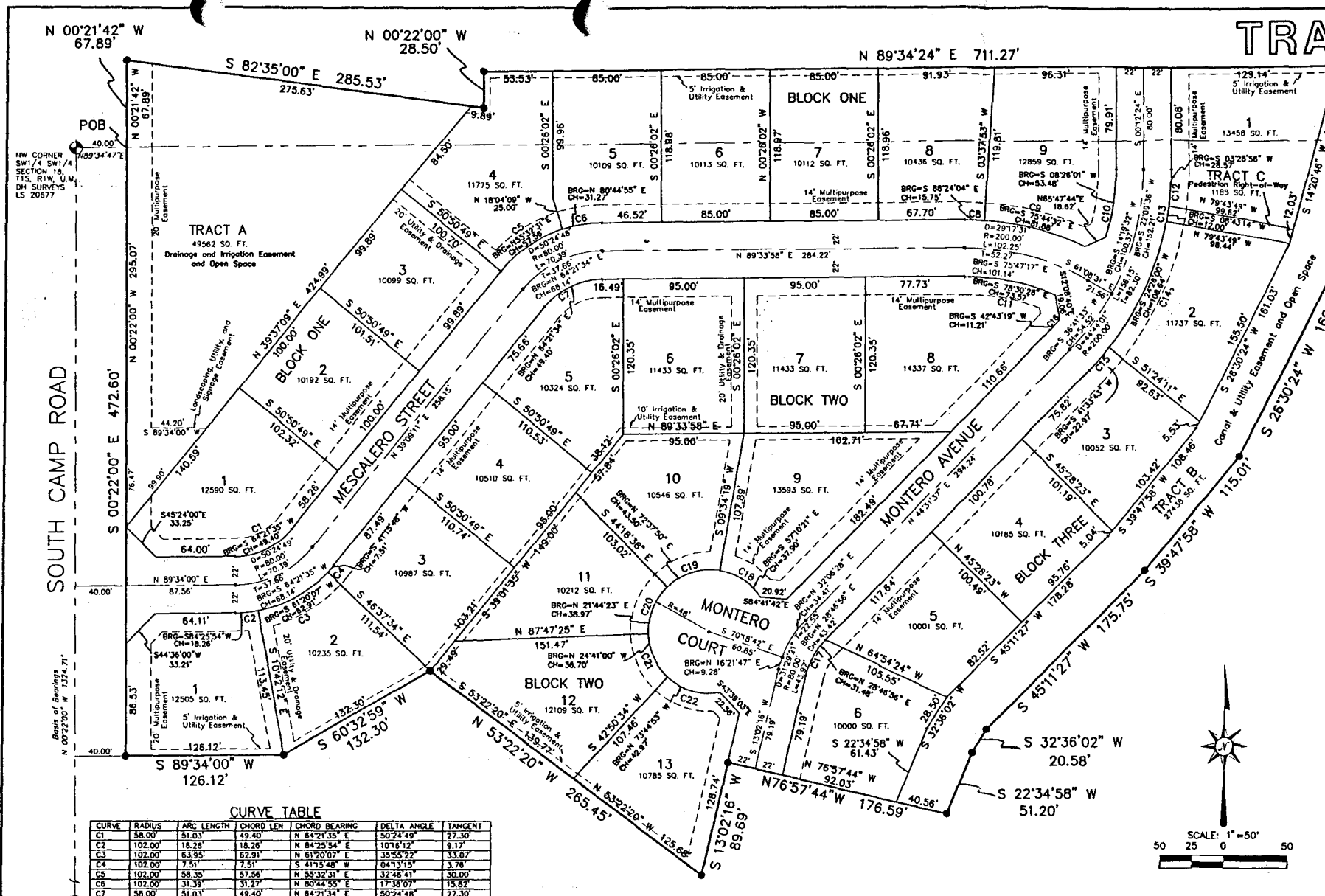
TYPE LEGAL DESCRIPTION(S) BELOW, USING ADDITIONAL SHEETS AS NECESSARY. USE SINGLE SPACING WITH A ONE INCH MARGIN ON EACH SIDE.

\*\*\*\*\*

COMMENCING at the Southwest Corner of Section 18, Township 1 South, Range 1 West of the Ute Meridian, from whence the Northwest Corner of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) bears North 00 degrees 22 minutes 00 seconds West, a distance of 1324.71 feet for a Basis of Bearings, with all bearings contained herein relative thereto; thence North 00 degrees 22 minutes 00 seconds West, a distance of 360.00 feet to the POINT OF BEGINNING; thence North 00 degrees 22 minutes 00 seconds West, a distance of 964.70 feet; thence North 00 degrees 21 minutes 42 seconds West, a distance of 73.39 feet; thence South 82 degrees 35 minutes 00 seconds East, a distance of 325.90 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 28.50 feet; thence North 89 degrees 34 minutes 24 seconds East, a distance of 996.21 feet; thence South 00 degrees 30 minutes 01 seconds East, a distance of 57.57 feet; thence South 00 degrees 20 minutes 52 seconds East, a distance of 1324.37 feet; thence South 89 degrees 33 minutes 55 seconds West, a distance of 1100.99 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 360.00 feet; thence South 89 degrees 34 minutes 00 seconds West, a distance of 217.81 feet to the POINT OF BEGINNING.

Said parcel containing 40.002 Acres, as described.

# TRAILS WEST VILLAGE FILING NO. ONE



**DEDICATION**

KNOW ALL MEN BY THESE PRESENTS: That Camelot Investments, L.L.C., a Colorado Limited Liability Company, is the owner of that real property located in part of the Southwest Quarter of Section 18, Township 1 South, Range 1 West of the Ute Meridian, Mesa County, Colorado, being more particularly described as follows: (Original Warranty Deed Book 2170, Pages 875 through 876.)

COMMENCING at the Southwest Corner of Section 18, Township 1 South, Range 1 West of the Ute Meridian, from whence the Northwest Corner of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) bears North 00 degrees 22 minutes 00 seconds West, a distance of 1324.71 feet for a Basis of Bearings, with all bearings contained herein relative thereto; thence North 00 degrees 22 minutes 00 seconds West, a distance of 1324.71 feet; thence North 89 degrees 34 minutes 24 seconds West to the POINT OF BEGINNING; thence North 00 degrees 22 minutes 00 seconds West, a distance of 67.89 feet; thence South 82 degrees 35 minutes 00 seconds East, a distance of 285.53 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 28.50 feet; thence North 89 degrees 34 minutes 24 seconds West, a distance of 711.27 feet; thence South 14 degrees 20 minutes 46 seconds West, a distance of 158.25 feet; thence South 26 degrees 30 minutes 24 seconds West, a distance of 169.95 feet; thence South 39 degrees 47 minutes 58 seconds West, a distance of 115.01 feet; thence South 45 degrees 11 minutes 27 seconds West, a distance of 175.75 feet; thence South 32 degrees 36 minutes 02 seconds West, a distance of 20.58 feet; thence North 76 degrees 57 minutes 44 seconds West, a distance of 176.59 feet; thence North 53 degrees 22 minutes 20 seconds West, a distance of 89.69 feet; thence North 53 degrees 22 minutes 20 seconds West, a distance of 265.45 feet; thence South 60 degrees 32 minutes 59 seconds West, a distance of 132.30 feet; thence South 89 degrees 34 minutes 00 seconds West, a distance of 126.12 feet; thence North 00 degrees 22 minutes 00 seconds West, a distance of 472.60 feet to the POINT OF BEGINNING.

Said parcel containing 10.701 Acres, as described.

That said owners have caused the real property to be laid out and platted as Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, That said owner does hereby dedicate and set apart real property as shown and labeled as the accompanying plat of Trails West Village as follows:

- All Streets and Rights-of-way to the City of Grand Junction for the use of the public forever;
- All Private Open Space to the Trails West Village Homeowners Association, a Colorado non-profit corporation, for the purposes of the Association, including but not limited to landscaping and signs;
- All Multi-Purpose Easements to the City of Grand Junction for the use of the public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, telephone lines, and also for the installation and maintenance of traffic control facilities, street lighting, street trees and grade structures;
- All Utility Easements to the City of Grand Junction for the use of public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, and telephone lines.
- All Irrigation Easements a set forth on this plat to the Trails West Village Homeowners Association for the installation, operation, maintenance and repair of private irrigation systems;
- All Pedestrian Easements and rights-of-way to the City of Grand Junction as perpetual easements for ingress and egress by the general public pedestrian;
- All Drainage Easements hereby platted to the Trails West Village Homeowners Association Inc. as perpetual easements for the conveyance of runoff water which originates within the area hereby platted or from upstream areas, through natural or man-made facilities above or below ground;
- All easements include the right of ingress and egress on, along, over, under, and through and across by the beneficiaries, their successors, or assigns, together with the right to trim or remove interfering trees and brush. Provided, however, that the beneficiaries of said easements shall utilize the same in a reasonable and prudent manner. Furthermore, the owners of lots or tracts hereby platted shall not burden nor overburden said easements by erecting or placing any improvements thereon which may prevent reasonable ingress and egress to and from the easement.

**CURVE TABLE**

CURVE	RADIUS	ARC LENGTH	CHORD LEN.	CHORD BEARING	DELTA ANGLE	TANGENT
C1	58.00	51.03	49.40	N 84°21'35" E	50°24'49"	27.30
C2	102.00	18.28	18.28	N 84°25'54" E	101°18'12"	8.17
C3	102.00	63.95	62.91	N 61°20'07" E	35°55'22"	33.07
C4	102.00	7.57	7.57	S 41°13'48" W	04°13'15"	3.78
C5	102.00	56.35	57.56	N 83°32'31" E	37°48'41"	30.00
C6	102.00	31.39	31.27	N 80°44'55" E	17°38'07"	15.82
C7	58.00	51.03	49.40	N 84°21'34" E	50°24'48"	27.30
C8	222.00	15.75	15.75	S 89°24'04" E	04°03'55"	7.88
C9	222.00	82.33	81.88	S 75°44'32" E	21°31'11"	41.85
C10	178.00	53.89	53.48	S 08°28'01" W	17°18'51"	27.05
C11	178.00	74.10	73.57	S 78°30'28" E	23°31'07"	37.56
C12	222.00	28.59	28.57	S 03°28'56" W	07°22'41"	14.31
C13	222.00	12.81	12.80	S 08°31'14" W	03°05'55"	6.00
C14	222.00	108.78	108.64	S 24°28'00" W	28°19'58"	58.03
C15	222.00	22.98	22.97	S 41°33'43" W	05°55'47"	11.50
C16	178.00	11.22	11.21	S 42°43'19" W	03°36'37"	5.61
C17	58.00	31.88	31.48	N 28°46'58" E	31°29'21"	16.35
C18	48.00	38.37	37.80	S 57°10'21" E	48°50'11"	20.63
C19	48.00	45.14	43.50	N 72°37'50" E	53°52'57"	24.40
C20	48.00	40.13	38.97	N 21°44'23" E	47°53'56"	21.32
C21	48.00	37.86	36.70	N 24°41'00" W	44°58'51"	19.86
C22	48.00	44.55	42.97	S 73°44'53" E	33°10'55"	24.03

**AREA SUMMARY**

FILING 1	=	7.184 Acres	67.13%
LOTS	=	1.768 Acres	16.53%
OPEN SPACE	=	1.749 Acres	16.34%
ROAD ROW	=		
TOTAL	=	10.701 Acres	100.00%

**BASIS OF BEARINGS**

Basis of bearings assume the West line of the SW1/4 SW1/4 of Section 18 to bear N 00°22'00" W, 1324.71 feet, as described in Warranty Deed recorded at Book 2170, Pages 875 and 876, Mesa County Records.

Monuments on this line are a Mesa County Marker and a Private Survey Marker as shown on the accompanying plat. Easement and title documents (schedules A&B) provided by \_\_\_\_\_ Land Title Company - Title policy No. \_\_\_\_\_

Note: Existing property corners which were recovered during this survey which were within 0.25 feet ± of the calculated position were accepted as being "in position".

The Declaration of Covenants and Restrictions are recorded in Book \_\_\_\_\_ Page \_\_\_\_\_, Mesa County Records.

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOUR FIRST DISCOVERY OF SUCH DEFECT. IF NO EVENT, DATE ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

- LEGEND**
- MESA COUNTY OR BLM SURVEY MARKER
  - SET CENTERLINE MONUMENTS
  - SET ALUMINUM CAP ON No. 5 REBAR, PLS 16835, IN CONCRETE
  - RECORD MEASUREMENT
  - FOUND PROPERTY CORNER, AS NOTED
  - ALUMINUM CAP ON No. 5 REBAR, PLS 16835, TO BE SET AT ALL LOT CORNERS

**CLERK AND RECORDER'S CERTIFICATE**

STATE OF COLORADO } ss  
COUNTY OF MESA }

I hereby certify that this instrument was filed in my office at \_\_\_\_\_ o'clock \_\_\_\_\_ M., \_\_\_\_\_ A.D., 1996, and was duly recorded in Plat Book No. \_\_\_\_\_ Page No. \_\_\_\_\_, Reception No. \_\_\_\_\_, Drawer No. \_\_\_\_\_

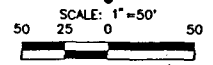
Clerk and Recorder

**CITY OF GRAND JUNCTION APPROVAL**

This plat of Trails West Village, a subdivision of a part of the City of Grand Junction, County of Mesa, State of Colorado, is approved and accepted this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.

City Manager \_\_\_\_\_ President of City Council \_\_\_\_\_

Approval of this plan may create a vested property right pursuant to C.R.S. 24-68-101, et seq.



Said owner hereby declares there are no lienholders to herein described real property.

IN WITNESS WHEREOF, said owners, Camelot Investments, L.L.C., a Colorado Limited Liability Company, has caused their names to be hereunto subscribed this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.

by: \_\_\_\_\_ Title: Managing Member  
for: Camelot Investments, L.L.C., a Colorado Limited Liability Company

**NOTARY PUBLIC CERTIFICATION**

STATE OF COLORADO } ss  
COUNTY OF MESA }

The foregoing instrument was acknowledged before me by Brian L. Stowell, Managing Member, Camelot Investments, L.L.C., a Colorado Limited Liability Company, this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.

Witness my hand and official seal:

Notary Public \_\_\_\_\_  
My Commission Expires \_\_\_\_\_

Located in the SW1/4 Section 18, T1S, R1W, UTE M.

**TRAILS WEST VILLAGE  
FILING NO. ONE**  
A Part of the SW1/4  
SECTION 18, T1S, R1W,  
UTE MERIDIAN, MESA COUNTY, CO

**LANDesign**  
ENGINEERS • SURVEYORS • PLANNERS

259 GRAND AVENUE  
GRAND JUNCTION, COLORADO 81501 (970) 244-9180

PROJECT NO. 95182	SUR. BY: RSK	DRAWN: RSK	CHECKED: RSK	SHEET: 2	OF: 3
DATE: APRIL, 1996					

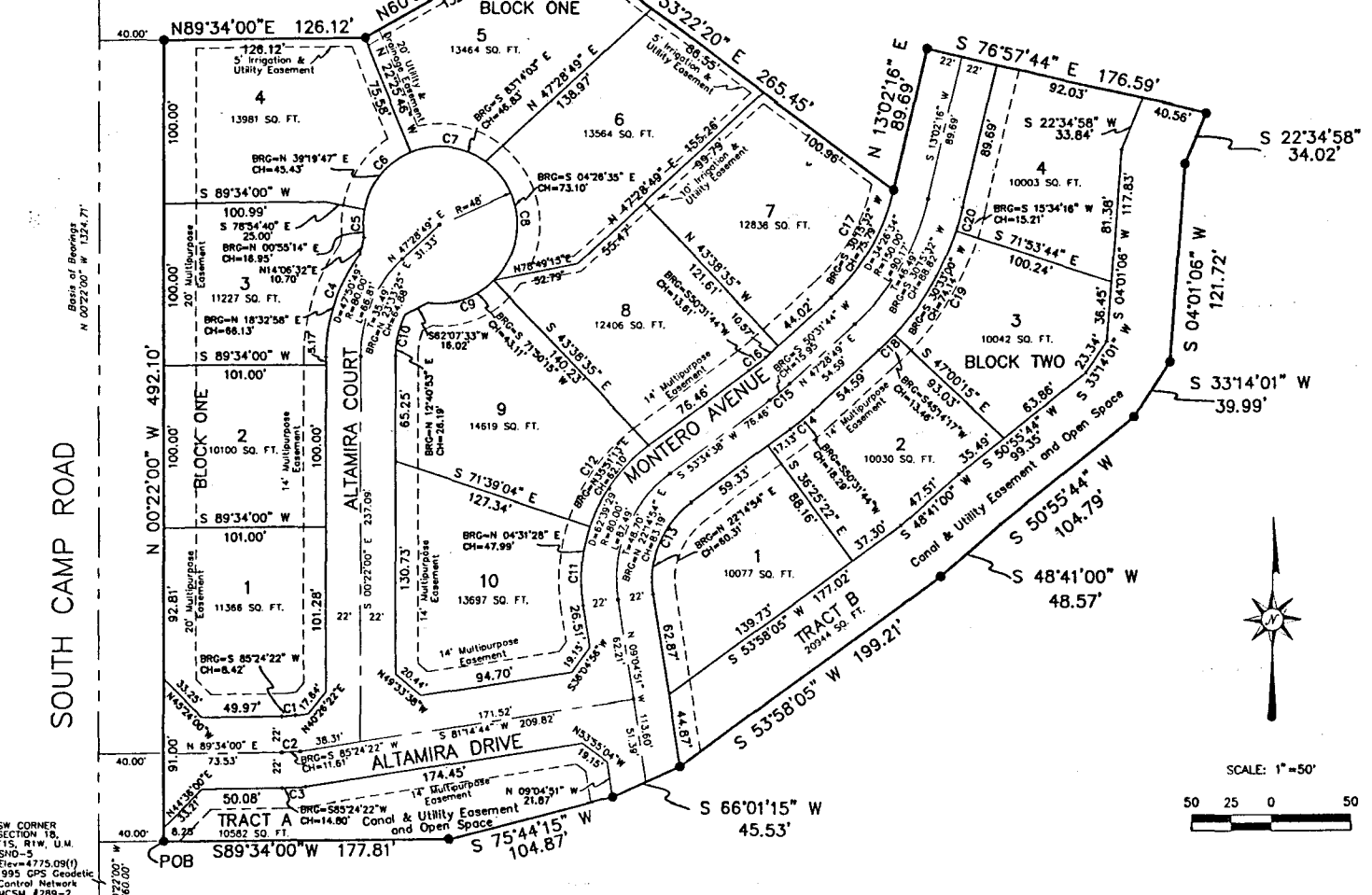
DENNIS W. JOHNSON, PLS  
COLORADO PROFESSIONAL LAND SURVEYOR  
P.L.S. NO. 18035

**SURVEYOR'S CERTIFICATION**

I, Dennis W. Johnson, do hereby certify that the accompanying plat of Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, has been prepared under my direct supervision and represents a field survey of same. This plan conforms to the requirements for subdivision plats specified in the City of Grand Junction Development code and the applicable laws of the State of Colorado.

Date certified \_\_\_\_\_

# TRAILS WEST VILLAGE FILING NO. TWO



**DEDICATION**  
KNOW ALL MEN BY THESE PRESENTS: That Camelot Investments, L.L.C., a Colorado Limited Liability Company, is the owner of that real property located in part of the Southwest Quarter of Section 18, Township 1 South, Range 1 West of the Ute Meridian, Mesa County, Colorado, being more particularly described as follows: (Original Warranty Deed Book 2170, Pages 875 through 876.)

COMMENCING at the Southwest Corner of Section 18, Township 1 South, Range 1 West of the Ute Meridian, from whence the Northwest Corner of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) bears North 00 degrees 22 minutes 00 seconds West, a distance of 1324.71 feet for a Basis of Bearings, with all bearings contained herein relative thereto; thence North 00 degrees 22 minutes 00 seconds West, a distance of 360.00 feet; thence North 89 degrees 34 minutes 00 seconds East, a distance of 40.00 feet to the POINT OF BEGINNING; thence North 00 degrees 22 minutes 00 seconds East, a distance of 492.10 feet; thence North 89 degrees 34 minutes 00 seconds East, a distance of 126.12 feet; thence North 60 degrees 32 minutes 59 seconds East, a distance of 132.30 feet; thence South 53 degrees 22 minutes 20 seconds East, a distance of 265.45 feet; thence North 13 degrees 02 minutes 16 seconds East, a distance of 89.69 feet; thence South 76 degrees 57 minutes 44 seconds East, a distance of 176.59 feet; thence South 22 degrees 34 minutes 58 seconds West, a distance of 33.84 feet; thence South 22 degrees 34 minutes 58 seconds West, a distance of 34.02 feet; thence South 04 degrees 01 minutes 06 seconds West, a distance of 121.72 feet; thence South 33 degrees 14 minutes 01 seconds West, a distance of 39.99 feet; thence South 48 degrees 41 minutes 00 seconds West, a distance of 48.57 feet; thence South 50 degrees 55 minutes 44 seconds West, a distance of 104.79 feet; thence South 55 degrees 05 minutes 05 seconds West, a distance of 199.21 feet; thence South 53 degrees 58 minutes 05 seconds West, a distance of 177.81 feet to the POINT OF BEGINNING. Said parcel containing 5.821 Acres, as described.

That said owners have caused the real property to be laid out and platted as Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, That said owner does hereby dedicate and set apart real property as shown and labeled as the accompanying plot of Trails West Village as follows:

- All Streets and Rights-of-way to the City of Grand Junction for the use of the public forever;
- All Private Open Space to the Trails West Village Homeowners Association, a Colorado non-profit corporation, for the purposes of the Association, including but not limited to landscaping and signs.
- All Multi-Purpose Easements to the City of Grand Junction for the use of the public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, telephone lines, and also for the installation and maintenance of traffic control facilities, street lighting, street trees and grade structures;
- All Utility Easements to the City of Grand Junction for the use of public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, and telephone lines.
- All Irrigation Easements a set forth on this plat to the Trails West Village Homeowners Association, as perpetual easements for the installation, operation, maintenance and repair of private irrigation systems;
- All Pedestrian Easements and rights-of-way to the City of Grand Junction as perpetual easements for ingress and egress use by the general public pedestrian;
- All Drainage Easements hereby platted to the Trails West Village Homeowners Association Inc., as perpetual easements for the conveyance of runoff water which originates within the area hereby platted or from upstream areas, through natural or man-made facilities above or below ground;

All easements include the right of ingress and egress on, along, over, under, and through and across by the beneficiaries, their successors, or assigns, together with the right to trim or remove interfering trees and brush. Provided, however, that the beneficiaries of said easements shall utilize the same in a reasonable and prudent manner. Furthermore, the owners of lots or tracts hereby platted shall not burden nor overburden said easements by erecting or placing any improvements thereon which may prevent reasonable ingress and egress to and from the easement.

Said owner hereby declares there are no lienholders to herein described real property. IN WITNESS WHEREOF, said owners, Camelot Investments, L.L.C., a Colorado Limited Liability Company, has caused their names to be hereunto subscribed this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1996.

by: \_\_\_\_\_ Title: Managing Member  
for: Camelot Investments, LLC,  
a Colorado Limited Liability Company

**NOTARY PUBLIC CERTIFICATION**  
STATE OF COLORADO )  
COUNTY OF MESA ) ss  
The foregoing instrument was acknowledged before me by Brian L. Stowell, Managing Member, Camelot Investments, L.L.C., a Colorado Limited Liability Company, this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.  
Witness my hand and official seal:

Notary Public \_\_\_\_\_  
My Commission Expires \_\_\_\_\_

**CLERK AND RECORDER'S CERTIFICATE**  
STATE OF COLORADO ) ss  
COUNTY OF MESA )  
I hereby certify that this instrument was filed in my office at \_\_\_\_\_ o'clock \_\_\_\_\_ M., \_\_\_\_\_ A.D., 1996, and was duly recorded in Plat Book No. \_\_\_\_\_ Page No. \_\_\_\_\_, Reception No. \_\_\_\_\_, Drawer No. \_\_\_\_\_  
Clerk and Recorder \_\_\_\_\_

**CITY OF GRAND JUNCTION APPROVAL**  
This plat of Trails West Village, a subdivision of a part of the City of Grand Junction, County of Mesa, State of Colorado, is approved and accepted this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.  
City Manager \_\_\_\_\_ President of City Council \_\_\_\_\_

**CURVE TABLE**

CURVE	RADIUS	ARC LENGTH	CHORD LEN	CHORD BEARING	DELTA ANGLE	TANGENT
C1	35.00	8.42	8.42	N 85°24'22" E	08°19'14"	4.22
C2	50.00	11.62	11.61	N 85°24'22" E	08°19'16"	5.82
C3	102.00	23.24	23.24	N 85°24'22" E	08°19'16"	11.62
C4	102.00	23.24	23.24	N 85°24'22" E	08°19'16"	11.62
C5	48.00	17.04	16.95	N 00°55'14" E	20°20'10"	8.61
C6	48.00	17.04	16.95	N 39°19'47" E	56°28'54"	25.78
C7	48.00	17.04	16.95	S 83°14'03" E	58°23'28"	26.62
C8	48.00	17.04	16.95	S 04°26'35" E	99°11'28"	56.39
C9	48.00	17.04	16.95	N 71°50'15" E	53°22'11"	24.13
C10	58.00	26.42	26.19	N 12°40'53" E	26°05'48"	13.44
C11	102.00	48.44	47.99	N 04°31'28" E	27°12'59"	24.69
C12	102.00	48.44	47.99	N 35°51'13" E	35°26'51"	32.60
C13	58.00	26.42	26.19	N 22°14'54" E	62°39'29"	35.30
C14	172.00	74.72	74.14	S 50°31'42" W	06°05'49"	9.16
C15	156.00	68.40	67.81	S 50°31'42" W	06°05'49"	7.99
C16	128.00	56.32	55.81	S 50°31'42" W	06°05'49"	6.82
C17	128.00	56.32	55.81	S 30°15'32" W	34°28'34"	39.67
C18	172.00	74.72	74.14	S 45°14'17" W	04°29'04"	6.73
C19	172.00	74.72	74.14	S 30°33'00" W	24°53'29"	37.96
C20	172.00	74.72	74.14	S 15°34'16" W	05°04'00"	7.81

Approval of this plan may create a vested property right pursuant to C.R.S. 24-68-101, et seq.

- LEGEND**
- MESA COUNTY OR BLM SURVEY MARKER
  - SET CENTERLINE MONUMENTS
  - SET ALUMINUM CAP ON No. 5 REBAR, PLS 16835, IN CONCRETE
  - (R) RECORD MEASUREMENT
  - FOUND PROPERTY CORNER, AS NOTED
- ALUMINUM CAP ON No. 5 REBAR, PLS 16835, TO BE SET AT ALL LOT CORNERS

**AREA SUMMARY**

FILING 2		
LOTS	= 3.843 Acres	66.02%
OPEN SPACE	= 0.724 Acres	12.44%
ROAD ROW	= 1.254 Acres	21.54%
TOTAL	= 5.821 Acres	100.00%

**BASIS OF BEARINGS**  
Basis of bearings assume the West line of the SW1/4 SW1/4 of Section 18 to bear N 00°22'00" W, 1324.71 feet, as described in Warranty Deed recorded at Book 2170, Pages 875 and 876, Mesa County Records. Monuments on this line are a Mesa County Marker and a Private Survey Marker as shown on the accompanying plat. Easement and title documents (schedules A&B) provided by \_\_\_\_\_ Land Title Company - Title policy No. \_\_\_\_\_  
Note: Existing property corners which were recovered during this survey which were within 0.25 feet ± of the calculated position were accepted as being "in position".  
The Declaration of Covenants and Restrictions are recorded in Book \_\_\_\_\_ Page \_\_\_\_\_, Mesa County Records.  
NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

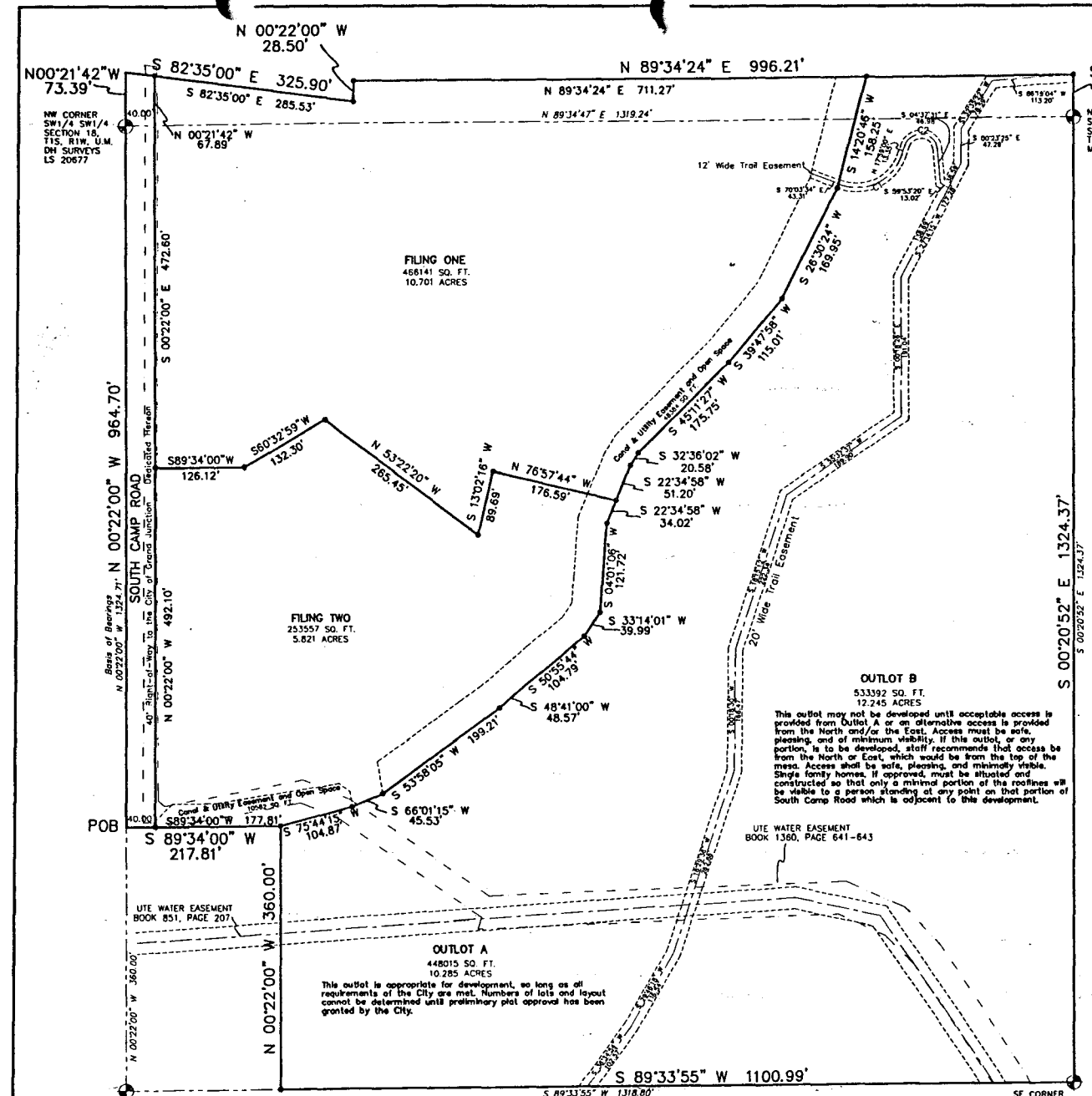
Located in the SW1/4 Section 18, T1S, R1W, UTE M.

**TRAILS WEST VILLAGE  
FILING NO. TWO**  
A Part of the SW1/4  
SECTION 18, T1S, R1W,  
UTE MERIDIAN, MESA COUNTY, CO

**LANDesign**  
ENGINEERS • SURVEYORS • PLANNERS  
759 GRAND AVENUE  
GRAND JUNCTION, COLORADO 81501 (970) 244-9180  
PROJECT NO. 95182 SUR. BY: DRAWN CHECKED SHEET OF  
DATE: APRIL, 1996 ASK 3 3

DENNIS W. JOHNSON, PLS  
COLORADO PROFESSIONAL LAND SURVEYOR  
P.L.S. NO. 18853

# TRAILS WEST VILLAGE



CURVE	RADIUS	ARC LENGTH	CHORD LEN	CHORD BEARING	DELTA ANGLE	TANGENT
C1	85.00'	104.32'	93.48'	N 63°57'43" E	91°57'28"	67.26'
C2	22.50'	81.81'	44.13'	S 83°19'16" E	157°23'29"	112.58'

### LEGEND

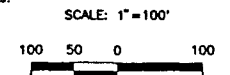
- ⊕ MESA COUNTY OR BLM SURVEY MARKER
  - SET CENTERLINE MONUMENTS
  - SET ALUMINUM CAP ON No. 5 REBAR, PLS 16835, IN CONCRETE
  - (R) RECORD MEASUREMENT
  - FOUND PROPERTY CORNER, AS NOTED
- ALUMINUM CAP ON No. 5 REBAR, PLS 16835, TO BE SET AT ALL LOT CORNERS

Approval of this plan may create a vested property right pursuant to C.R.S. 24-68-101, et seq.

**BASIS OF BEARINGS**  
 Basis of bearings assume the West line of the SW1/4 SW1/4 of Section 18, Township 1S, Range 1W, Ute Meridian, as described in Warranty Deed recorded at Book 2170, Pages 875 and 876, Mesa County Records. Monuments on this line are a Mesa County Marker and a Private Survey Marker as shown on the accompanying plot. Easement and title documents (schedules A&B) provided by \_\_\_\_\_ Land Title Company - Title policy No. \_\_\_\_\_

Note: Existing property corners which were recovered during this survey which were within 0.25 feet ± of the calculated position were accepted as being "in position".

The Declaration of Covenants and Restrictions are recorded in Book \_\_\_\_\_ Page \_\_\_\_\_, Mesa County Records.



**AREA SUMMARY**

FILING 1	= 10.701 Acres	26.75%
FILING 2	= 5.821 Acres	14.55%
OUTLOT A	= 10.285 Acres	25.71%
OUTLOT B	= 12.245 Acres	30.61%
ROAD ROW	= 0.950 Acres	2.38%
<b>TOTAL</b>	<b>= 40.002 Acres</b>	<b>100.00%</b>

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IF NO DEFECT WAS ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

**KNOW ALL MEN BY THESE PRESENTS:**  
 That Corneli Investments, L.L.C., a Colorado Limited Liability Company, is the owner of that real property located in part of the Southwest Quarter of Section 18, Township 1 South, Range 1 West of the Ute Meridian, Mesa County, Colorado, being more particularly described as follows: (Original Warranty Deed Book 2170, Pages 875 through 876.)  
**COMMENCING** at the Southwest Corner of Section 18, Township 1 South, Range 1 West of the Ute Meridian, from whence the Northwest Corner of the Southwest Quarter of the Southwest Quarter (SW1/4 SW1/4) bears North 00 degrees 22 minutes 00 seconds West, a distance of 1324.71 feet for a Basis of Bearings, with all bearings contained herein relative thereto; thence North 00 degrees 22 minutes 00 seconds West, a distance of 360.00 feet to the POINT OF BEGINNING; thence North 00 degrees 22 minutes 00 seconds West, a distance of 964.70 feet; thence North 00 degrees 21 minutes 42 seconds West, a distance of 73.39 feet; thence South 82 degrees 35 minutes 00 seconds East, a distance of 325.90 feet; thence North 89 degrees 34 minutes 24 seconds East, a distance of 996.21 feet; thence North 00 degrees 30 minutes 01 seconds East, a distance of 57.57 feet; thence South 00 degrees 20 minutes 52 seconds East, a distance of 1324.37 feet; thence South 89 degrees 33 minutes 00 seconds West, a distance of 360.00 feet; thence South 89 degrees 34 minutes 00 seconds West, a distance of 217.81 feet to the POINT OF BEGINNING.  
 Said parcel containing 40.002 Acres, as described.

That said owners have caused the real property to be laid out and platted as Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, that said owner does hereby dedicate and set apart real property as shown and labeled as the accompanying plot of Trails West Village as follows:  
 All Streets and Rights-of-way to the City of Grand Junction for the use of the public forever;  
 All Private Open Space to the Trails West Village Homeowners Association, a Colorado non-profit corporation, for the purposes of the Association, including but not limited to landscaping and signs;  
 All Multi-Purpose Easements to the City of Grand Junction for the use of the public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, telephone lines, and also for the installation and maintenance of traffic control facilities, street lighting, street trees and grade structures;  
 All Utility Easements to the City of Grand Junction for the use of public utilities as perpetual easements for the installation, operation, maintenance and repair of utilities and appurtenances thereto including, but not limited to electric lines, cable TV lines, natural gas pipelines, sanitary sewer lines, water lines, and telephone lines;  
 All Irrigation Easements as set forth on this plot to the Trails West Village Homeowners Association, as perpetual easements for the installation, operation, maintenance and repair of private irrigation systems;  
 All Pedestrian Easements and rights-of-way to the City of Grand Junction as perpetual easements for ingress and egress use by the general public pedestrian;  
 All Drainage Easements hereby plotted to the Trails West Village Homeowners Association Inc., as perpetual easements for the conveyance of runoff water which originates within the area hereby plotted or from upstream areas, through natural or man-made facilities above or below ground;  
 All easements include the right of ingress and egress on, along, over, under, and through and across by the beneficiaries, their successors, or assigns, together with the right to trim or remove interfering trees and brush. Provided, however, that the beneficiaries of said easements shall utilize the same in a reasonable and prudent manner. Furthermore, the owners of lots or tracts hereby platted shall not burden nor overburden said easements by erecting or placing any improvements thereon which may prevent reasonable ingress and egress to and from the easement.

Said owner hereby declares there are no lienholders to herein described real property.

IN WITNESS WHEREOF, said owners, Corneli Investments, L.L.C., a Colorado Limited Liability Company, has caused their names to be hereunto subscribed this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1996.

by: \_\_\_\_\_ Title: Managing Member

For: Corneli Investments, L.L.C., a Colorado Limited Liability Company

### NOTARY PUBLIC CERTIFICATION

STATE OF COLORADO ) ss  
 COUNTY OF MESA )

The foregoing instrument was acknowledged before me by Brian L. Stowell, Managing Member, Corneli Investments, L.L.C., a Colorado Limited Liability Company, this \_\_\_\_\_ day of \_\_\_\_\_ A.D. 1996.  
 Witness my hand and official seal:

Notary Public

My Commission Expires \_\_\_\_\_

### CLERK AND RECORDER'S CERTIFICATE

STATE OF COLORADO ) ss  
 COUNTY OF MESA )

I hereby certify that this instrument was filed in my office at \_\_\_\_\_ o'clock \_\_\_\_\_ M., \_\_\_\_\_ A.D., 1996, and was duly recorded in Plat Book No. \_\_\_\_\_ Page No. \_\_\_\_\_ Reception No. \_\_\_\_\_ Drawer No. \_\_\_\_\_

Clerk and Recorder

### CITY OF GRAND JUNCTION APPROVAL

This plot of Trails West Village, a subdivision of a part of the City of Grand Junction, County of Mesa, State of Colorado, is approved and accepted this \_\_\_\_\_ day of \_\_\_\_\_ A.D., 1996.

City Manager

President of City Council

Located in the SW1/4 Section 18, T1S, R1W, UTE M

	<b>TRAILS WEST VILLAGE</b>			
	A Part of the SW1/4 SECTION 18, T1S, R1W, UTE MERIDIAN, MESA COUNTY, CO			
	<b>LANDesign</b>			
ENGINEERS • SURVEYORS • PLANNERS				
729 GRAND AVENUE GRAND JUNCTION, COLORADO 81501 (970) 244-9180				
PROJECT NO. 95182	SUR. BY: DRAWN	CHECKED	SHEET	OF
DATE: APRIL, 1996	RSK		1	3

### SURVEYOR'S CERTIFICATION

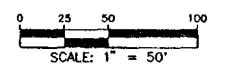
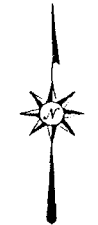
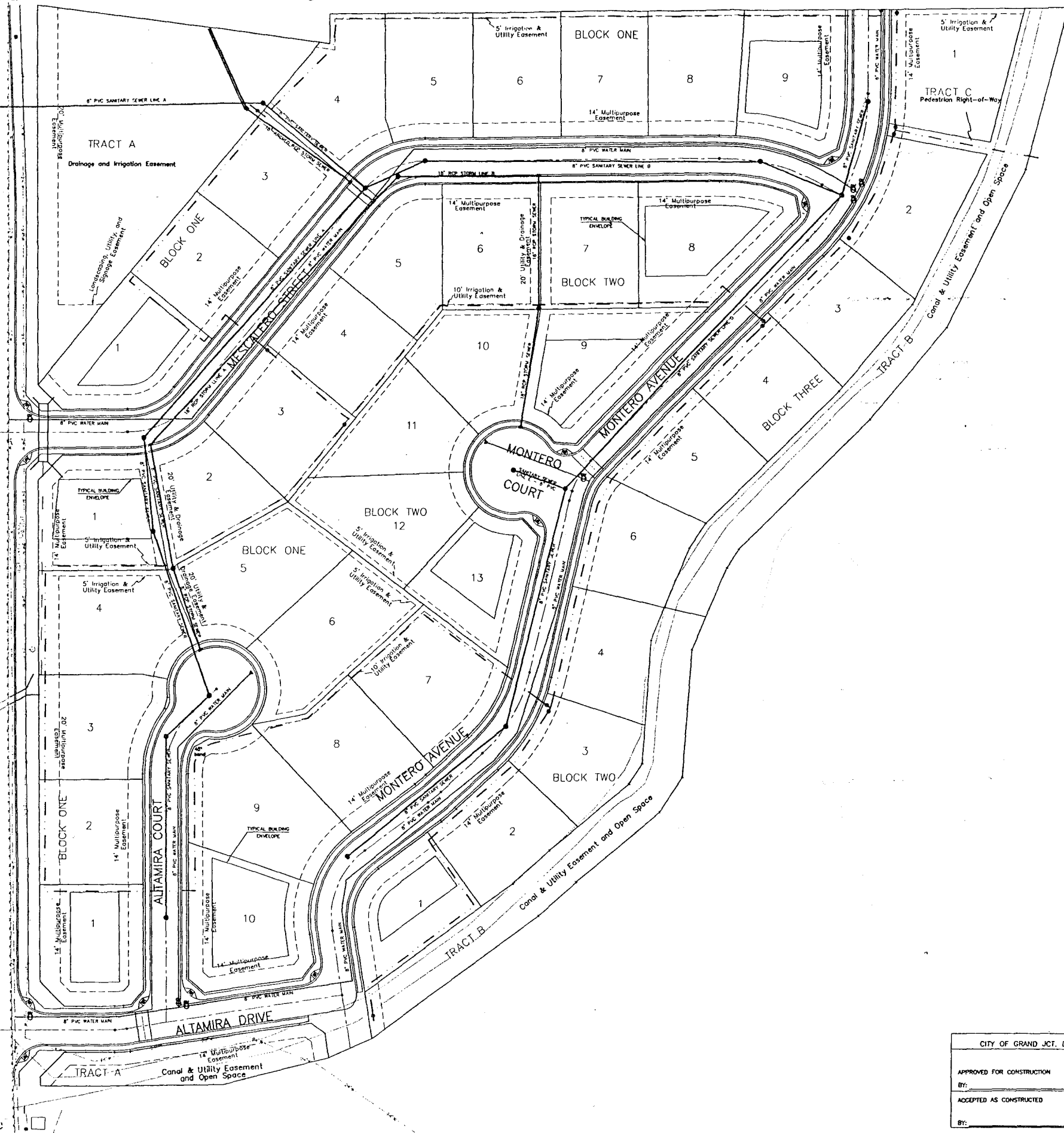
I, Dennis W. Johnson, do hereby certify that the accompanying plot of Trails West Village, a subdivision of a part of the City of Grand Junction, Colorado, has been prepared under my direct supervision and represents a field survey of same. This plot conforms to the requirements for subdivision plats specified in the City of Grand Junction Development code and the applicable laws of the State of Colorado.

Date certified \_\_\_\_\_



SOUTH CAMP ROAD

EXISTING 48" CONCRETE BOX CULVERT



DATE:	NO:	REVISIONS:	By:

CITY OF GRAND JCT. DEPT. OF PUBLIC WORKS

APPROVED FOR CONSTRUCTION

By: \_\_\_\_\_ DATE: \_\_\_\_\_

ACCEPTED AS CONSTRUCTED

By: \_\_\_\_\_ DATE: \_\_\_\_\_

PHILIP M. HART  
REGISTERED PROFESSIONAL ENGINEER  
P.E. NO. 19346

UTILITY COMPOSITE  
TRAILS WEST VILLAGE  
SUBDIVISION

**LANDesign**  
ENGINEERS • SURVEYORS • PLANNERS

259 GRAND AVENUE  
GRAND JUNCTION, COLORADO 81501 (970) 245-4099

PROJECT NO. 95182	DESIGNED DRAWN	CHECKED	SHEET	OF
DATE: APRIL 26, 1995	ipc	jcs	5	22