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e SPR-1995-035

Date 7/12/99

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

DOCUMENTS SPECIFIC TO THIS DEVELOPMENT FILE:

X	X	Flood Plain Permit			
X	X	Certification of elevation of lowest floor			
X	X	Preliminary drainage report			
X		Fax to Mike Davis from Kathy Portner			
X		Release of Improvements Agreement & Guarantee			
X		Elevation certificate			
X		Letter from Bill Nebeker to Darryl Fleming – 3/22/96	X		Owner's policy of title insurance
X		E-mail from Jody Klisa to Bill Nebeker – 3/22/96	X		Development Improvement Agreement
X		Certificate of occupancy			
X		Planning Clearance - **			
X		Letter to Don Newton from Nalow – 10/27/95			
		E-mail from Don Newton to Bill Nebeker – 10/27/95			
		E-mail to Don Newton from Bill Nebeker – 10/25/95			
X		Memo to Bill Dunn from Bill Nebeker – 9/21/95			
X		Summary of revisions to plans reviewed on 3/6/95 (dated 9/18/95)			

SUBMITTAL CHECKLIST

SITE PLAN REVIEW + FLOODPLAIN

Location: Lot 1 Appleton Kennels Subdivision F & 24 Rds.

Project Name: Grand Jct. Storage Units

FLP-95-35

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ITEMS: DESCRIPTION	SSID REFERENCE	● City Community Development	● City Dev. Eng.	● City Utility Eng.	● City Property Agent	● City Parks/Recreation	● City Fire Department	● City Attorney	○ City Downtown Dev. Auth.	● County Planning	● County Bldg. Dept.	○ Irrigation District	● Drainage District	○ Water District	○ Sewer District	○ U.S. West	○ Public Service	○ GVRP	○ CDOT	○ Corps of Engineers	○ Walker Field	TOTAL REQ'D.
● Application Fee $125	VII-1	1																				
● Submittal Checklist*	VII-3	1																				
● Review Agency Cover Sheet*	VII-3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
● Planning Clearance*	VII-3	1																				
● 11"x17" Reduction of Assessor's Map	VII-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
● Evidence of Title	VII-2	1			1			1														
○ Appraisal of Raw Land	VII-1	1			1	1																
○ Deeds	VII-1	1			1			1														
○ Easements	VII-2	1	1	1	1			1														
○ Aviation Easement	VII-1	1			1			1														
○ ROW	VII-3	1	1	1	1			1														
○ Improvements Agreement/Guarantee	VII-2	1	1	1				1														
○ CDOT Access Permit	VII-3	1	1																			
○ Industrial Pretreatment Sign-off	VII-4	1		1																		
● General Project Report (narrative)	X-7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
○ Elevation Drawing	IX-13	1	1																			
● Site Plan	IX-29	2	2	1	1																	
● 11"x17" Reduction of Site Plan	IX-29					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
○ Grading and Drainage Plan	IX-16	1	2										1							1		
○ Storm Drainage Plan and Profile	IX-30	1	2										1			1	1	1				
○ Water and Sewer Plan and Profile	IX-34	1	2	1			1							1	1	1	1	1				
○ Roadway Plan and Profile	IX-28	1	2										1									
○ Road Cross-Sections	IX-27	1	2																			
○ Detail Sheet	IX-12	1	2																			
● Landscape Plan	IX-20	2	1	1																		
○ Geotechnical Report	X-8	1	1								1											
○ Final Drainage Report	X-5,6	1	2										1									
○ Stormwater Management Plan	X-14	1	2										1							1		
○ Phase I and II Environmental Report	X-10,11	1	1																			
○ Traffic Impact Study	X-15	1	2																1			

NOTES:
1) An asterisk in the item description column indicates that a form is supplied by the City.
2) Required submittal items and distribution are indicated by filled in circles, some of which may be filled in during the pre-application conference. Additional items or copies may be subsequently requested in the review process.
3) Each submitted item must be labeled, named, or otherwise identified as described above in the description column.

Francis Constructors, Inc.

P.O. Box 1767 Grand Junction, Colorado 81502-1767 (303) 434-9093
FAX (303) 434-7583

DATE: FEBRUARY 15, 1995

FLP-95-35

TO: CITY OF GRAND JUNCTION
COMMUNITY DEVELOPMENT DEPARTMENT
250 NORTH 5TH STREET
GRAND JUNCTION, COLORADO 81501

PROJECT: **GRAND JUNCTION STORAGE UNITS**
GRAND JUNCTION, COLORADO

Project to be developed on Lot 1, Appleton Kennels Subdivision, on F and 24 Roads.

The proposed scope of work for this project will consist of extensive site work including drainage shaping, flood berms and drainage retention pond. Installation of 8" fire water line with six (6) each new fire hydrants. There will be a total of nine new buildings for storage units with one building for office/residence. The total of all buildings will be approximately 68,000 square feet. Foundations will be slab on grade with thickened edges. Structures will be steel framed with metal siding and roofing. Access roads will be paved and sloped for drainage. Site will be landscaped on F Road frontage. There will be a curb cut and installation of new ingress, egress area approximately 25' x 50' off of F Road at the edge of Lots 1 and 2.

RMC:sc

wp\prop\gjstrg

REVIEW COMMENTS

FILE #FLP-95-35

TITLE HEADING: Flood Plain Permit / Site Plan Review - Grand Junction Storage Units

LOCATION: Lots 1, Appleton Kennels Subdivision, F & 24 Roads

PETITIONER: Colorado Self Storage

PETITIONER'S ADDRESS/TELEPHONE: 2745 N Locust Avenue
Rialto, CA 92377
909-875-8529

PETITIONER'S REPRESENTATIVE: Francis Constructors

STAFF REPRESENTATIVE: Tom Dixon

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., , 1995.

GRAND JUNCTION FIRE DEPARTMENT **2/23/95**
Hank Masterson **244-1414**

1. The existing 8" water line shown on site plan is fed by a 3" line and does not provide adequate fire flows. This line must be extended east along F Road to connect to the 8" line that ends just east of Leach Creek.
2. The fire flow requirements for structures as shown on site plan are 3,200 gallons per minute. The available water based on fire flow tests conducted on 2/22/95 for the 8" line east of Leach Creek is 3,400 gallons per minute. The extension of this water line to the existing water line serving Appleton Kennels Subdivision will result in several thousand feet of dead end line. Petitioner must supply documentation from a licensed engineer showing that minimum require fire flows will be available.
3. Locations of on-site fire hydrants and the public hydrant at the entrance to the storage units is acceptable to the Fire Department.

CITY DEVELOPMENT ENGINEER **2/23/95**
Jody Kliska **244-1591**

1. Transportation Capacity Payment = $5,916 based on 68,000 s.f.
2. Please provide a Drainage Report detailing the calculations.
3. A Floodplain Application and Engineering Report are required.

MESA COUNTY BUILDING DEPARTMENT **2/21/95**
Bob Lee **244-1656**

Building plans submitted to our office for plan review must be sealed by an architect or engineer. No other comments.

CITY PARKS & RECREATION DEPARTMENT **2/22/95**
Don Hobbs **244-1542**

Does this action require an Open Space Fee? If it does, we need an appraisal of the site.

GRAND JUNCTION DRAINAGE DISTRICT **2/23/95**
John L. Ballagh **242-4343**

The ditch this site will drain into is not a facility of the Grand Junction Drainage District. The proposed pipe from the detention site will not be a facility of the Drainage District. The detention site will not be a drainage district facility.

MESA COUNTY PLANNING DEPARTMENT **2/24/95**
Debbie **244-1634**

Refer to the file on the following concerns: flooding, building permit hold, access and drainage. Development impact fees are due at the time of building so have not been paid.

CITY UTILITY ENGINEER **2/27/95**
Bill Cheney **244-1590**

No comment.

COMMUNITY DEVELOPMENT DEPARTMENT **3/6/95**
Tom Dixon **244-1447**

See attached.

ADMINISTRATIVE REVIEW

FILE: #FLP-95-35

DATE: March 6, 1995

STAFF: Tom Dixon, AICP

REQUEST: Floodplain and Site Plan Review for mini-storage units and one office/residence

LOCATION: F Road east of Highway 6 & 50

APPLICANT: Bill Dunn, Francis Construction

EXISTING LAND USE: Undeveloped

PROPOSED LAND USE: Commercial

EXISTING ZONING: C (Mesa County)

RELATIONSHIP TO COMPREHENSIVE PLAN: No such plans have been adopted in this part of the City.

STAFF ANALYSIS: The proposal is to create 68,000 square feet of mini-warehouse floor area to be contained in nine separate structures. The development also includes an office/residence for the manager of the facility.

The site is located in the 100-year flood plain of Leach Creek. Therefore, a floodplain review and approval is necessary prior to the issuance of a planning clearance. This proposal is also subject to the requirements of site plan review.

As proposed, the site would be developed with a perimeter flood berm which would rise some two feet above the finished grade of the site. This berm is intended to protect all structures from potential flood damage should a 100-year storm event occur. The berm will have a finished top elevation of 4,546 feet. The 100-year flood elevation on this site is right at 4,546 feet. The finished floor elevations of the buildings will range from elevations of 4,544 to 4,545 feet. The berm will therefore floodproof the buildings as required by FEMA regulations and the City's Zoning and Development Code.

ADMINISTRATIVE DECISION: Approval is subject to satisfaction of the following issues:

1) A Drainage Report from a registered engineer is necessary and shall be reviewed and approved by the City prior to the issuance of a planning clearance.

2) The petitioners may be required to pay a Transportation Capacity Payment (TCP), a Plant Investment Fee (PIF), and other service fees prior to the issuance of a planning clearance.

3) The petitioner shall provide a certificate from a registered engineer that the proposed berm will adequately satisfy floodproofing requirements.

CITY OF GRAND JUNCTION FLOODPLAIN PERMIT

APPLICANT: Francis Constructors Inc.

Original Do NOT Remove From Office

MAILING ADDRESS PO BOX 1767

Grand Junction, CO 81502

FLP-95-35

TELEPHONE: Home ( ) Work (303) 434-9093

OWNER (If different than applicant): Colorado Self Storage

MAILING ADDRESS 2745 North Locust Ave.

Rialto, California 92376

TELEPHONE: Home ( ) Work (909) 875-8529

COMMON LOCATION OF PROJECT SITE: Lot 1, Appleton Kennels Subdivision F & 24 Roads
(STREET ADDRESS)

MESA COUNTY ASSESSOR'S TAX PARCEL NO: 2945-054-05-001

BRIEF DESCRIPTION OF THE PROPOSED USE OF THE SITE: Storage Units

RIVER, STATION: Leach Creek

ELEVATION OF THE 100 YEAR FLOOD EVENT: 4546.0

DETERMINED FROM: ( ) CORPS OF ENGINEERS, FLOOD HAZARD STUDY, NOVEMBER 1976
( ) HUD FLOOD INSURANCE STUDY, JANUARY 1978
(x) 1992 FEMA Study

ENGINEER: TED V. HERMANNS/ MESA ENGINEERING

MAILING ADDRESS PO BOX 1287

Montrose, CO 81402

TELEPHONE: Work (303) 249-7771

TO BE COMPLETED BY STAFF:

DATE REC'D _____ **RECEIPT NO.** _____

FILE NO. _____ **FEE** _____

REQUIRED DOCUMENTS: _____ _____

_____ _____

_____ _____

CERTIFICATE OF ELEVATION OF LOWEST FLOOR

FLP-95-35

Name: Francis Constructors Inc.

Address: PO BOX 1767

Grand Junction, CO 81502

Original Do NOT Remove From Office

Date Submitted: 1-12-95

Property Location: Lot 1, Appleton Kennells Subdivision

F & 24 Roads Grand Junction, CO

Structure Type: Storage Units on concrete slabs

Steel framed with metal siding.

This document is submitted to the Mesa County Flood Plain Administrator to certify that the elevation of the lowest floor of the above described structure is 4543.90. This elevation was established from a survey conducted by Ted Hermanns, a registered land surveyor in the State of Colorado, on 1/12, 1995.

Submitted By: _____
(Owner)

Surveyed By: Ted Hermanns
(Surveyor)

Grand Junction Storage Units

Lot 1, Appleton Kennels Subdivision

Grand Junction, Colorado

Preliminary Drainage Plan Report

Mesa Engineering

P.O. Box 1287

Montrose, Colorado,81401

I. Location and Description of Property

A. Property Location

1. The property occupies the area northwest of the intersection of F and 24 with frontage on both roads.
2. SE 1/4 of Section 5, T 1S, R 1W, Ute PM
3. The proposed development is adjacent to Cummins Power on the west and Apppleton Kennels occupies Lot 2 of the subdivision. Across F-road lies the Ryder warehouse and Pipe Traders Education Center, and directly north is a storage yard for 2387 Leland Ave.
4. Parcel ID # 2945-054-05-001

B. Description of Property

1. The area of the property is 3.72 acres.
2. The ground cover consists of a dense patch of willows and sparsely located elm trees.
3. The dominant soil type has been classified as a sandy clay.
4. There are no existing irrigation facilities.

II. Drainage Basins and Sub-Basins Locations and Evaluation.

A. Major Basin Description

1. The existing major drainageway is the Colorado River.
2. The 100-year floodplain is shown on the attached plot.

3. The major basin drainageway characteristics are consistent with those established for the Colorado River.
4. There are no nearby and contributing irrigation facilities within 100 feet of the property boundary.

B. Sub-basin Description-Leach Creek Sub-basin

1. The property historically drains from north to south and due to the configuration of Pattterson Road, the drainage is directed to the southwest corner where it is routed into an existing drainage CMP. From this CMP, it is then routed into the existing drainage route south of the highway.
2. Off-site drainage flow patterns that will impact the development result from the configuration of Patterson Road and the drainage patterns of Lots 2,3, & 4 of Appleton Kennels Subdivision. These lots also drain from north to south and thus are routed in the same manner as the lot being developed.

III. Drainage Design Criteria

A. No optional criteria or deviation from the manual has resulted.

B. Development Criteria Reference and Constraints

1. Previous drainage studies that will be influenced by this drainage design are the studies that led

to the design conclusions concerning the existing drainage plan by Western Engineering. In best case scenario, the current drainage plan should not be affected due to the on-site storage and the design assumption that the CMP will not be required to convey any larger flows than predevelopment.

2. The drainage impact due to development should be held to a minimum due to the type of development and materials chosen. The layout of these storage buildings provides for simple routing and the majority of the property is covered by materials that allow for optimum stormwater runoff management.

C. Hydrological Criteria, Discussion

1. The design rainfall for the property in question has been established as 1.6 in for the 10 yr. flood and 2.2 in for 100 yr.
2. The SCS Tabular Hydrograph Method has been chosen as the runoff calculation criteria.
3. The detention discharge and storage calculations were a result of the sizing of a single stage riser.
4. The 10 yr and 100 yr floods are the chosen design storm recurrence intervals.
5. No calculations or other criteria was used that was not presented in the manual.

D. Hydraulic Criteria, Discussion and Method Reference

1. The storage basin is designed to hold and convey 9450 ft^3 for the 100 yr flood and 6400 ft^3 for the 10 yr flood.
2. The detention outlet type will be a properly sized pipe at a calculated elevation with the design assumption that it will convey the estimated amount of flow difference between the 10 yr flood and 100 yr flood.
3. The method of energy dissipation will be a rip-rapped channel at the outlet facility. At such small grades, the energy dissipation will be minimal.
4. No other drainage criteria has been used that was not in the manual.

IV. Drainage Facility Design

A. General Concept, Discussion

1. The concept behind this design is that this facility will be able to hold the roof and street drainage with typical drainage patterns resulting from slab and road grades.
2. The off-site drainage patterns have been complied with due to the fact that the resulting drainage will not be routed any differently than predevelopment.
3. For existing and proposed drainage patterns, please see sections IIB and IVA respectively.
4. For tables, charts, figures, or drawings presented in this report, please attached appendices.

B. Specific Details, Discussion

1. The most influential drainage problem encountered would be the elevation and current capacity of the existing drainage CMP at the southwest corner of the property. The site is relatively flat, thus resulting in the utilization of minimum flow line grades which lead into this CMP.

   There really is no proposed solution other than keeping the site as close to existing grade as possible and utilizing minimum grades.

2. For detention storage and outlet configuration, please see enclosed plan.
3. The storage facility will be accessible through the proposed development
4. Maintenance responsibility is implied by ownership.

V. Conclusions

A. The standards presented in the Mesa County Storm Drainage Criteria Manual and referenced in Hydrologic Analysis and Design By Richard H. McCuen have been complied with.

B. Drainage Concept

1. The effectiveness of the drainage design results from the fact that the detention area will only discharge at a rate which reflects the difference between the major and minor floods. This implies that the facility will store a 10-yr flood and convey a 100-yr flood.
2. For post development peak discharge control, please see section section VB.

C. Hydrologic Impact of the Proposed Project

The result of the proposed development will be that more of the surface drainage will be routed into existing conductors rather than entering the groundwater.

D. Impact Mitigation Plans

The proposed development impact should be minimal due to the fact that all surface drainage will be routed and stored. This may result in standing water at times, but this consequence can be lessened with effective landscaping and construction techniques.

VI. References

1. Mesa County Storm Drainage Criteria Manual
2. Hydrologic Analysis and Design by Richard McCuen
3. Western Engineering Analysis of current drainage

VII. Appendices

A. Hydrologic Computation Summary

1. Assume:

   A. Uniform spatial distribution over watershed.

   B. Rainfall excess rate constant with time.

   C. Specific duration of rainfall excess.

2. Major and Minor Storm Runoff at Design Point

   A. The 100 yr storm runoff predevelopment is 2.54 CFS.

      Postdevelopment is 6.44 CFS.

   B. The 10 yr storm runoff predevelopment is 1.46 CFS.

      Postdevelopment is 4.68 CFS.

3. See attached flood worksheets for runoff computations.

4. See attached hydrographs.

5. For example calculations, see hydraulic computations summary.

B. Hydraulic Computations Summary

1. Culvert capacity using DW ADS,

   18" dia.

   $q = (1.49/0.012)(1.77\ ft^2)(1.77\ ft^2/4.71\ ft)^{2/3}(0.005)^{1/2}$

   $= 8.1\ ft^3/s$ will carry 100 yr flood

2. Storm sewer is not utilized.

3. Using 0.3' drop in 25',

   $q = (1.49/0.013)(3.75\ ft^2)^{2/3}(3.75\ ft^2/25\ ft)^{1/2}$

   $= 8.58\ ft^3/s$ OK

4. Storm inlets are not utilized.

5. Energy Grade Line (EGL) $= V_o^2/2g + Z$

Z(ft)	$V_o^2/2g$	EGL (ft)
4541.4	0	0
4542.9	0	1.5
4540.07	0.33	2.9

6. An open channel 2 ft wide, 1.5 ft deep will carry,

$q = (1.49/0.022)(3\ ft^2)(3\ ft^2/5\ ft)^{2/3}(0.005)^{1/2}$

$= 10.22\ ft^3/s$ OK

7. Channel drop will consist of an evenly spaced rip-rapped entrance or exit utilizing 6" to 10" dia. material set in concrete.

8. Erosion control will consist of evenly spaced 6" to 10" dia. material used for rip-rap.

9. Detention Area/Volume

10 yr flood yields 6400 ft^3

@ 1.5 ft deep, use 100x85 triangular area

Volume will detain 10 yr flood

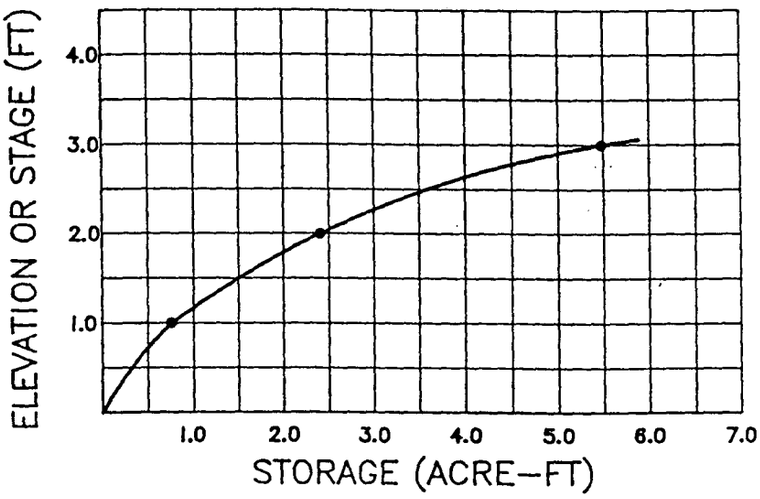
100 yr flood yields a difference of 4 ft^3/s in flow rates thus a 14" dia. pipe will conduct

$q = (1.49/0.010)(1.07ft^2)(1.07\ ft^2/3.66\ ft)^{2/3}(0.005)^{1/2}$

$= 4.96\ ft^3/s$ OK

GRAND JUNCTION STORAGE UNITS

LOT I APPLETON KENNELS SUBDIVISION
GRAND JUNCTION, COLORADO



STAGE–STORAGE

CONTOUR ELEVATION (FT)	AREA (ACRES)	AVERAGE AREA (ACRES)	CONTOUR INTERVAL (FT)	DEPTH h (FT)	CHANGE IN STORAGE (ACRE–FT)	STORAGE (ACRE–FT)
4542.60	0			0		0
		0.38	1		0.76	
4543.60	0.76			1		0.76
		1.65	1		1.65	
4544.60	2.53			2		2.41
		3.07	1		3.07	
4545.60	3.60			3		5.48

$$\Delta S = 1/2\ (A_1 + A_{1+1})\ \Delta h$$

STAGE–STORAGE DISCHARGE

ELEVATION h (FT)	STORAGE $(FT^3) \times 10^5$	DISCHARGE (FT^3/S)
4542.90	0	0
4544.30	0.06316	0
4545.30	0.106	4.8

Q = 0 when $h \leq 1.70$

Q = VA when $00.30 < h \leq 1.37$

ENERGY GRADE LINE (EGL)

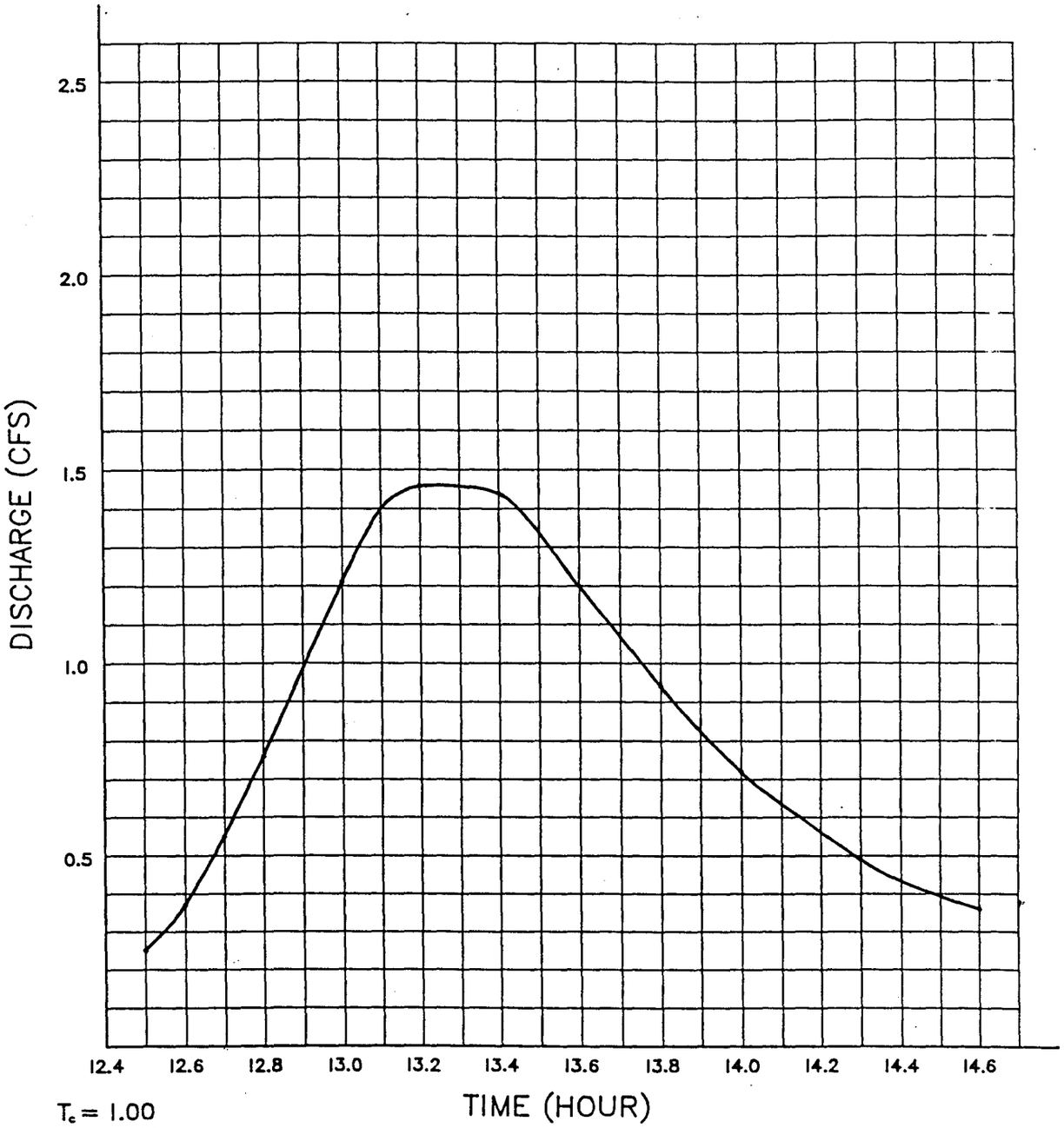
$EGL = Z + (V_0^2 / 2g)$

Z (FT)	$V_0^2 / 2g$ (FT)	EGL (FT)
4542.90	0	0
4544.30	0	1.5
4545.30	0.33	2.9

GRAND JUNCTION STORAGE UNITS

LOT I APPLETON KENNELS SUBDIVISION
GRAND JUNCTION, COLORADO

10 YEAR PRESENT



T_c = 1.00
T_t = 0.50
I_a/P = 0.10
$A_m Q$ = 0.0048

Worksheet 5a: Basic watershed data

Project Grand Junction Storage Units **Location** Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado **By** DT/DC **Date** 12/21/94

Circle one: (Present) Developed **Frequency (yr)** 10 **Checked** _____ **Date** _____

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
1	0.0058	1.09	0.5			1.6	91	0.822	0.0048	0.198	0.124

From worksheet 3 From worksheet 2 From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 2: Runoff curve number and runoff

Project Grand Junction Storage Units By DT/DC Date 12/21/94

Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado Checked _____ Date _____

Circle one: (Present) Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☐ acres ☐ mi² ☐ %	Product of CN x area
C	Developing Urban Area	91			0.0058	0.5278
1/ Use only one CN source per line.				Totals =		0.5278

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ——— = _____; Use CN = 91

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	10		
Rainfall, P (24-hour) ..... in	1.6		
Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) SEE HG. 413 Eq. 4-8	0.822		

Worksheet 5b: Tabular hydrograph discharge summary

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision, Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: (Present) Developed Frequency (yr) 10 Checked ___ Date ___

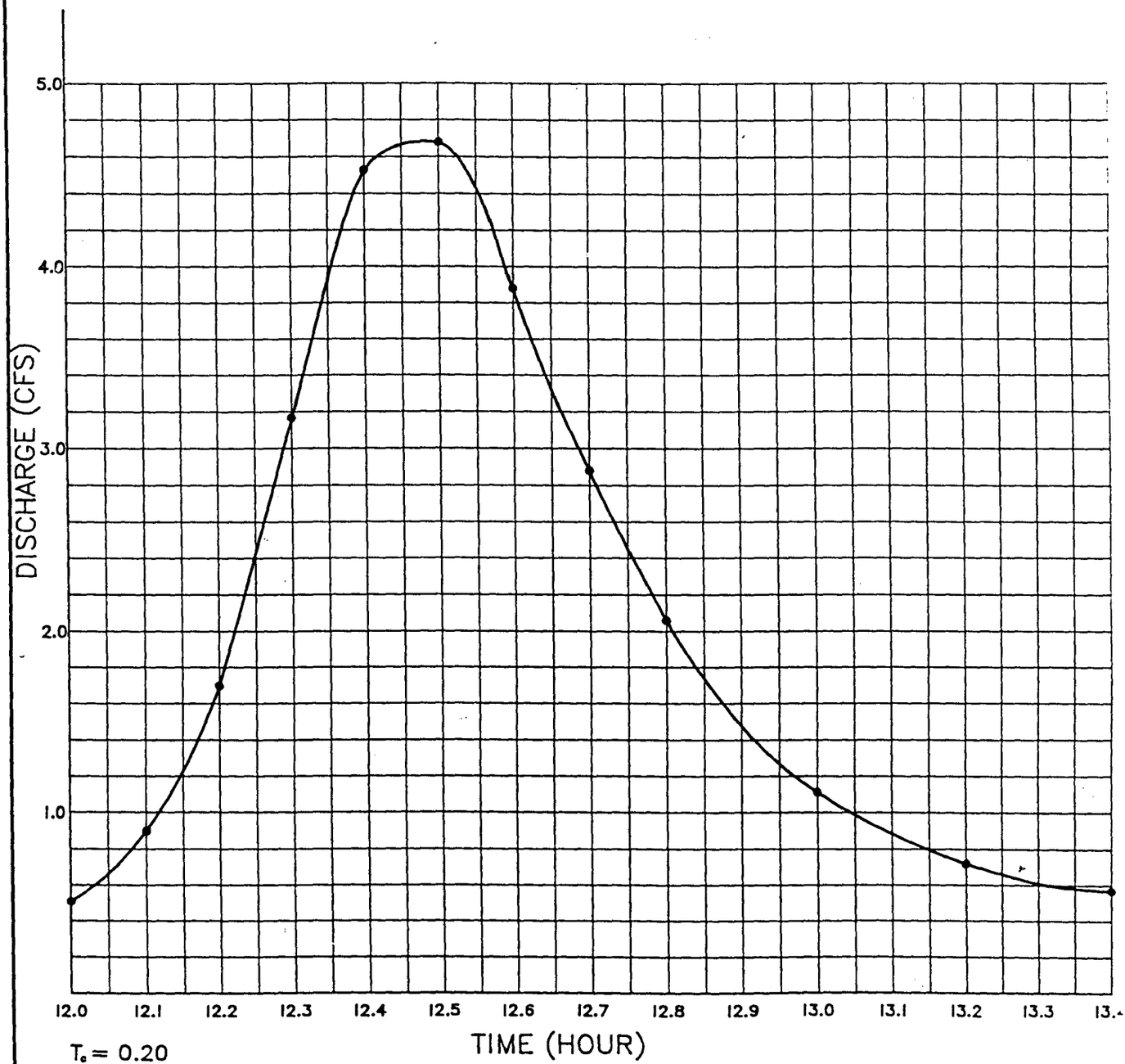
Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5- 2/											
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2-in)	12.5	12.6	12.7	12.8	13.0	13.2	13.4	13.6	13.8	14.0	14.3	14.6
					Discharges at selected hydrograph times 3/ (cfs)											
1	1.09	0.5	0.124	0.0048	0.25	0.37	0.55	0.76	1.21	1.46	1.44	1.2	0.94	0.72	0.49	0.36
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

GRAND JUNCTION STORAGE UNITS

LOT I APPLETON KENNELS SUBDIVISION
GRAND JUNCTION, COLORADO

10 YEAR DEVELOPED



$T_o = 0.20$
$T_t = 0.30$
$I_a/P = 0.10$
$A_m Q = 0.008$

Worksheet 5a: Basic watershed data

Project Grand Junction Storage Units **Location** Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado **By** DT/DC **Date** 12/21/94

Circle one: Present (Developed) _____ **Frequency (yr)** 10 **Checked** _____ **Date** _____

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
1	0.0058	0.163	0.3			1.6	98	1.38	0.008	0.041	0.026

From worksheet 3 From worksheet 2 From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 2: Runoff curve number and runoff

Project Grand Junction Storage Units By DT/DC Date 12/21/94

Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado Checked _____ Date _____

Circle one: Present / Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☐ acres ☐ mi² ☐ %	Product of CN x area
	Asphalt, Roof, Concrete	98			0.0058	0.5684
1/ Use only one CN source per line.		Totals =				0.5684

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = ——— = _____; Use CN = 98

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	10		
Rainfall, P (24-hour) ..... in	1.6		
Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) SEE TG 413 Eq 4-3	1.38		

Worksheet 5b: Tabular hydrograph discharge summary

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: Present (Developed) Frequency (yr) 10 Checked ___ Date ___

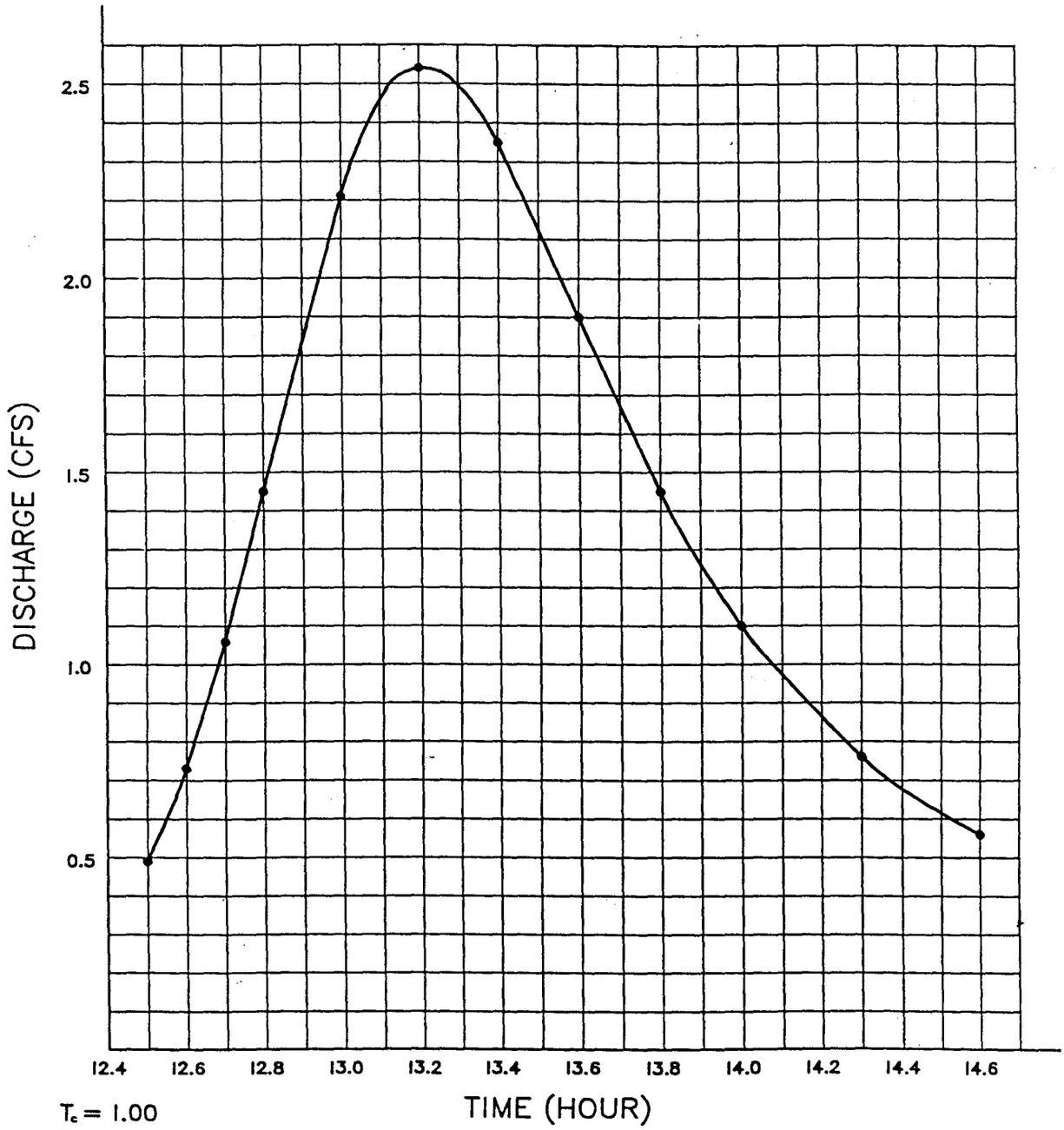
Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5- 2/											
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2-in)	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	13.0	13.2	13.4
					Discharges at selected hydrograph times 3/ (cfs)											
1	0.163	.3	0.026	0.008	0.51	0.90	1.70	3.17	4.53	4.68	3.88	2.88	2.06	1.11	.72	.57
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

GRAND JUNCTION STORAGE UNITS

LOT I APPLETON KENNELS SUBDIVISION
GRAND JUNCTION, COLORADO

100 YEAR PRESENT



$T_c = 1.00$
$T_t = 0.40$
$I_a/P = 0.10$
$A_m Q = 0.008$

Worksheet 5a: Basic watershed data

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: (Present) Developed Frequency (yr) 100 Checked _____ Date _____

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
	0.0058	1.09	0.43			2.2	91	1.34	0.008	0.198	0.09

From worksheet 3 From worksheet 2 From table 5-1

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 2: Runoff curve number and runoff

Project Grand Junction Storage Units By DC/DT Date 12/21/94

Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado Checked _____ Date _____

Circle one: (Present) Developed

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☐ acres ☐ mi²	Product of CN x area
C	Developing Urban Area	91			0.0058	0.5278
1/ Use only one CN source per line.		Totals =				0.5278

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 91

2. Runoff

	Storm #1	Storm #2	Storm #3
Frequency ..... yr	100		
Rainfall, P (24-hour) ..... in	2.2		
Runoff, Q ..... in (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) SEE HG. 413 Eq 4-3	1.34		

Worksheet 5b: Tabular hydrograph discharge summary

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision, Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: (Present) Developed Frequency (yr) 100 Checked ___ Date ___

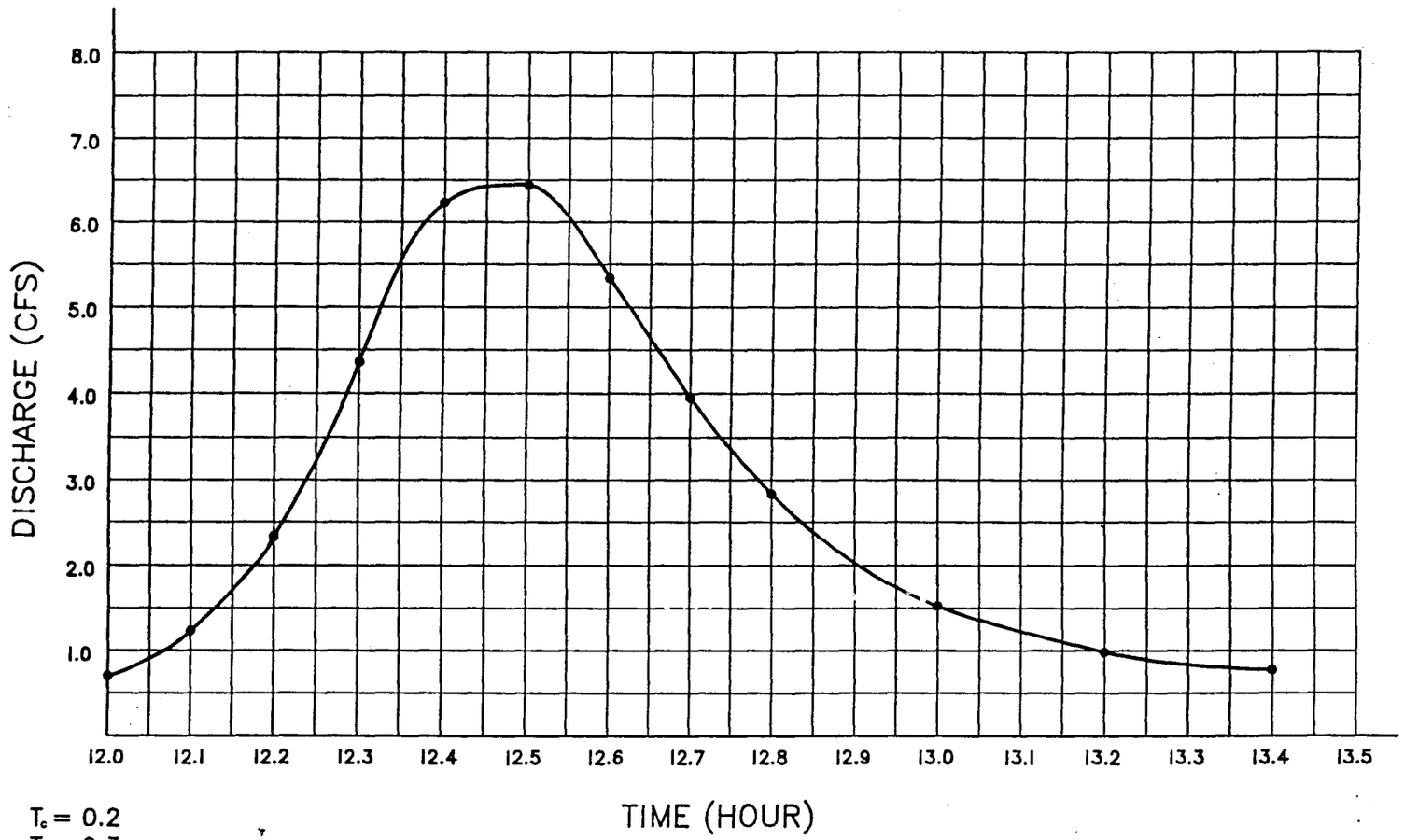
Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5- 2/											
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	A_mQ (mi^2-in)	12.5	12.6	12.7	12.8	13.0	13.2	13.4	13.6	13.8	14.0	14.3	14.6
					Discharges at selected hydrograph times 3/ (cfs)											
	1.09	0.43	0.09	0.008	0.49	0.73	1.06	1.45	2.21	2.54	2.35	1.90	1.45	1.10	0.76	0.56
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is A_mQ multiplied by tabular discharge from appropriate exhibit 5.

GRAND JUNCTION STORAGE UNITS

LOT I APPLETON KENNELS SUBDIVISION
GRAND JUNCTION, COLORADO

100 YEAR DEVELOPED



$T_c = 0.2$
$T_t = 0.3$
$I_a/P = 0.1$
$A_m Q = 0.011$

Worksheet 5a: Basic watershed data

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: Present (Developed) Frequency (yr) 100 Checked _____ Date _____

Subarea name	Drainage area A_m (mi^2)	Time of concentration T_c (hr)	Travel time through subarea T_t (hr)	Downstream subarea names	Travel time summation to outlet ΣT_t (hr)	24-hr Rainfall P (in)	Runoff curve number CN	Runoff Q (in)	$A_m Q$ (mi^2-in)	Initial abstraction I_a (in)	I_a/P
	0.0058	0.163	0.26			2.2	98	1.97	0.011	0.041	0.019

From worksheet 3 (Tc, Tt) From worksheet 2 (CN, Q) From table 5-1 (I_a)

(210-VI-TR-55, Second Ed., June 1986)

Worksheet 5b: Tabular hydrograph discharge summary

Project Grand Junction Storage Units Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado By DT/DC Date 12/21/94

Circle one: Present (Developed) Frequency (yr) 100 Checked ___ Date ___

Subarea name	Basic watershed data used 1/				Select and enter hydrograph times in hours from exhibit 5- 2/											
	Sub-area T_c (hr)	ΣT_t to outlet (hr)	I_a/P	$A_m Q$ (mi^2-in)	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	13.0	13.2	13.4
					Discharges at selected hydrograph times 3/ -(cfs)-											
	0.163	0.26	0.019	0.011	0.70	1.23	2.33	4.36	6.23	6.44	5.34	3.96	2.84	1.53	0.99	0.78
Composite hydrograph at outlet																

1/ Worksheet 5a. Rounded as needed for use with exhibit 5.
2/ Enter rainfall distribution type used.
3/ Hydrograph discharge for selected times is $A_m Q$ multiplied by tabular discharge from appropriate exhibit 5.

Worksheet 2: Runoff curve number and runoff

Project Grand Junction Storage Units By DT/DC Date 12/21/94

Location Lot 1, Appleton Kennels Subdivision Grand Junction, Colorado Checked _____ Date _____

Circle one: Present (Developed)

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☐ acres ☐ mi² ☐ %	Product of CN x area
	Asphalt, Roof, Concrete	98			0.0058	0.5684
1/ Use only one CN source per line.				Totals =		0.5684

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ = _____ = _____; Use CN = 98

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	100		
Rainfall, P (24-hour)	in	2.2		
Runoff, Q (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.) SEE HG 413 Eq. 4-8	in	1.97		

Worksheet 9-3 Single-stage and two-stage riser design

WATERSHED CHARACTERISTICS

Var.	Units	Before	After	Comments
A	acres	3.72	3.72	
CN	–	91	98	from Table 7-6
t_c	hr	1.09	0.163	
P	in.		1.6	low stage/high stage
I_a/P				low stage
I_a/P				high stage

OUTLET FACILITY CHARACTERISTICS

n	–	0.013	
L	ft	100	
D	ft	1.0	Initial estimate
K_p		0.031	
C_*		0.58	
E_0	ft	1.0	
E_c	ft	0	

Step	Var.	Units	Low Stage	High Stage	Comments
1	Q_b Q_a	in. in.		0.82 1.38	$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$ $S = \frac{1000}{CN} - 10$
2	q_{ub} q_{ua} q_{pb} q_{pa}	$ft^3/sec/mi^2/in.$ $ft^3/sec/mi^2/in.$ ft^3/sec ft^3/sec		 1.46 4.05	See Fig. 7-10 $q_p = q_u A Q$ with A [=] mi^2
3	R_q	–		0.36	$R_q = q_{pb}/q_{pa}$
4	R_s	–		0.34	From Fig. 9-6
5	V_s	in. acre-ft		0.47 0.145	$V_s = Q_a R_s$ $V_s = V_s A/12$ with A [=] acres
6	V_d	acre-ft	0.76	–	From elevation-storage curve
7	V_t	acre-ft		0.91	$V_t = V_d + V_s$
8	E	ft		1.15	From elevation-storage curve
9	D	ft		0.70	$D = C_* q_{pb2}^{0.5} (E_1 - E_c)^{-0.25}$
10	W_0 A_0 H_0 q_{02}	ft ft^2 ft ft^3/sec		– – – –	Try $0.75D$ $A_0 = 0.2283 q_{pb1}/\sqrt{E_1 - E_0}$ $H_0 = A_0/W_0$ $q_{02} = 4.82 A_0 (E_2 - E_1)^{0.5}$
11	L_{W1} q_{02}	ft ft^3/sec	– –		$L_{W1} = q_{pb1}/[3.1(E_1 - E_0)^{1.5}]$ $q_{02} = 3.1 L_{W1} (E_2 - E_0)^{1.5}$
12	L_{W2}	ft	–		$L_{W2} = (q_{pb2} - q_{02})/[3.1(E_2 - E_1)^{1.5}]$
13	E_i	ft		–	$E_i = E_c - 0.5D$

Worksheet 9-3 Single-stage and two-stage riser design

WATERSHED CHARACTERISTICS

Var.	Units	Before	After	Comments
A	acres	3.72	3.72	
CN	–	91	98	from Table 7-6
t_c	hr	1.09	0.163	
P	in.		2.2	low stage/high stage
I_a/P				low stage
I_a/P				high stage

OUTLET FACILITY CHARACTERISTICS

n	-	0.013	
L	ft	100	
D	ft	1	Initial estimate
K_p		0.31	
C_*		0.58	
E_0	ft	2.2	
E_c	ft	00.20	

Step	Var.	Units	Low Stage	High Stage	Comments
1	Q_b Q_a	in. in.		1.34 1.97	$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$ $\quad S = \frac{1000}{CN} - 10$
2	q_{ub} q_{ua} q_{pb} q_{pa}	$ft^3/sec/mi^2/in.$ $ft^3/sec/mi^2/in.$ ft^3/sec ft^3/sec		 2.54 6.44	See Fig. 7-10 $q_p = q_u AQ$ with A [=] mi^2
3	R_q	–		0.39	$R_q = q_{pb}/q_{pa}$
4	R_s	–		0.32	From Fig. 9-6
5	V_s	in. acre-ft		0.63 0.195	$V_s = Q_a R_s$ $V_s = V_s A/12$ with A [=] acres
6	V_d	acre-ft	1.95	–	From elevation-storage curve
7	V_t	acre-ft	2.145		$V_t = V_d + V_s$
8	E	ft		1.96	From elevation-storage curve
9	D	ft		0.77	$D = C_* q_{pb2}^{0.5} (E_1 - E_c)^{-0.25}$
10	W_0 A_0 H_0 q_{02}	ft ft^2 ft ft^3/sec		– – – –	Try $0.75D$ $A_0 = 0.2283 q_{pb1}/\sqrt{E_1 - E_0}$ $H_0 = A_0/W_0$ $q_{02} = 4.82 A_0 (E_2 - E_1)^{0.5}$
11	L_{W1} q_{02}	ft ft^3/sec	– –		$L_{W1} = q_{pb1}/[3.1(E_1 - E_0)^{1.5}]$ $q_{02} = 3.1 L_{W1} (E_2 - E_0)^{1.5}$
12	L_{W2}	ft	–		$L_{W2} = (q_{pb2} - q_{02})/[3.1(E_2 - E_1)^{1.5}]$
13	E_i	ft		–	$E_i = E_c - 0.5D$

MESA ENGINEERING & SURVEYING CO., INC.

P.O. Box 1287 — 330 South 5th Street
Montrose, Colorado 81401
303-249-7771 FAX 303-249-7773

January 12, 1995

Francis Constructors, Inc.
P.O. Box 1767
Grand Junction, CO 81502

"I hereby certify that this report (plan) for the preliminary drainage design of _____ was prepared by me, (or under my direct supervision)."

Ted Hermanns
Registered Professional Engineer,
State of Colorado, Number 5720

Deep Creek Inc.

LANDSCAPING & IRRIGATION

DESIGN • CONSTRUCTION • MAINTENANCE

Tierra Corporation
Re; Storage Unit Landscaping
Grand Junction, CO

Proposal #9577
11/10/95

Quan.	Size	Price	Description	Cost
			Planting Per Landscape Plan	
17	1 1/2"	140.00	Russian Olive	2,380.00
5	2 "	230.00	Cottonwoods	1,150.00
45	#5	22.00	Yucca	990.00
51	#5	24.00	Potentilla	1,224.00
				5,744.00
			Planting Substitutes:	
			Pinion Pine 5' - 6' $170.00/ea	
			Austrian Pine 5' - 6' $180.00/ea	
			Juniper Evergreen #5 $28.00/ea	
			Steel Edging, Bark Mulch, Cobble Mulch and Landscape Boulders	2,151.00
			Native Seed and Mulch	1,080.00
			Drip Irrigation System	595.00
			Total Amount	$9,570.00

All grades to be 2/10ths of finish grade. If the backhoe, dozer and/or dump truck is required for additional work, it will be charged at a rate of $50.00 per hour.

OWNER/OWNER'S REP.

Print Name

Signature

Date

CONTRACTOR'S REP

Darol Stumpf

Signature

Date

P.O. BOX 40268 GRAND JUNCTION, CO 81504 (970) 244-8768

DARRYL FLAMING
CAROLYN FLAMING
P. O. BOX 7032 PH. 619-759-9334
RANCHO SANTA FE, CA 92067

274

2/16 19 96

90-3210/1222
0125050706

PAY TO THE ORDER OF Mesa County Recorder $ 6.00/xx

Six and 00/100 DOLLARS

GROSSMONT BANK
The Bank To Believe In
LA MESA OFFICE
5500 Grossmont Center Dr., La Mesa, CA 91942-3082

MEMO

⑆122232109⑆0274⑈0125050706⑈

DARRYL FLAMING
CAROLYN FLAMING
P. O. BOX 7032 PH. 619-759-9334
RANCHO SANTA FE, CA 92067

275

2/14 19 96

90-3210/1222
0125050706

PAY TO THE ORDER OF City of Grand Junction $ 9,570.00/xx

Nine thousand five hundred seventy and 00/100 DOLLARS

GROSSMONT BANK
The Bank To Believe In
LA MESA OFFICE
5500 Grossmont Center Dr., La Mesa, CA 91942-3082

MEMO

⑆122232109⑆0275⑈0125050706⑈