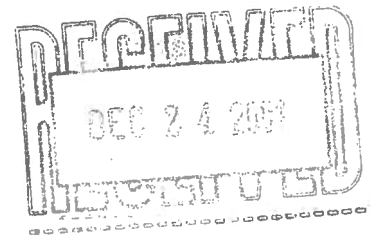


**MASTER DRAINAGE REPORT
FOR
ORCHARD VALLEY WEST SUBDIVISION**

**PRESENTED TO:
City of Fruita**

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**May 22, 1998
Revised: August 17, 1998
Revised: September 9, 1998
8020dm.wpd**

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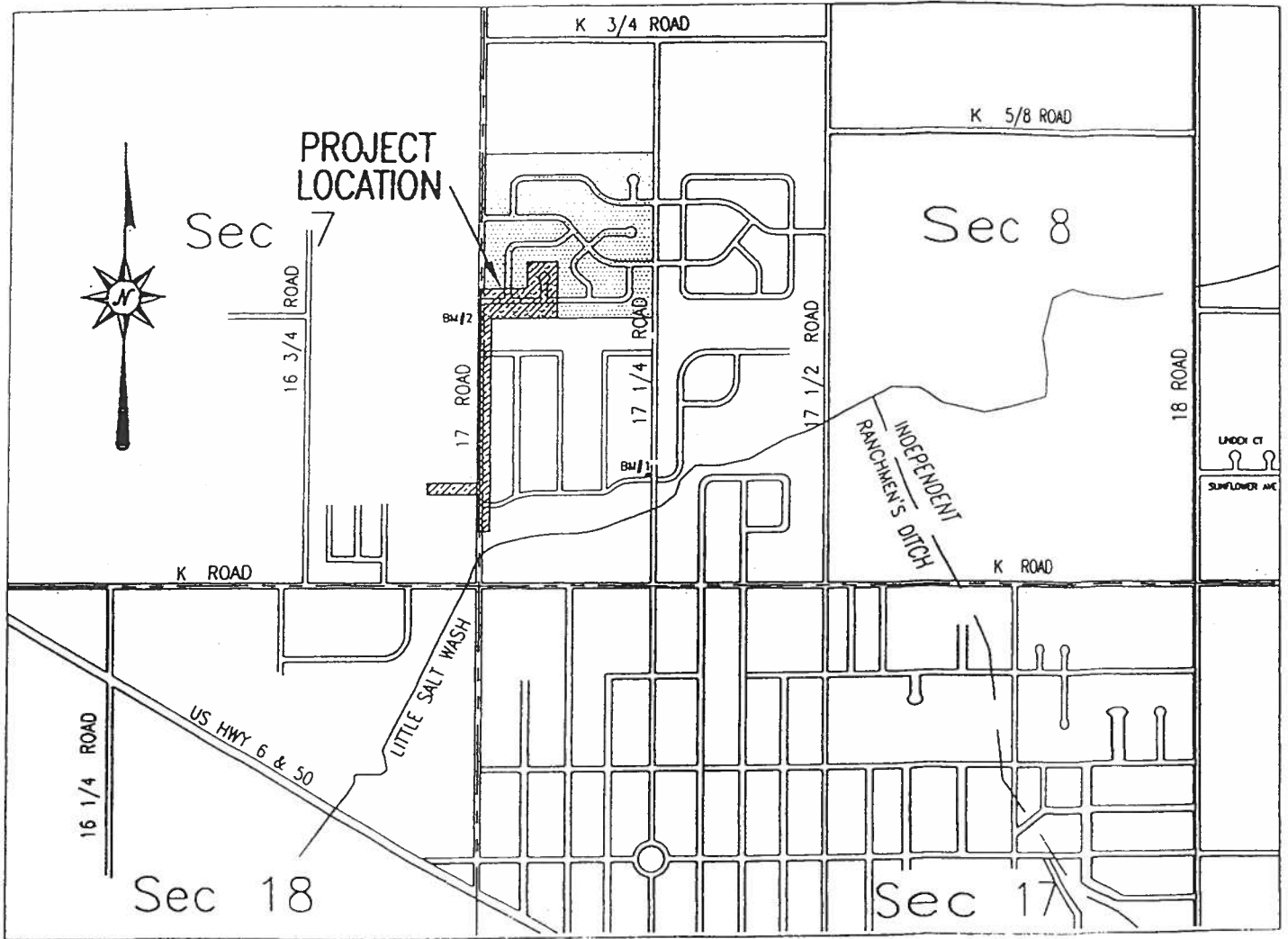
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MASTER GRADING AND DRAINAGE PLAN

VICINITY MAP



I. SITE LOCATION AND DESCRIPTION

Orchard Valley West Subdivision is located in the City of Fruita, Colorado. The subdivision is bounded by 17 Road to the west, 17 ½ (North Mesa Ave.) to the east, Roberson Manor and Roberson West Subdivisions to the south, and Elmwood Cemetery and Pasture land to the north. More particularly, it is located in the NW 1/4, SW 1/4 of Section 8, Township 1 North, Range 2 West of the Ute Meridian. Refer to the Vicinity Map.

The historic land use for the proposed Orchard Valley West has been irrigated farm land. Slopes are consistently between 0.5% and 1% to the southwest.

II. PURPOSE OF REPORT

Orchard Valley West will be subdivided into 137 lots at this time. The first phase of construction will include approximately 4.9 acres of the total 38.3 in the subdivision. This report shall serve as a guideline for future construction phases in the subdivision.

III. EXISTING DRAINAGE CONDITIONS

Major Basin Description

Orchard Valley West is part of a basin of approximately 85 acres drains into the Little Wash from the north between 17 Road and 17 1/4 Road. Drainage for this subdivision and surrounding areas generally flows west and south to the Little Salt Wash, which is located 1000 feet south of the southwest corner of the Orchard Valley Subdivision. The Little Salt Wash empties into the Colorado River at a point 1.4 miles southwest of the site.

On-Site Flows

On-Site drainage flows west to a road side ditch along 17 Road, where drainage enters an existing 18" RCP at conveys flows to the Little Salt Wash. A drainage ditch along the southern boundary of the site intercepts drainage and carries it to 17 Road.

Off-Site Flows

Offsite flows enter the right-of-way adjacent to the proposed subdivision at the northwest corner of the site (Basin OS2) and along the northern boundary of the project (Basin OS1). Offsite Basin OS2 includes approximately 17.7 acres of cemetery and pasture. Offsite Basin OS1 includes approximately 3.4 acres of pasture and one rural residence. Minor offsite flows will be intercepted by a drainage channel along the southern portion of the property to the north and directed to the right-of-way of 17 Road. Flows from major storm events from offsite Basin OS 1 will pass along a common lot line to West Applewood Drive (See Appendix D).

K 3/4 ROAD

OS 1
17.1 AC

OS 2
3.4 AC

2
CONSTRUCT SD SYSTEM

3
CONSTRUCT SD

DENTON

ORCHARD VALLEY
WEST
SUBDIVISION

1
CONSTRUCT SD SYSTEM

APPLEWOOD DR

15' RCP

42"

15'

8'

12'

36'

36'

HESA ST / 17 1/4 ROAD

SUNSET DR

PEAR DR

HAZEL DR

SABIL DR

24' RCP

PINYON DR

PINYON CT

12'

MEADOW AV

48'

42'

DAK ST

VILLOVIST

CHERRY S

PLUM ST

ROBERTSON DR

PAULSON DR

PEACH WY

MIDBERRY CT

OLE REC CT

30' RCP @ .70%

ORTLEY AV

30' RCP @ .42%

30' RCP @ .70%

MAPLE ST / 17 1/8 ROAD
18' RCP @ .37%

HULBERRY

IV. PROPOSED DRAINAGE CONDITIONS

General

The City of Fruita Storm Water Master Plan has stated that no storm water detention will be required for this development. The proposed storm drain system is sized to convey runoff from the 100 year storm event to the Little Salt Wash before peak flows occur. Developed runoff flows have been calculated for the 100 year storm.

Drainage from the roadside ditch along 17 Road, irrigation tailwater and minor flows from the north will continue to enter the existing 18" RCP. The capacity of the existing 18" RCP is about 6.3 cfs. A separate storm sewer will need to be constructed to serve the two drainage basins in the subdivision and 100 year flows from offsite Basin OS1. No detention is being proposed for this subdivision, in accordance to the City of Fruita's Master Plan. The proposed storm sewer is sized to carry the runoff from the 100 year storm event to the Little Salt Wash.

Developed Basin A

This basin consists of 19.5 acres in the southern half of the subdivision, including Elderberry Drive, Dogwood Drive, Poplar Drive, Crystal Court and about 1/4 of West Sunset Drive. Drainage will be conveyed in the streets to inlets located at the southwest corner of the basin at the intersection of Elderberry Drive and Cottonwood Drive

Developed Basin B

This basin consists of 18.9 acres in the northern half of the subdivision, including Dogwood Court, Applewood Court, West Applewood Drive and about 3/4 of West Sunset Drive. Drainage will be conveyed in the streets to inlets located at the west side of the basin at the intersection of West Sunset Drive and West Applewood Drive.

V. DRAINAGE CRITERIA

General Considerations

This Master Drainage Report has been performed according to the requirements of the Mesa County Storm Water Management Manual (SWMM) dated May 1996 and the City of Fruita Design Standards and Construction Specifications.

Hydrology

The SCS method with a storm duration of 24 hours was used to compute developed and historic flow rates.

Based on the "Soil Survey, Grand Junction Area, Colorado, United States Department of Agriculture, Soil Conservation Service, issued in November 1955," the soils in this area are Ravola Clay Loam, Billings Silty Clay and Fruita Sandy Loam. These soils vary in runoff potential. The sandy loam would be classified as Soil Group A and the clay loam and silty clay would be classified in Soil Group D. "Hydrologic Soil Group C" would best approximate soil conditions when selecting Curve Numbers.

Historic Runoff Summary

<u>Basin</u>	<u>Area (Ac.)</u>	<u>CN</u>	<u>100 Yr Runoff (cfs)</u>
OS1	17.1	77	4.8
OS2	3.4	77	1.5
Site	38.5	85	18.9

Developed Runoff Summary

<u>Basin</u>	<u>Area (Ac.)</u>	<u>CN</u>	<u>100 Yr Runoff (cfs)</u>
A	19.6	87	15.7
B	18.9	87	12.7

Routed Peak Flows

<u>Design Point</u>	<u>100 Yr Flow Rate (cfs)</u>
17 Rd & W. Applewood Dr.	17.5
Outfall at Little Salt Wash	32.6

Inlet Sizing

Flows will be collected in inlets. Inlets are located in the curb and gutter at a low points. From Table G-1 in the SWMM, each single opening inlet in a sump condition can collect 13 CFS for 100 year inundation limits. One of the inlets in Basin A collects runoff from 55% of the basin, approximately 8.6 cfs for the 100 year storm. Single opening inlets are acceptable at all locations.

Pipe Sizing

Using a software program based on the Manning's Equation, the capacity for each pipe was determined. Refer to Appendix C.

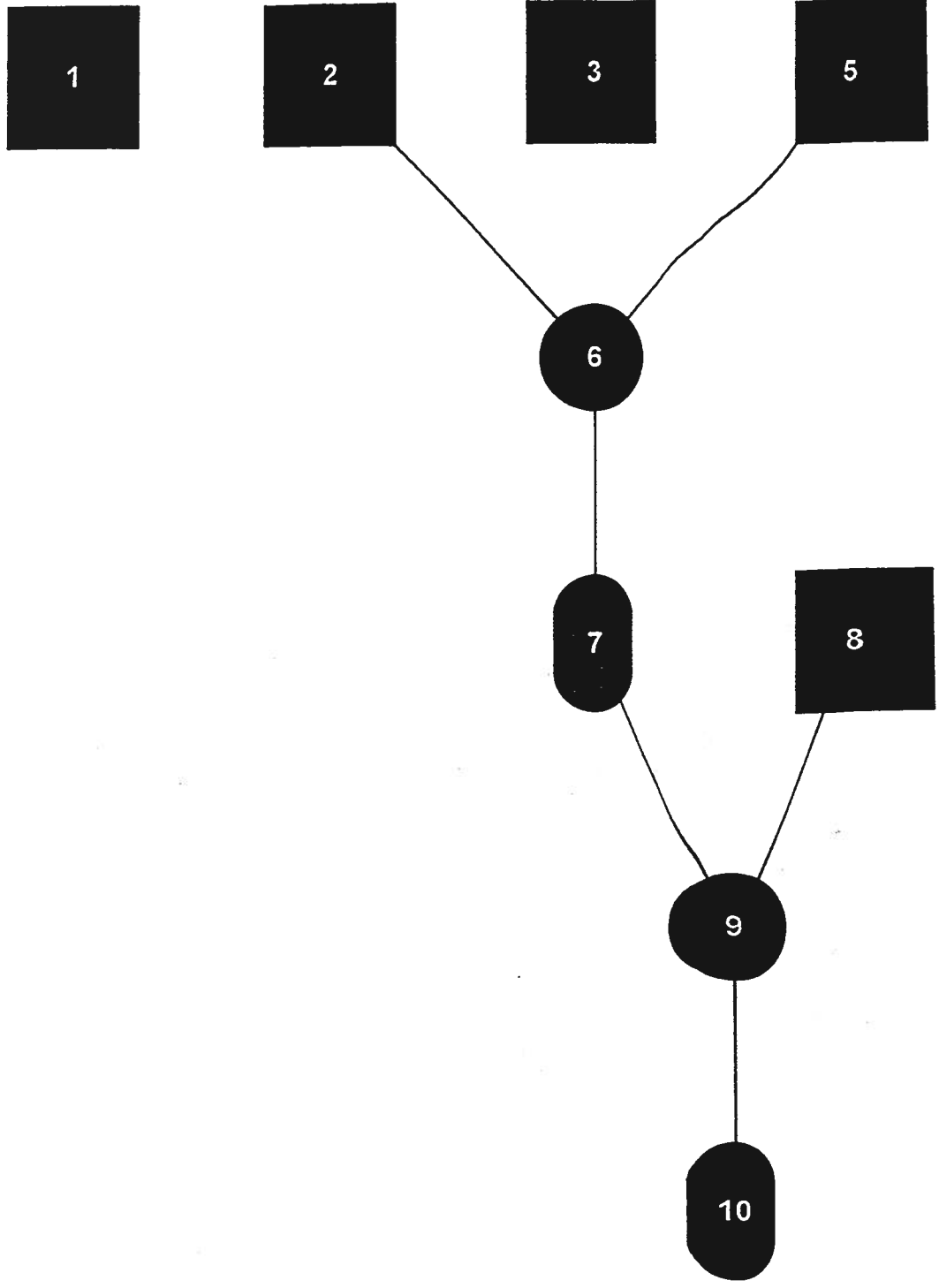
Gutter Capacity

Streets in this subdivision are classified as Urban Residential (Local). Streets of this type have a capacity of about 8 cfs at 0.5% for the two year storm (Figure G-5 in the SWMM). Flow rates at the worst case points in each basin for the 100 year storm do not exceed the allowable for the two year storm.





VI. CONCLUSIONS

The runoff and storm sewer systems for this project have been calculated in accordance with the SWMM. Detention is not being utilized due to the proximity to the Little Salt Wash. It should be noted that this report calculates the minimum size of storm drain in 17 Road based on this development only.

APPENDIX A
HISTORIC AND DEVELOPED
RUNOFF



Legend

-  **Runoff**
-  **Combined**
-  **Channel Reach**
-  **Pond Route**

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time Interval (min)	Time to peak (min)	Volume (acft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	18.9	6	744	2.51	100	—	—	—	Site Historic
2	SCS Runoff	4.8	6	738	0.67	100	—	—	—	Basin OS1
3	SCS Runoff	1.5	6	726	0.12	100	—	—	—	Basin OS2
5	SCS Runoff	12.7	6	738	1.48	100	—	—	—	Basin B
6	Combine	17.5	6	738	2.15	100	2 + 5	—	—	Basin B + OS1
7	Reach	17.5	6	738	2.15	100	6	—	—	24" in 17 Road
8	SCS Runoff	15.7	6	732	1.49	100	—	—	—	Basin A
9	Combine	32.6	6	732	3.64	100	7 + 8	—	—	Basin A + B +
10	Reach	32.6	6	732	3.64	100	9	—	—	30" in 17 Road