

# DRAINAGE REPORT

FOR  
TRIPLETS MINOR  
**625 S. MAPLE STREET**  
FRUITA, COLORADO  
**PARCEL No. 2697-202-17-002**  
**SITE ZONING CR**

PREPARED  
FOR  
CHRIS NIELSEN  
907 PRINCE COURT  
GRAND JUNCTION, COLORADO  
81521

DATE: JULY 11, 2003



**PROJECT  
SITE**

## VICINITY MAP

NOT TO SCALE

PREPARED  
BY

**MDY**  
**CONSULTING ENGINEERS, INC.**

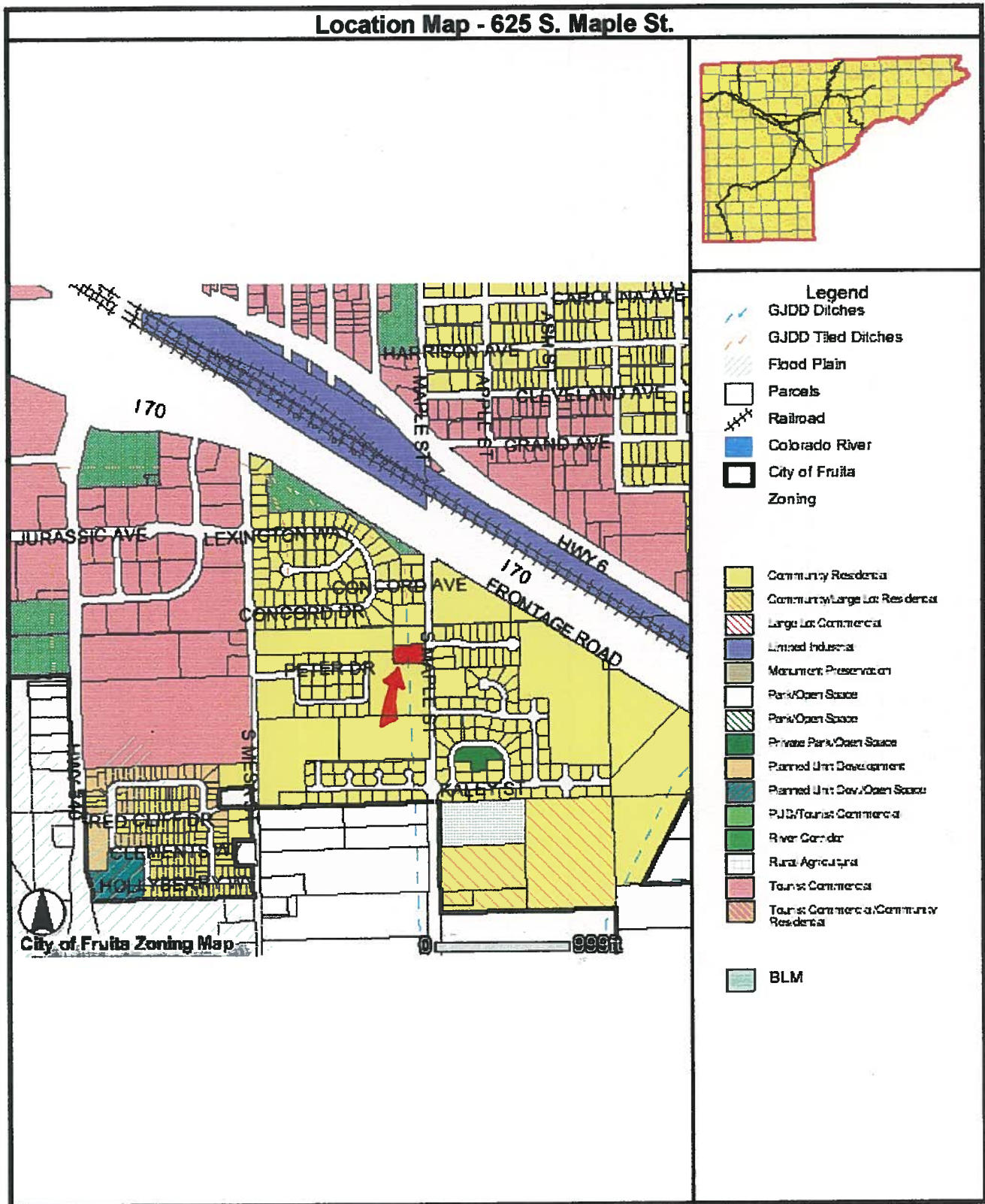
**HORIZON PARK PLAZA**

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NOT TO SCALE



**635 S. MAPLE STREET, FRUITA, COLORADO  
DRAINAGE REPORT**

02-711  
07-14-02

**I) GENERAL LOCATION AND DESCRIPTION:**

The proposed development site is located at 625 S. Maple Street, which is south of I-70, and west of S. Maple Street. The parcel, (2697-202-17-002), lies within the T&L Minor Subdivision. The site is parcel 2 located in the NE ¼ NW ¼ of section 20, T.1N., R.2W., Ute Meridian, City of Fruita, County of Mesa, State of Colorado.

The area was at one time agricultural. The site now falls under CR zoning. This parcel is 234' wide by 137.50' deep having an area of 0.74 acres.

Soil classification information provided by the Mesa Soil Conservation District indicates that the soils belong in the SCS Hydrologic Soil Group B. These soils have been classified at Rc (Fruitland sandy clay loam, 0-2 percent slopes.)

**II) EXISTING DRAINAGE CONDITIONS:**

The site in its present condition appears to drain from east to west and then north to south, draining into an existing storm drain. Properties that border the site to the north and east convey drainage to the west and south respectively.

**III) PROPOSED DRAINAGE CONDITIONS:**

The proposed method of drainage will consist of controlled surface drainage through grading and surface slopes and surface materials. The surface drainage will generally shed from north to south over developed ground at approximately a one percent slope. A paved drive located along the south property line and sloping one percent to the east will convey collective flows to a proposed storm drain inlet. A 12" diameter pipe will convey maximum 100 year event volumes into the existing storm drain system located within S. Maple Street.

The volume of runoff has been determined using the methods found in the Storm Water Management Manual. Reference attached historic and developed drainage calculations for the site.

## FROM THE MESA COUNTY WEB SITE 4/10/03

Rc-Fruitland sandy clay loam, 0 to 2 percent slopes

### Map Unit Setting

#### MLRA:

Elevation: 4,600 to 4,800 feet (1,402 to 1,463 meters)

Mean annual precipitation: 7 to 10 inches (178 to 254 millimeters)

Average annual air temperature: 50 to 54 degrees F. (10 to 12 degrees C.)

Frost-free period: 150 to 190 days

### Map Unit Composition

Fruitland and similar soils: 90 percent

Minor components: 10 percent

### Component Descriptions

Fruitland soils

Landform: Alluvial fan

Geomorphic position: Unspecified

Parent material: Alluvium derived from sandstone and shale

Slope: 0 to 2 percent

Surface fragments: Unspecified

Depth to restrictive feature: Unspecified

Drainage class: Well drained

Slowest permeability: About 0.60 in/hr (moderate)

Available water capacity: About 7.6 inches (moderate)

Shrink-swell potential: About 1.5 LEP (low)

Flooding hazard: None

Ponding hazard: Unspecified

Seasonal water table minimum depth: Greater than 6 feet

Runoff class: Low Hydrologic Soil Group B

Calcium carbonate maximum: About 10 percent

Gypsum maximum: None

Salinity maximum: About 2 mmhos/cm (nonsaline)

Sodicity maximum: About 0 SAR (nonsodic)

Ecological site: Unspecified

Potential native vegetation: Unspecified

Land capability (irrigated): 2e

Land capability (non irrigated): 7c

##

Typical Profile:

Ap-0 to 8 inches; sandy clay loam

C1-8 to 30 inches; stratified gravelly sandy loam to fine sandy loam

C2-30 to 60 inches; stratified sandy loam to fine sandy loam

##

Minor Components

Other Soils and similar soils

Composition: About 10 percent

Landform: Unspecified

Geomorphic Position: Unspecified

Slope: Unspecified

Depth to restrictive feature: Unspecified

Drainage class: Unspecified

Ecological site: Unspecified

**Historic Runoff Estimates.**

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- a) Area, (acres)  $A := 0.74$
- b) Soil Type: Group "B" for current calculations.
- c) Ground Covers:  
Bare Ground
- d) Flow Path Length, (Lft.)  $L := 234$
- e) Slope: Top of slope elevation,  $t_p := 4502$   
Toe of slope elevation,  $t_e := 4500$

$$s := \left[ \frac{(t_p - t_e)}{L} \right]$$

$$s := (s \cdot 100)$$

$$s = 0.85 \%$$

- f) Rational Method / Runoff Coefficients
- 2h Bare ground  $C_{2h} := 0.18$
- 100h Bare ground  $C_{100h} := 0.24$
- g) Time of Concentration  $T_C$

1. Overland Flow Time  $T_O$   
Overland Flow Length (Lft.)  $L_{of} := 234$

$$T_{O2h} := \frac{[1.8 \cdot (1.1 - C_{2h}) \cdot L_{of}^{0.5}]}{s^{0.33}}$$

$$T_{O2h} = 26.68 \quad \text{Min.}$$

$$T_{O100h} := \frac{[1.8 \cdot (1.1 - C_{100h}) \cdot L_{of}^{0.5}]}{s^{0.33}}$$

$$T_{O100h} = 24.94 \quad \text{Min.}$$

2. Shallow Concentrated Flow Time  $T_S$   
Shallow Flow Length (Lft.)  $L_{sf} := 5$   
 $s = 0.85 \%$   
Velocity, V (ft/s) Figure E-3  $v := 1.0$   
(Cultivated Straight Row)

$$T_S := \left( \frac{L_{sf}}{v} \right) \cdot \left( \frac{1}{60} \right)$$

$$T_S = 0.08 \quad \text{Min.}$$

3.  $T_C$  Total Surface Times

$$T_{C2h} := T_{O2h} + T_S$$

$$T_{C2h} = 26.76 \quad \text{Min.}$$

$$T_{C100h} := T_{O100h} + T_S$$

$$T_{C100h} = 25.02 \quad \text{Min.}$$



**Historic Runoff Estimates Cont.****h) IDF Data**

$$I_2 := \frac{26.71}{(T_{C2h} + 19.01)}$$

$$I_2 = 0.584 \quad \text{in/hr}$$

$$I_{100} := \frac{104.94}{(T_{C100h} + 18.80)}$$

$$I_{100} = 2.395 \quad \text{in/hr}$$

**i) Conveyance**

$$Q_{2h} := C_{2h} \cdot I_2 \cdot A$$

$$Q_{2h} = 0.08 \quad \text{cfs}$$

$$Q_{100h} := C_{100h} \cdot I_{100} \cdot A$$

$$Q_{100h} = 0.43 \quad \text{cfs}$$

**Developed Runoff Estimates Total Site 0.74 Ac.**  
**02-711**  
**07-10-03**

- a) Area, (acres)  $A := 0.74$
1. Lots,  $L_{ots}$   $A_u := \frac{A}{L_{ots}}$   $L_{ots} := 3$   
 Acre/Units  
 $A_u = 0.25$
- b) Soil Type: To be determined. Group "B" for current calculations.
- c) Ground Covers:  
 Developed, Asphalt

- d) Rational Method / Runoff Coefficients / Developed Areas.
- 2h (1/8) Acre Per Unit.  $C_{2d} := 0.46$
- 100h (1/8) Acre Per Unit.  $C_{100d} := 0.54$

- e) Time of Concentration  $T_C$

1. Overland Flow Time  $T_O$

Overland Flow Length (Lft.)  $L_{of} := 234$

Slope: S  $s := 1 \%$

$$T_{O2d} := \frac{[1.8 \cdot (1.1 - C_{2d}) \cdot L_{of}^{0.5}]}{s^{0.33}} \quad T_{O2d} = 17.62 \text{ Min.}$$

$$T_{O100d} := \frac{[1.8 \cdot (1.1 - C_{100d}) \cdot L_{of}^{0.5}]}{s^{0.33}} \quad T_{O100d} = 15.42 \text{ Min.}$$

2. Shallow Concentrated Flow Time  $T_S$

Shallow Flow Length (Lft.)  $L_{sf} := 20$

Slope: S  $s := 1 \%$

Velocity, V (ft/s) Figure E-3  
 (Grassed Waterway)  $v := 1.5$

$$T_S := \left( \frac{L_{sf}}{v} \right) \cdot \left( \frac{1}{60} \right) \quad T_S = 0.22 \text{ Min.}$$

3. Street, Curb & Gutter Flow Time  $T_{cg}$

Shallow Flow Length (Lft.)  $L_{cg} := 234$

Slope: S  $s := 1 \%$



**Developed Runoff Estimates Cont.**

Velocity, V (ft/s) Figure E-3  
(Grassed Waterway)  $v := 2.0$

$$T_{cg} := \left( \frac{L_{cg}}{V} \right) \cdot \left( \frac{1}{60} \right) \quad T_{cg} = 1.95 \quad \text{Min.}$$

**3.  $T_C$  Total Surface Times**

$$T_{C2d} := T_{O2d} + T_S + T_{cg} \quad T_{C2d} = 19.79 \quad \text{Min.}$$

$$T_{C100d} := T_{O100d} + T_S + T_{cg} \quad T_{C100d} = 17.59 \quad \text{Min.}$$

**f) IDF Data**

$$I_2 := \frac{26.71}{(T_{C2d} + 19.01)} \quad I_2 = 0.688 \quad \text{in/hr}$$

$$I_{100} := \frac{104.94}{(T_{C100d} + 18.80)} \quad I_{100} = 2.884 \quad \text{in/hr}$$

**g) Conveyance**

$$Q_{2d} := C_{2d} \cdot I_2 \cdot A \quad Q_{2d} = 0.23 \quad \text{cfs}$$

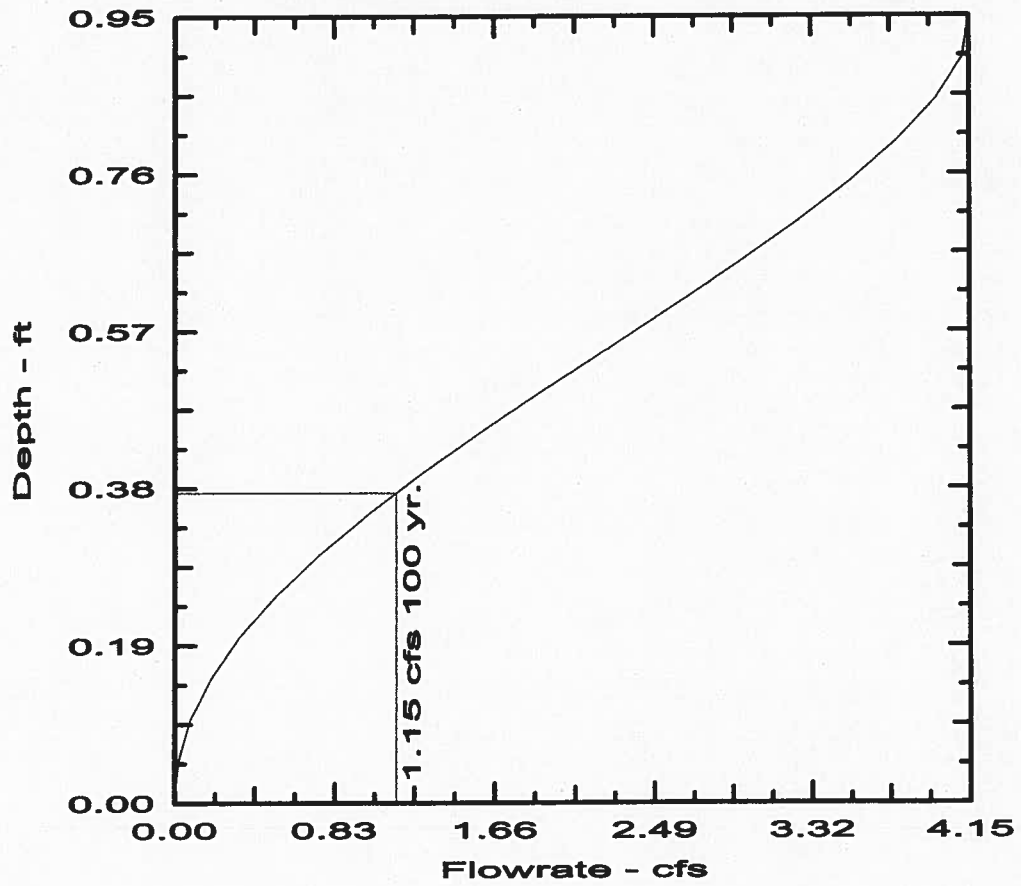
$$Q_{100d} := C_{100d} \cdot I_{100} \cdot A \quad Q_{100d} = 1.15 \quad \text{cfs}$$

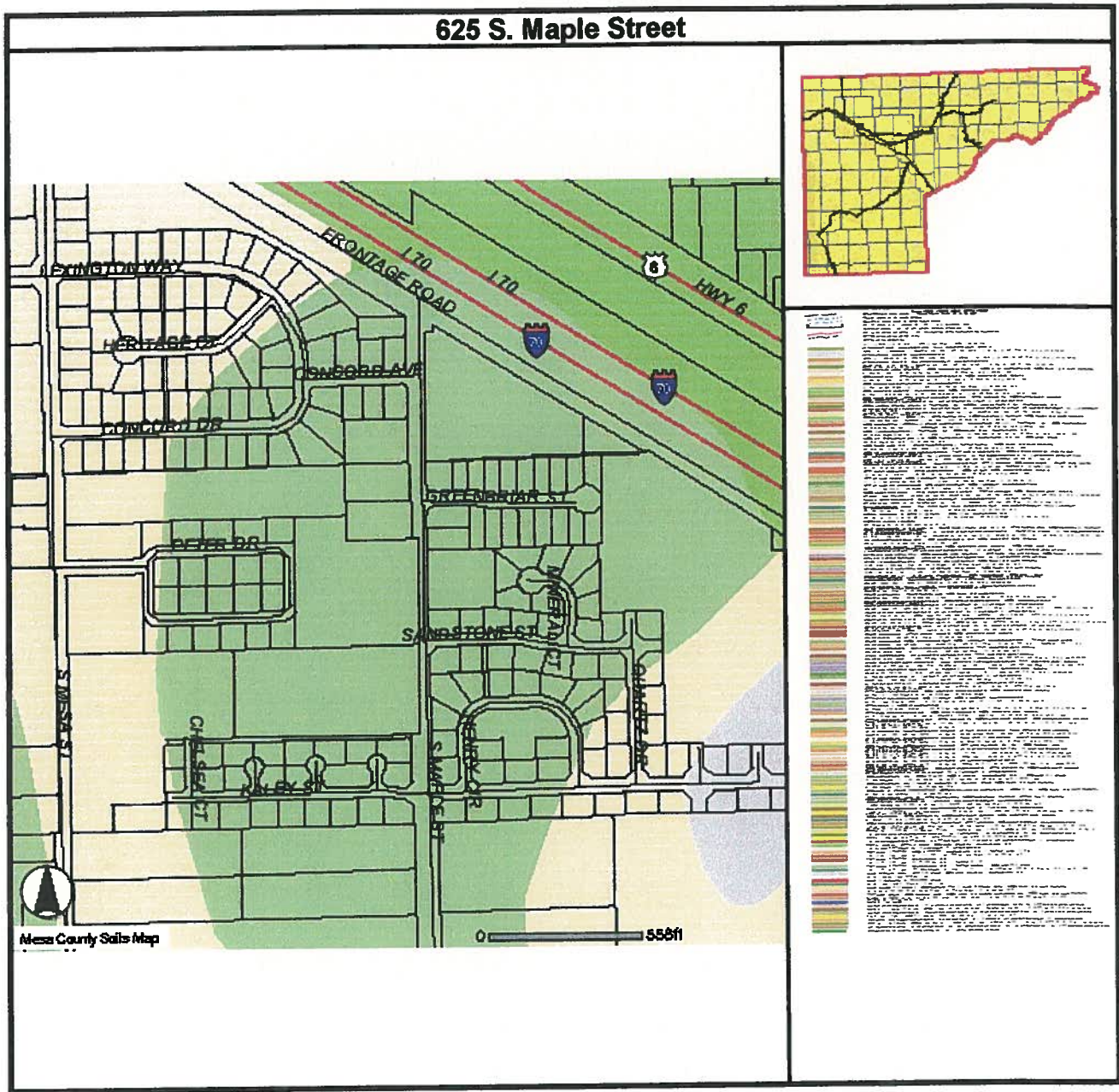
07-11-03

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## SD PIPE RATING CURVE

DIA. = 12"  
S = 0.01  
"n" = 0.012





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