

**FINAL DRAINAGE REPORT FOR:  
*CLEAR SKYE, LLC 722 WEST OTTLEY AVE.***

Fruita , Colorado

April 19, 2022

Prepared By:

Atkins and Associates

885 Summer Breeze Court

Grand Junction, CO 81501

970-261-2807

Prepared For:

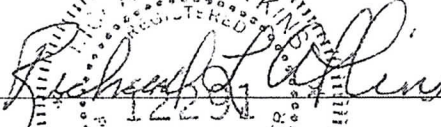
SCOTT EMSLEY

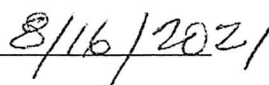
803 Sabil Drive

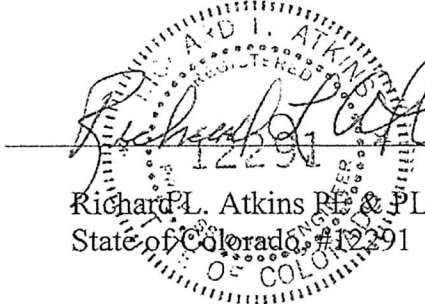
Fruita, CO 81521

970-270-4161

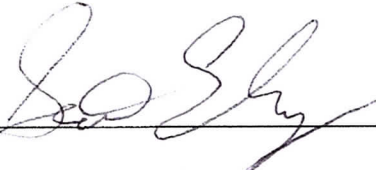
I hereby certify that this Final Drainage Report for the design of **722 West Ottley Ave.** Fruita, Colorado was prepared under my direct supervision in accordance with the provisions of the Stormwater Management Manual for the owners thereof. I understand that the City of Fruita does not and will not assume liability for drainage facilities designed by others.

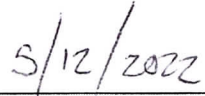
  
\_\_\_\_\_  
Richard L. Atkins R.E. & PLS  
State of Colorado #12291

  
\_\_\_\_\_  
Date



I, Scott Emsley, hereby certify that the drainage facilities for **722 West Ottley Ave.** shall be constructed according to the design presented in this report. I understand that the City of Fruita does not and will not assume liability for the drainage facilities designed and/or certified by my engineer. I understand that the City of Fruita reviews drainage plans but cannot, on behalf of **722 West Ottley Ave.** guarantee that final drainage design review will absolve Scott Emsley and/or their successors and/or assigns of future liability for improper design. I understand that approval of the Site Plans does not imply approval of my engineer's drainage design.

  
\_\_\_\_\_  
Scott Emsley

  
\_\_\_\_\_  
Date

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## **I. General Location and Description**

The site selected for the Clear Skye development consists of a single parcel of land that is .93 acres. The site is located at 722 Ottley in Fruita, Colorado. The parcel of land is described as: LOT 5 BLK 1 DOWNER SUB FIL NO 2 SEC 18 1N 2W. The Mesa County Assessor has given the property the following parcel number: 2697-181-01-005. The City of Fruita has designated the area as Community Residential. This development is owned by Clear Skye developers. The site is occupied by a single family home. Current access is made off of Ottley along the western side of the parcel. A new access point will be created and the existing access vacated. Along the North side of the property there are all required utilities for the proposed development in a 7 foot utility easement. There is a 10 foot utility easement along the eastern boundary. Stormwater will be handled through drainage microbasins having the appropriate carrying and storage capacity. This proposal is to build and attach additional units to create a 4-plex unit with associated parking/garages. The site has no wetlands, no surface waters, no unusual topography, and slopes 0.9% towards the southwest.

### **Site and Major Basin Description**

The site under concern is rectangular in shape; approximately 270 feet in length and 150 feet in width. The primary land use evident on the property is: fallow irrigated land. Ground cover is weedy with some pasture grasses evident. The topography of the site is: flat. Slopes on the property average less than one percent from the north towards the south. A vertical distance of one foot drop is from North to South of the property. The mean elevation of the property is 4495.0 feet above sea level.

<b>GENERALIZED SOILS TABLE</b>								
<b>SYMBOL</b>	<b>DESCRIPTION</b>	<b>DRAINAGE CLASS</b>	<b>PERMEABILITY</b>	<b>SHRINK/SWELL POTENTIAL</b>	<b>MIN. WATER TABLE DEPT</b>	<b>RUNOFF CLASS</b>	<b>SALINITY</b>	<b>HYDROLOGIC GROUP</b>
BcS	Sagers silty clay loam, Saline 0 – 2% Slopes	Well	Moderate To Slow	Moderate	> 6 ft.	Med.	Strong	B

## **II. Existing Drainage Conditions**

### **Major Basin Drainage Description**

#### **Site Drainage Description**

Stormwater generated on-site (Basin A1), (Basin A2) and (Basin A3) is carried on the surface and conveyed by a drainage swale to the west side of the property. The runoff is conveyed in a drainage easement and discharges eventually into the Colorado River.

County is referenced to NAVD88.

## **B. Detailed Analysis**

The proposed site plan provides for the ultimate development of 4 single family residential units, and landscaping buffers adjacent to West Ottley Ave. and the east, south and west sides of the property.

### Historic Conditions.

As the project is to be designed with onsite sheet flow discharging at calculated maximum allowable release rates the Historic conditions and associated stormwater runoff is analyzed in this report.

### Proposed Conditions.

The entire site's onsite drainage area (0.93 acres), will drain southwesterly and west by curb and gutter and west by a drainage ditch. The runoff will continue west.

### **Changes in Drainage Patterns:**

There will be no change in drainage patterns.

The developed property will still generally drains from north to south, and then to the southwest corner of the property.

The subject site will be re-graded in a fashion that creates three new sub-basins. In the event of a 100 year frequency flood, the facilities will convey the runoff to the southwest corner of the property.

BASIN A1 – Is the smallest of the consisting of 0.37 acres. Developed stormwater flows will be routed overland towards a drainage swale that will drain down the west side of the property.

BASIN A2 – The area of A2 is 0.44 acres. The drainage from area A2 will be directed to a concrete drive and directed south and then west to a drainage swale.

BASIN A3 – The area of A3 is 0.12 acres. The drainage from A3 will drain south to a drainage easement on the south end of the property.

### **Maintenance Issues**

Access to the property will be via West Ottley. Dedicated street in the City of Fruita.

### **III. Design Criteria and Approach**

#### **General Considerations**

We are not aware of any previous studies performed in this area specific to this site. Other than the limitations created by the 100 year Colorado River flood plain, there are no other known major drainage constraints on the property.

#### **Hydrology**

The criteria used for the preparation of this Final Drainage Study was obtained from Mesa County's *Stormwater Management Manual* dated December 2007.

The Intensity Duration Frequency data (IDF) for use in the Grand Valley shown on Exhibit 4.0 was used for design and analysis.

Times of Concentration were calculated based on the Average Velocities for Overland Flow and Manning's equation to calculate flow velocities.

Peak Discharge flow rates were computed for historic and developed values using the "Rational Method".

In order to maintain the quality of surface storm water that crosses any exposed ground areas resulting from construction, a stormwater management plan has been prepared in accordance with the City of Fruita's criteria.

#### **Hydraulics**

Calculations were performed to analyze the historic and developed 2-year and 100-year storm event. Calculations were also performed to ensure that the proposed facilities have the capacity to handle the 100 year event.

#### **DRAINAGE SWALE WEST SIDE OF GARAGES - Capacity**

The proposed v-pan drain have all been sized for the 100-year frequency. Storm Sewer Pipe Calculations, shows a summary of the pipe calculations for the proposed storm drainage facilities. All calculations assumed a Manning's  $n=0.012$  and hydraulic grade elevations were calculated using the parameters as outlined in the SWMM manual.

$$Q = 1.49/n AR^{2/3}S^{1/2}$$

$$N=.022 \quad A=.93 \text{ ac} \quad R = A/P = 0.17$$

$$S = 0.008 \quad P=8.08'$$

$$Q = 1.70 \text{ CFS}$$

DRAINAGE – According to the Federal Emergency Agency’s Flood Insurance Rate Map (FIRM), the property is located within Zone X, outside the 0.2 percent annual chance floodplain. According to Mesa County’s Geographic Information System, the subject property is located within the lower one percent of the 36.48 square mile Little Salt Wash Basin. The basin lies within the jurisdiction of the Grand Valley Drainage District and is tributary to the Colorado River. A map depicting the location of the site in relationship to the drainage basin can be found on the following page. The site is not adversely affected by flooding from adjacent properties. Stormwater generated on the site is carried on the ground surface to drainage easement on the south end of the property and conveyed to the west in a platted drainage easement.

**Drainage Fee**

The drainage fee for direct discharge has been calculated to be \$ 1,620.45. This fee was calculated according to the SWMM using a composite runoff coefficient of 0.62 for the property area of 0.93 acres. .

Scott Emsley  
 BY: Richard Atkins  
 April 22, 2022

DRAINAGE FEE CALCULATION  
 CLEAR SKY 722 WEST OTTLEY AVE

BASIN DESIGNATION  AND STORM	TOTAL BASIN AREA  (Acres)	C CALC			
		%I-1	A1	%I-2	A2
		Sparsely Vegetated Ground		Gravel Driveways	
<b>Historic Flows</b>					
BASIN A					
100 YR Historic	0.93	0.000	0.903	0.00	0.026
100 YR Developed	0.93	0.000	0.200	0.00	0.000

$$\text{Drainage Fee} = \text{Base Value} * (C_{100d} - C_{100h}) * A^{0.7}$$

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DRAINAGE FEE CALCULATION  
 CLEAR SKY 722 WEST OTTLEY AVE

BASIN DESIGNATION AND STORM	TOTAL BASIN AREA (Acres)	C CALCULATION											
		%I-1	A1	%I-2	A2	%I-3	A3	%I-4	A4	% Impervious			
		Sparsely Vegetated Ground		Gravel Driveways		Landscape/Lawns/ Agriculture		Bldg., Conc. & Pavement				Kcd	Ccd
<b>Historic Flows</b>													
BASIN A													
100 YR Historic	0.93	0.000	0.903	0.00	0.026	1.000	0.000	1.00	0.001	0.001	0.460	0.500	
100 YR Developed	0.93	0.000	0.200	0.00	0.000	1.000	0.220	1.00	0.100	0.480	0.273	0.598	

$$\text{Drainage Fee} = \text{Base Value} * (C_{100d} - C_{100h}) * A^{0.7}$$

The base value for 2021 is \$17450

C100d = 0.598

C100h = 0.500

A = 0.930



FEE = \$ 1,620.45
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The base value for 2021 is \$17450

C100d = 0.598

C100h = 0.500

A = 0.930

FEE =	\$	1,620.45
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#### IV. Results and Conclusion

This Final Drainage Study has been prepared to address site-specific drainage concerns in accordance with the requirements of the City of Fruita, Colorado. The swale on the west side of the garages is placed to have the capacity to intercept the 100-year storm.

The Appendix of this report includes criteria and calculations to support the infrastructure proposed.

#### References

1. Mesa County Stormwater Management Manual (SWMM), City of Fruita, Mesa County, Colorado, December, 2007.
2. Soils Survey, Mesa County, Colorado, USDA, Natural Resources Conservation Service, January 14, 2002.
3. FIRM, Flood Insurance Rate Map, City of Grand Junction, Colorado, Mesa County, Federal Insurance Management Agency, Community Panel Number 080115-0480-C, Map Revised: July 15, 1992.
4. Zoning and Development Code, City of Fruita Zoning and Development Code,
2. FIRM Flood Insurance Rate Map, Mesa County, Colorado and Unincorporated Areas, Map Number 08077C0830F, Panel 830 of 1725, FEMA Federal Emergency Management Agency, Effective Date July 6, 2010.