MEMORANDUM

TO: Jamie Woodworth Foral

FROM: Deron Dircksen, P.E.; Eric Mahoney, E.I.

DATE: July 25, 2025

RE: **Mountain Tots: Storm Drainage Memo**

Introduction

The purpose of this memo is to show that the storm runoff originating from and running through the Mountain Tots site development does not negatively impact the existing and proposed storm sewer infrastructure located on Mount Hope Circle, Hay Meadow Drive, and Whitney Peak Road in Eagle, Colorado.

Previous Studies and Methodology

This memo references the hydraulic calculations and drainage basins from the Harris Kocher Smith Drainage Conformance Letter dated May 16, 2025. The letter utilized the Rational Method per MHFD standards, which is also used by SGM in this memo to produce comparable results.

Hydraulic Calculations

The Mountain Tots site spans three proposed basins analyzed in the HKS report. The basins are identified as D1P, D4P, and D8AP. The proposed site plan (Figure 1) alters these basins. The proposed swale redirects the upper portion of basin D4P into D8AP, and the proposed parking lot redirects an additional area of D4P into basin D1P. Redirecting this stormwater to Mt. Hope Circle and Haymeadow Drive seems like a better stormwater solution than conveying it to the alley to the west.

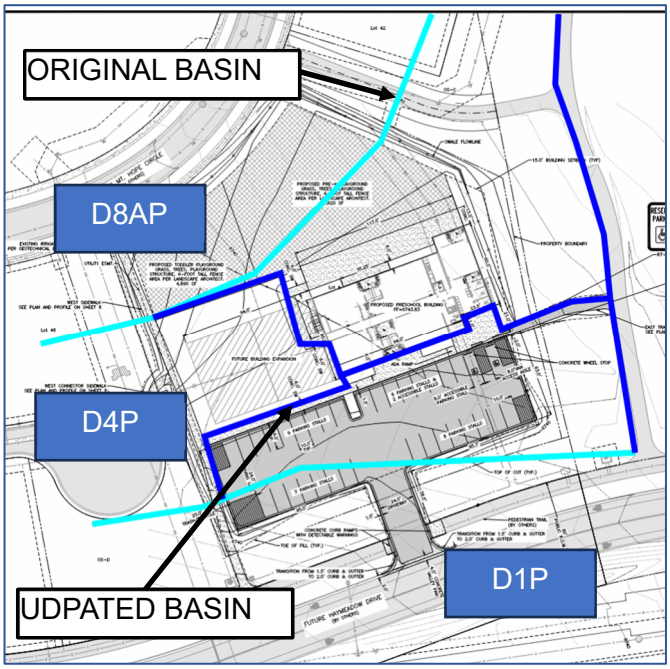

Figure 1

A description of the basins analyzed in this memo is shown in Table 1. Table 1 lists the area and percentage of impervious area as analyzed in the HKS report, as well as the areas and percentage of impervious area as they are modified by the Mountain Tots site, along with 5-, 25-, and 100-year runoff coefficients, per MHFD guidance.

Table 1

	HKS					SGM				
BASIN	AREA	IMP. %	C_5	C_{25}	C_{100}	AREA	IMP. %	C_5	C_{25}	C_{100}
D1P	2.59	49%	0.33	0.60	0.69	3.12	53%	0.47	0.62	0.70
D4P	4.72	32%	0.30	0.50	0.61	1.37	28%	0.26	0.47	0.60
D8AP	2.88	46%	0.42	0.58	0.67	5.76	40%	0.36	0.54	0.65

The upper portion of basin D4P is diverted into basin D8AP. Therefore, the initial overland time (T_i) of 33.9 minutes used by HKS is reduced to 9.8 minutes, assuming a length of 134 ft. and a slope of 5.8%. The updated time of concentration (T_c) for basin D4P is 12.0 minutes.

Results and Conclusions

Table 2 presents the calculated outflows for each basin, for both the 25-year and 100-year storm events. The overall increase in flow for the 25-year is 1.15 CFS, due to the increase in the impervious area from the proposed parking area. However, the 25-year flow of 5.22 CFS does not exceed the capacity of the curb & gutter and will flow to existing inlet D1.

Table 2

BASIN	HKS					SGM				
	AREA	Q_{25}	Q_{100}	I_{25}	I_{100}	AREA	I_{25}	I_{100}	Q_{25}	Q_{100}
D1P	2.59	4.18	6.48	2.72	3.65	3.12	2.71	3.71	5.22	8.12
D4P	4.72	5.57	9.24	2.37	3.19	1.37	3.19	4.29	2.08	3.51
D8AP	2.88	4.11	6.42	2.46	3.31	5.76	2.46	3.30	7.71	12.34

D1P

The flow increases by 1.64 CFS, from 6.48 CFS to 8.12 CFS for the 100-year storm event. The increase in flow can be attributed to the increase in area of the basin, as well as the increase in impervious area due to the proposed parking lot. Basin D1P drains to Design Point 30 (as identified in the HKS report). The total 100-year flow at DP 30 increases from 25.40 CFS to 27.04 CFS (HKS, pg. 95), which is lower than the Back of Walk to Back of Walk Capacity of the roadway of 65.84 CFS and can be conveyed without flooding (HKS, pg. 254).

D4P

The flow from this basin decreases. The flow previously originating from the upper reaches of the basin in the HKS report is now conveyed to basin D8AP via the proposed swale on the Mountain Tots site. Since the flow is decreased, there is no concern regarding the capacity of the alley to convey the runoff.

D8AP

The flow from basin D8AP increases, since it adds the flows from the upper portion of D4P. The 100-year flow increases by 5.92 CFS, from 6.42 CFS to 12.34 CFS. The total flow at DP 25 increases to 24.24 CFS, which is lower than the Back of Walk to Back of Walk Capacity of the roadway of 65.84 CFS and can be conveyed without flooding (HKS, pg. 254).

DP 28 includes the flows from both basin D4P and D8AP. The flow at this point remains approximately equal to what was modeled in the HKS report (0.19 CFS decrease).

While the flows from the individual basins differ between scenarios, the sum of the flows from basins D4P and D8AP does not change significantly. The final outfall from these basins is Pond 1D which is located close to the site approximately 600 linear feet to the west.