November 25, 2014

HYDROPLOT
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Mr. Matthew Rasmussen
2927 Melanie Lane
Ogden, Utah 84403

Re: Drainage Evaluation 2 for Dauphine'-Savoy-Piedmont Subdivision, Lot #2, Ogden, UT

Dear Matt:

HydroPlot has revised the drainage evaluation for Lot #2 of the Dauphine'-Savoy-Piedmont Subdivision in Ogden, Utah to address the County concerns. The drainage evaluation was based on the need to determine the flow rates from various return period storms for an ungauged watershed.

The watershed is located in the foothills of the Wasatch Range just southeast of Ogden, Weber County, Utah. The subject property is positioned on the bench of the Bonneville level of the foot hills at about 6500 Bybee Drive in unincorporated Weber County, Utah. Figure 1 shows the location of the watershed on a USGS base map. The watershed is called Broad Hollow.

The Broad Hollow watershed is relatively undisturbed with a heavily vegetated cover consisting of scrub oak, sage brush, and native grasses and weeds. Soils consist of coarse-grained, sandy, gravelly materials with some silts and very little clay. Most of these soils are derived from alluvial fan and debris flow deposits. Based on these soil gradations, the infiltration rate for these soils is expected to be rapid to vary rapid. Together with the vegetative cover, the runoff potential is low.

Initial runoff flow rates were determined using the methods proposed by Kenney, Wilkowske, and Wright (2007). This study was conducted by the USGS in cooperation with the Utah Department of Transportation and the Utah Division of Water Rights and Water Resources. The method uses regional regression equations to estimate peak flows for ungauged watersheds. The method can be used for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year recurrence or return period events. The regression equations are based on parameters such as the drainage area, area of herbaceous plants, precipitation type, and elevation of the watershed.

Figure 1 shows the site area and the drainage that flows through the Lot #2 area. Table 1 presents the watershed characteristics. Based on these values, the regression estimates for the runoff peak flows for the various return periods are presented in Table 2.

The County raised the concern that the regression estimates were too low and didn't reflect extreme events. Therefore, peak flow estimates were determined using the NRCS curve

is either A or B. Based on the vegetative cover of approximately 60%, the curve number from juniper-sage-grass type vegetation community is estimated to be about 50. Based on the watershed characteristics, the time of concentration was determined to be about 50 minutes. Precipitation depths for the 24-hour events were determined from the NOAA Website. These data are presented in Table 2. Using the triangular hydrograph calculations based on the NRCS curve number runoff relationship, the peak flows were estimated for the various return events. These revised extreme event peak flows are also presented in Table 2.

Based on the regression calculations, the runoff potential from the watershed is somewhat limited, though the long return period storms will result in runoff that will need to be directed away from the proposed residences. The NRCS method peak flows show runoff events that may result from more extreme events, such as rain on frozen ground in early spring. Therefore, for a more conservative event for design purposes, the structures on-site should be designed using the NRCS event flows.

If you have any questions, please give me a call.

Sincerely,

Thomas J. Suchoski, PG
Hydrologist

Enc.: Table 1 and 2, and Figure 1

REGISTERED PROFESSIONAL ENGINEER
NO. 368590
ADAM V. MACKELPRANG
11/25/14
STATE OF UTAH

Ref:
Kenney, T.A., Wilkowske, C.D., and Wright, S.J., 2007, Methods for estimating magnitude and frequency of peak flows for natural streams in Utah: U.S. Geological Survey Scientific Investigations Report 2007-5158, 28 p.

TABLE 1 – Watershed Characteristics

| Parameter | Broad Hollow WS |
|---|---|
| Mean Basin Elevation (ft) | 6010 |
| Drainage Area (sq. mi.) | 0.23 |
| Area covered by Herbaceous plants (%) | 17.2 |
| Area covered by forest (%) | 44.0 |
| Mean Annual Precipitation (in) | 26.6 |
| Average Basin Slope (%) | 60.4 |
| Slopes greater than 30% (%) | 93.9 |

TABLE 2 – Peak Flow Estimates

| Return Period | Broad Hollow WS Regression Peak Flow (cfs) | NOAA Precipitation Depth (in) | NRCS Peak Flow (cfs) |
|---|---|---|---|
| 2-year | 1.06 | 2.45 | 0.34 |
| 5-year | 2.77 | 2.94 | 1.36 |
| 10-year | 4.43 | 3.34 | 4.00 |
| 25-year | 6.64 | 3.91 | 11.18 |
| 50-year | 9.25 | 4.35 | 19.45 |
| 100-year | 11.7 | 4.80 | 30.36 |
| 200-year | 14.7 | 5.26 | 44.10 |
| 500-year | 20.6 | 5.90 | 66.85 |

Broad Hollow Drainage
Weber County, Utah

Matthew Rasmussen
Ogden, Utah

FIGURE 1. Broad Hollow Drainage Location & Topography

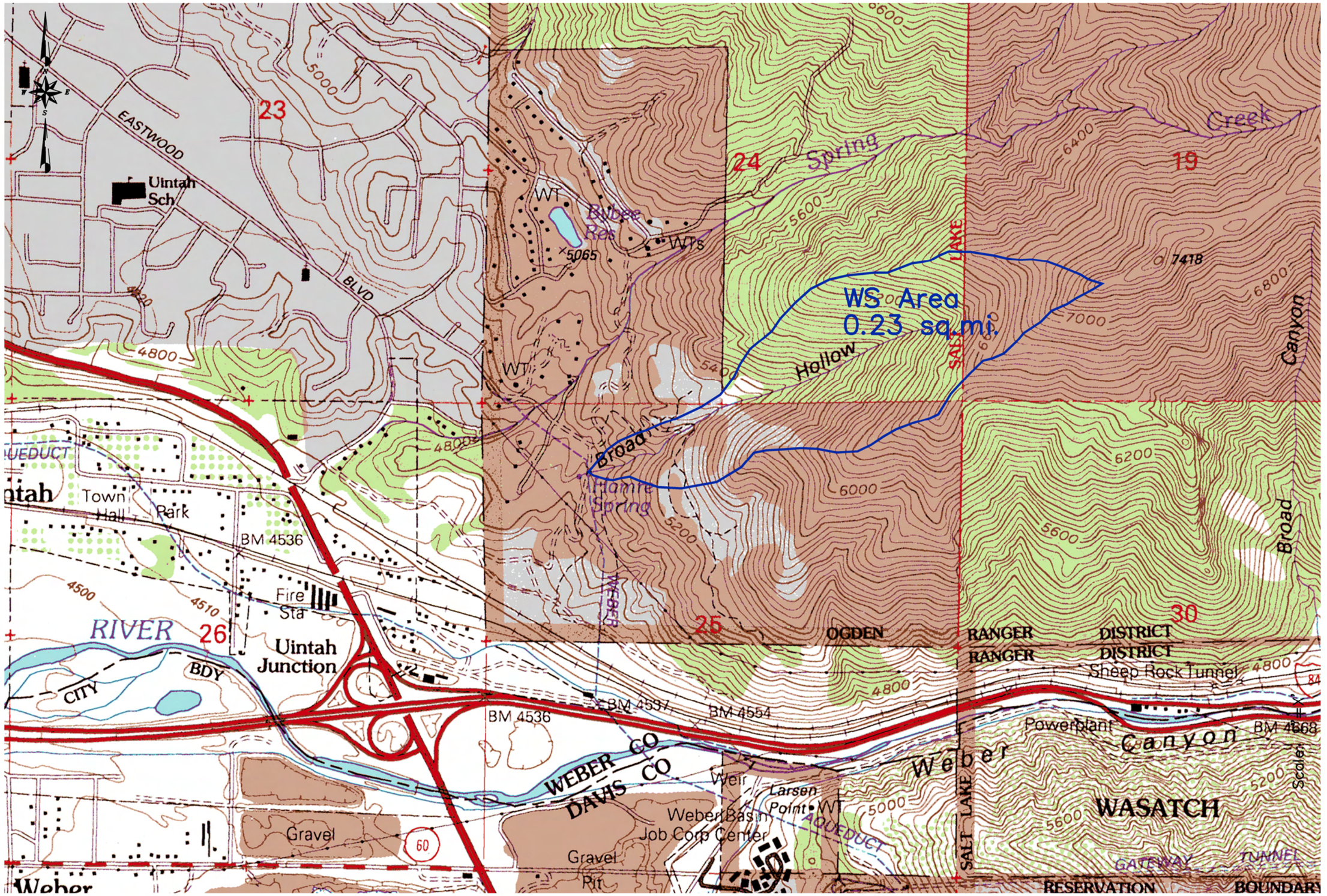


FIGURE 1.DWG, Rasmussen — South Ogden, 9/2014