

# TOWMATE, LLC

## Hydrology Study and Report

Revised 3/26/13

BY:

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3.26.13

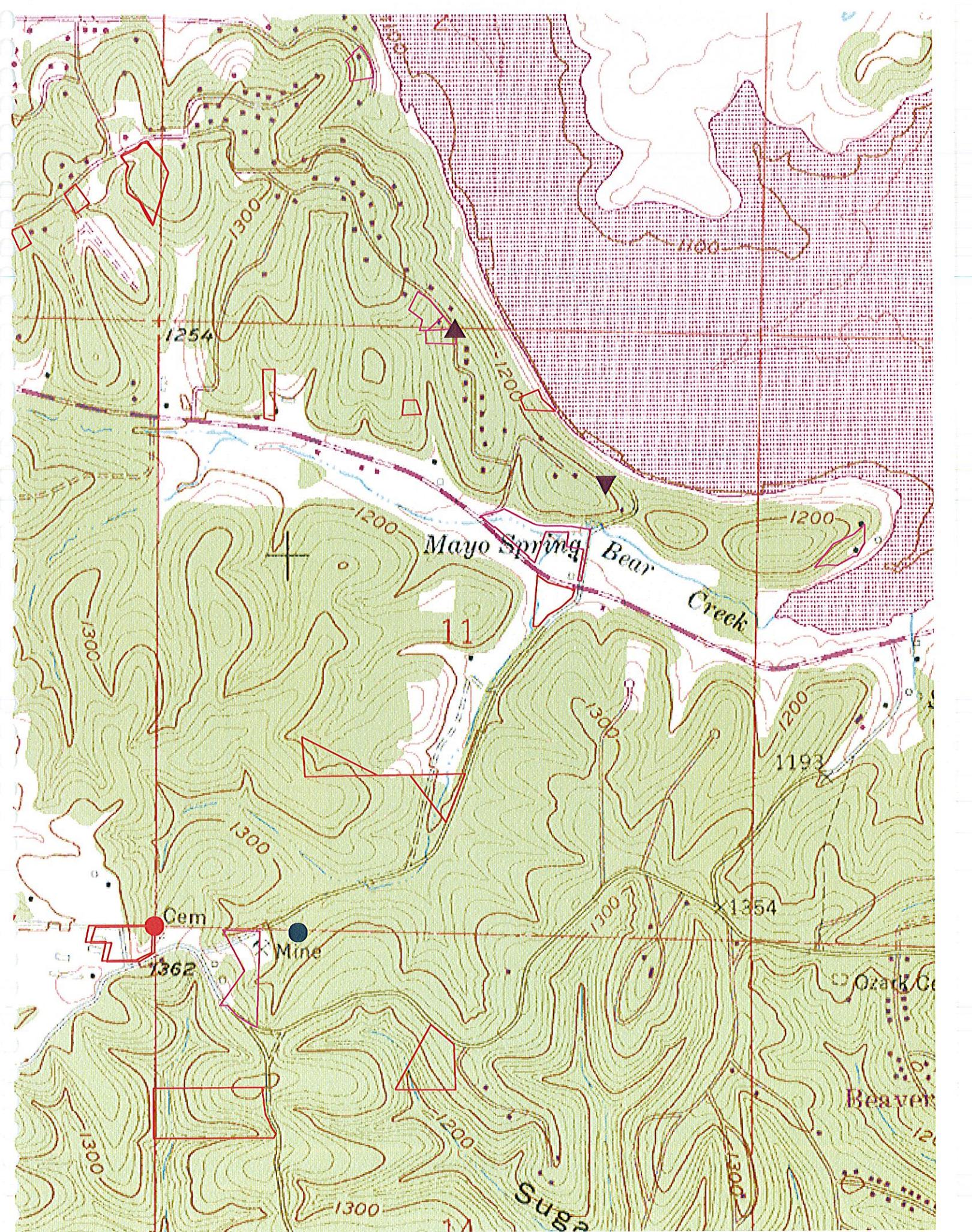
This site study is for a proposed commercial business to be located at 15704 East Hwy 12 in Rogers, Arkansas. The site is in Benton County and under the jurisdiction of the Benton County Planning & Environmental Department. The surveyed parcel is 3.913 acres and the parcel number is 18-03384-006.

The site is undeveloped with grass and few trees mainly along the property lines. It is bounded on the south by State Highway 12, on the west by Putman Lane, on the north by an intermittent dry creek and to the east by other commercial highway properties. The site is fairly flat with average slopes of approximately 2 percent.

Soil for the site is Elsay, gravelly alluvium/silty loam to depths of 60" and more. The soil is Hydrologic Soil Group B.

Offsite drainage from the west and north drains to the existing creek. The highway to the south is higher than the site so no runoff crosses the site from the south except from the approximate highway centerline. There is an existing drainage way on the property to the east which drains to the north, meets another intermittent dry stream and combine to flow to the east into Bear Creek. Bear Creek originate at historic Mayo Spring and flows east into Beaver Lake.

Due to the location of this site in the overall watershed being in the lower reaches it is the opinion of the design engineer that stormwater detention is not in the best interest of sound stormwater management. The site is very close to Beaver Lake. It was decided that the focus be on **stormwater quality**. Therefore, **bioretention** basins have been incorporated into the design to help filter and infiltrate the developed runoff. The soils onsite are highly permeable and conducive to infiltration during normal rainfall events.





## TowMate Runoff Calcs

Hydrologic Soil Group B

$T_c$  overland

Elsah soils  
gravelly alluvium

$$T_c = 450' / 2 \text{ fps} = 225 \text{ sec} = 3.8 \text{ mins} \quad \text{Use } \underline{5 \text{ mins}}$$

$$i_{10} = 7.34$$

$$\text{Area} = 3.9 \text{ Acs}$$

### Pre-Developed Runoff

$$C = 0.20$$

$$Q = CiA = (0.20)(7.34)(3.9) = \underline{5.74 \text{ cfs}}$$

### Post-Developed Runoff

$$C_w = (0.20)(3.3 \text{ Ac}) + (0.90)(0.6 \text{ Ac}) = 1.20 / 3.913 = 0.31$$

$$Q = CiA = (0.31)(7.34)(3.9) = \underline{8.90 \text{ cfs}}$$

### Basin to Bio-Retention

0.77 Ac Total    0.17 Ac Pervious    0.60 Ac Impervious

$$T_c = 5 \text{ mins} \quad C_w = 0.75$$

$$Q_{\text{pre}} = (0.20)(7.34)(0.77) = 1.13 \text{ cfs}$$

$$Q_{\text{post}} = (0.75)(7.34)(0.77) = 4.24 \text{ cfs} \quad 3.11 \text{ cfs increase}$$

# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 26 2013, 10:27 AM

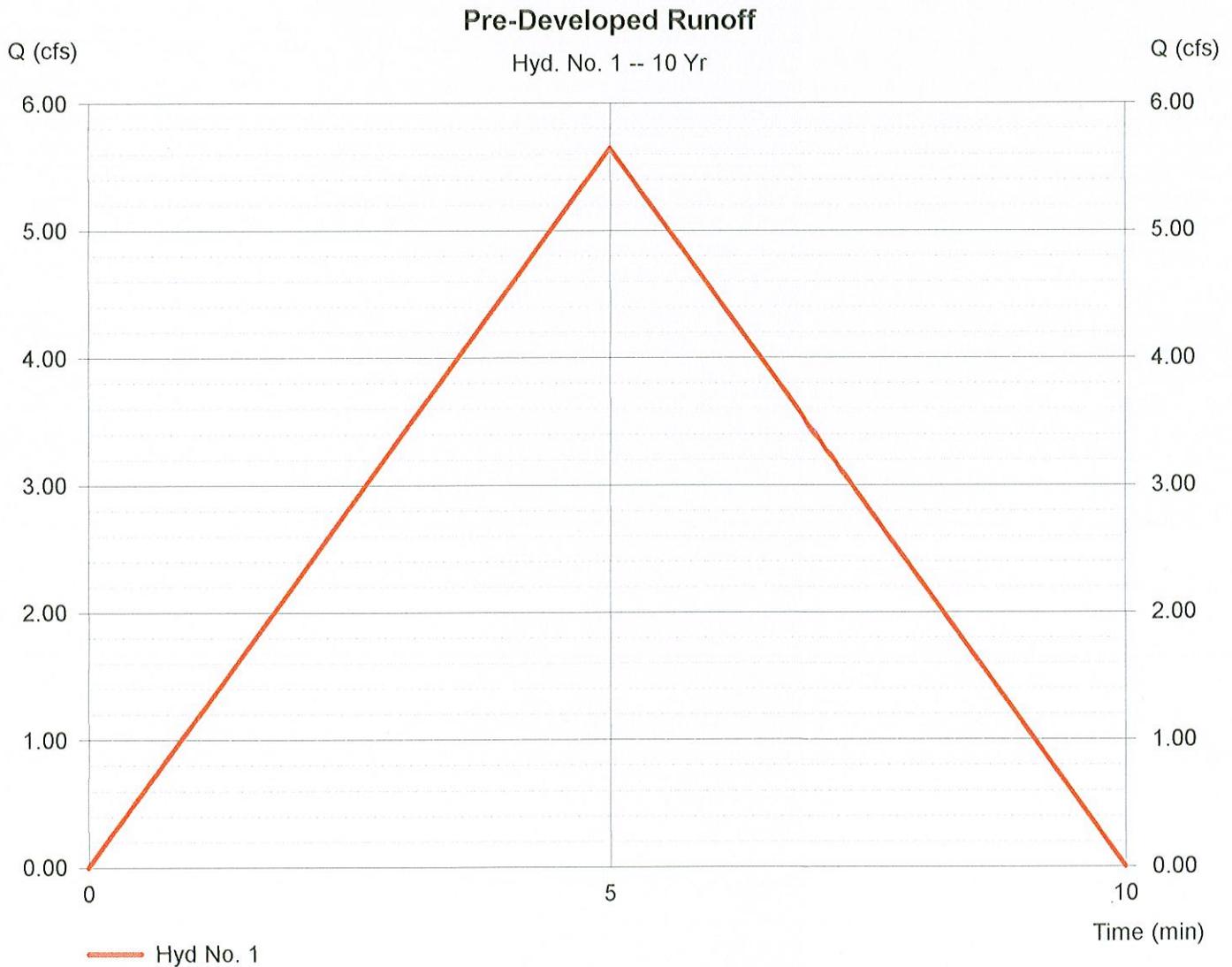
## Hyd. No. 1

### Pre-Developed Runoff

Hydrograph type = Rational  
Storm frequency = 10 yrs  
Drainage area = 3.900 ac  
Intensity = 7.238 in/hr  
IDF Curve = SampleFHA.idf

Peak discharge = 5.65 cfs  
Time interval = 1 min  
Runoff coeff. = 0.2  
Tc by User = 5.00 min  
Asc/Rec limb fact = 1/1

Hydrograph Volume = 1,694 cuft



# Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Mar 26 2013, 10:35 AM

## Hyd. No. 1

### Post-Developed Runoff

Hydrograph type = Rational  
Storm frequency = 10 yrs  
Drainage area = 3.900 ac  
Intensity = 7.238 in/hr  
IDF Curve = SampleFHA.idf

Peak discharge = 8.75 cfs  
Time interval = 1 min  
Runoff coeff. = 0.31  
Tc by User = 5.00 min  
Asc/Rec limb fact = 1/1

Hydrograph Volume = 2,625 cuft

