

Water Balance Calculations

JOB: TD Bank
LOCATION: 408 Edgell Road, Acton, MA
BY:MBM

$$P = DRO + ET + I$$

P = Mean Annual Precipitation (Attached) = 44" / year
ET = Evapotranspiration Potential (Attached) = 21" / year
DRO = Direct Runoff
I = Infiltration

Existing Condition:

DRO = Direct Runoff - Calculated with Hydrocad Output - 2 yr storm frequency - Acre-feet
0.198 Af

Express DRO as % of total P for Watershed - Total Existing Drainage Area

$$\text{Total runoff (Af) / (Exist. Drain Area x 2 yr rainfall, 24 hour storm (3.1"))} = 0.198 / (1.55 \text{ Ac} \times 3.1 \text{ inch} / 12)$$
$$= 0.49 \quad \text{Therefore 49\% of rainfall will become direct runoff in existing condition}$$

DRO = Total rainfall (44") x 49% Total P which becomes runoff
DRO = 21.56 in / yr Therefore 21.6" of direct runoff per year for existing site
ET = 21.0 in / yr Therefore 21" of evapotranspiration per year for existing site
P = 44.0 in / yr Therefore 44" per year of precipitation for existing site

$$I = P - DRO - ET \quad 1.4 \text{ inches infiltrated per year in existing condition}$$

Proposed Condition:

DRO = Direct Runoff - Calculated with Hydrocad Output - 2 yr storm frequency - Acre-feet
0.154 Af

Express DRO as % of total P for Watershed - Total Existing Drainage Area

$$= \text{Total runoff (Af) / (Exist. Drain Area x 2 yr rainfall, 24 hour storm (3.1"))} = 0.154 / (1.55 \text{ Ac} \times 3.1 \text{ inch} / 12)$$
$$= 0.38 \quad \text{Therefore 38\% of rainfall will become direct runoff in proposed condition}$$

DRO = Total rainfall (44") x % Total P which becomes runoff
DRO = 17 in / yr
ET = 21.0 in / yr Therefore 21" of evapotranspiration per year for existing site
P = 44.0 in / yr Therefore 44" per year of precipitation for existing site

$$I = P - DRO - ET \quad 6.1 \text{ inches infiltrated per year in proposed condition}$$

Greater Infiltration in Proposed Condition due to :
- Improved landcover; patchy grass areas planted with good grass
- Runoff collected and infiltrated by above ground infiltration / detention basin