

## 2-YR MONITORING OF SEDIMENT AND PHOSPHORUS REMOVAL FOR V2B1 MODEL 9 IN WAYZATA, MN

### THIRD PARTY RESPONSIBLE FOR MONITORING AND EVALUATION OF DATA

- Bonestroo, Rosene, Anderlik, & Associates were responsible for sizing, layout, monitoring, and data evaluation for the V2B1 stormwater treatment system. This Engineer/Architect firm has a staff of approximately 400 with Minnesota offices located in St. Paul, St. Cloud, Rochester, and Willmar. Other offices are located in Mequon, WI and Grayslake, IL.
- A summary of the 10-page Engineering Report is given below.

### SITE DESCRIPTION

- In September of 1999 a V2B1 Model 9 (7-ft diameter swirl chamber with 63" deep sediment sump) was installed in parallel to the new Walker Avenue drainage system. This layout was intended to allow flow from major storm events to bypass the V2B1.
- The tributary drainage area consisted of 6.5 acres of commercial/high density residential development with discharge to Lower Lake Minnetonka.

### POLLUTANT WASHOFF EVENTS

- From September 1999 to November 2001 there were 167 precipitation events (including snowfall). None of the events exceeded the one-year storm. All of the stormwater runoff is assumed to have passed through the V2B1.
- Total precipitation over 2 years was 60.5 inches (long term average for 2 years = 60.0 inches).

### SEDIMENT REMOVAL BY THE V2B1

- Approximately 10,700# of sediment were retained = 800#/acre-yr
- Based on published values for urban runoff, the tributary area was expected to generate sediment washoff of 200-500#/ac-yr. Winter application of sand and salt may have been larger than normal due to unusually cold weather and hilly terrain. Construction activity in the tributary area is believed to have also contributed to the mass of sediment washoff
- Sediment removal efficiency is estimated as >70% assuming sediment washoff = 1100#/ac-yr.
- Sediment pile depth varied from 36" to 63" before pumpout.
- Retained sediment was approximately 90% sand and 10% silt/clay.

### PHOSPHORUS REMOVAL BY THE V2B1

- Retained sediment phosphorus content was approximately 250 ppm (wt)
- Phosphorus retained is estimated at 0.20#/ac-yr
- Phosphorus removal efficiency is estimated as 24% assuming phosphorus washoff = 0.92#/ac-yr

### ENVIRONMENT 21 NOTES:

- (1) This system was approximately 20% undersized relative to current Environment 21 sizing guidelines which recommend a V2B1 Model 11 (8-ft diameter swirl chamber) to treat a highly impervious 6.5 acre site.
- (2) Sediment storage factor for V2B1 is estimated as 50# sediment /cf sump.