
**Cole** *and* ASSOCIATES INCORPORATED

APPROVED 9/11/07 RKC

# Storm Water Management Report

## Sediment Trap "C"

## Preston Woods Phase II

STATE OF MISSOURI
JOHN F. HARSHBARGER
NUMBER E-29716
REGISTERED PROFESSIONAL ENGINEER
8/22/07

| | |
|---|---|
| Prepared For: | The Jones Company Homes<br>16640 Chesterfield Grove<br>Suite 160<br>Chesterfield, MO 63005 |
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| Date: | August 22, 2007 |
| Job #: | 07-0041 |

# Sediment Trap C – Universal Soil Loss Calculations

Soil Loss (Tons/ac/yr) = A = R x K x (LS) x C x P

R = Rainfall Erosion Index = 220 (from Fig. 17.13)
K = Soil Erodibility Factor = 0.28 (Silty Clay- Table 17.6)

LS = Length – Slope Factor = $\left(\frac{L}{72.6}\right)^m\left(\frac{430x^2+30x+0.43}{6.574}\right)$

ADJ Factor

(0.58) Segment 1: L=100LF M=0.3, X=0.020

$$LS_1=\left(\frac{100}{72.6}\right)^{0.3}\left(\frac{430(0.02)^2+30(0.02)+0.43}{6.574}\right)$$

$LS_1$ = 0.20

(1.06) Segment 2: L=486LF M=0.3, X=0.020

$$LS_2=\left(\frac{486}{72.6}\right)^{0.3}\left(\frac{430(0.02)^2+30(0.02)+0.43}{6.574}\right)$$

$LS_2$ = 0.32

(1.37) Segment 3: L=31LF M=0.5, X=0.3333

$$LS_3=\left(\frac{31}{72.6}\right)^{0.5}\left(\frac{430(0.33)^2+30(0.33)+0.43}{6.574}\right)$$

$LS_3$ = 5.68

$$LS=\left(\frac{(0.58)(0.20)+(1.06)(0.32)+(1.37)(5.68)}{3}\right)$$

LS = 2.75

C = Cover Factor = 1.0 (For Construction Sites-Table 17.9)
P = Erosion Control Practice Factor = 1.3 (Table 17.10)
A = (220)(0.28)(2.75)(1.0)(1.3)
= 220.22 Tons/ac/yr

Unit Weight of Soil = 120 lbs/CF
Watershed Acreage = 11.36Acres

Volume of Soil Lost = $(220.22 Tons/ac/ty)(11.36 ac)\left(\frac{2000 lbs/ton}{120 lbs/cf}\right)$

= 41,695 cf/yr

Max. Storage Elevation = $\frac{71{,}371 - 41{,}695}{71{,}371 - 34{,}748} = \frac{590 - x}{590 - 588}$

x = 588.38

# Sediment Trap C Storage Calculations

Peak Runoff Rate

| | | | |
|---|---|---|---|
| | Q | = | CiA |
| | C | = | 0.5 (50% from Subsection B, Exhibit 2) |
| | i | = | 2.86 (6 month design for Sediment Basin taken from subsection C, Exhibit 3) |
| | A | = | 11.36ac (disturbed) |
| | Q | = | (0.5) (2.86) (11.36) |
| | Q | = | 16.24cfs (disturbed) |
| | | | |
| | A | = | 7.30ac (not disturbed) |
| | Q | = | (0.10) (2.86) (7.30) |
| | Q | = | 2.09cfs (not disturbed) |
| | | | |
| | A | = | 11.33 ac (off-site) |
| | Q | = | (0.50)(2.86)(11.33ac) |
| | Q | = | 16.20cfs (off-site) |
| | | | |
| | Q | = | (16.24) + (2.09) + (16.20) |
| Total | Q | = | 34.53cfs |

Total Runoff Volume

| | | | |
|---|---|---|---|
| | VR | = | P x C x A x 3630 |
| | P | = | 2.03 (6 month Basin design taken from Subsection D, Exhibit 4) |
| | C | = | 0.50 (50% from Subsection B, Exhibit 2) |
| | A | = | 11.36ac (disturbed) |
| | VR | = | (2.03) (0.50) (11.36) (3630) |
| | VR | = | 41,855 Cubic Feet |
| | | | |
| | A | = | 7.30ac (not disturbed) |
| | VR | = | (2.03) (0.10) (7.30) (3630) |
| | VR | = | 5,379 Cubit Feet (not disturbed) |
| | | | |
| | A | = | 11.33ac (off-site) |
| | VR | = | (2.03)(0.50)(11.33)(3630) |
| | VR | = | 41,745 Cubic Feet (off-site) |
| | | | |
| | VR | = | (41,855) + (5,379) + (41,745) |
| Total | VR | = | 88,979 Cubic Feet |

Total Soil Volume = VS = 41,695cf (per soil loss equation)

Total Soil Volume (V) = VR + VS
= 88,979cf + 41,695cf
= 130,674cf

(See Attached Trap Volume Calculations)

| | | | |
|---|---|---|---|
| Storage Elevation = | 206,966cf – 130,674cf = / 206,966cf – 127,415cf | 594-x / 594-592 | |
| | x | = | 592.08 |
| | Over flow Elevation | = | 592.10 |
| | 10-Year Q = 79.94cfs | | |
| | 10-Year High water Elevation | = | 595.20 |
| | Top of Basin | = | 600.00 |

$$\frac{206{,}966cf - 130{,}674cf}{206{,}966cf - 127{,}415cf} = \frac{594-x}{594-592}$$

(See attached riser inflow curve table for 42" stand pipe)

File.... S:\JOBS\Jobs2007\07-0041_C07-0041\POND PACK\SEDIMENT TRAP C.PPW

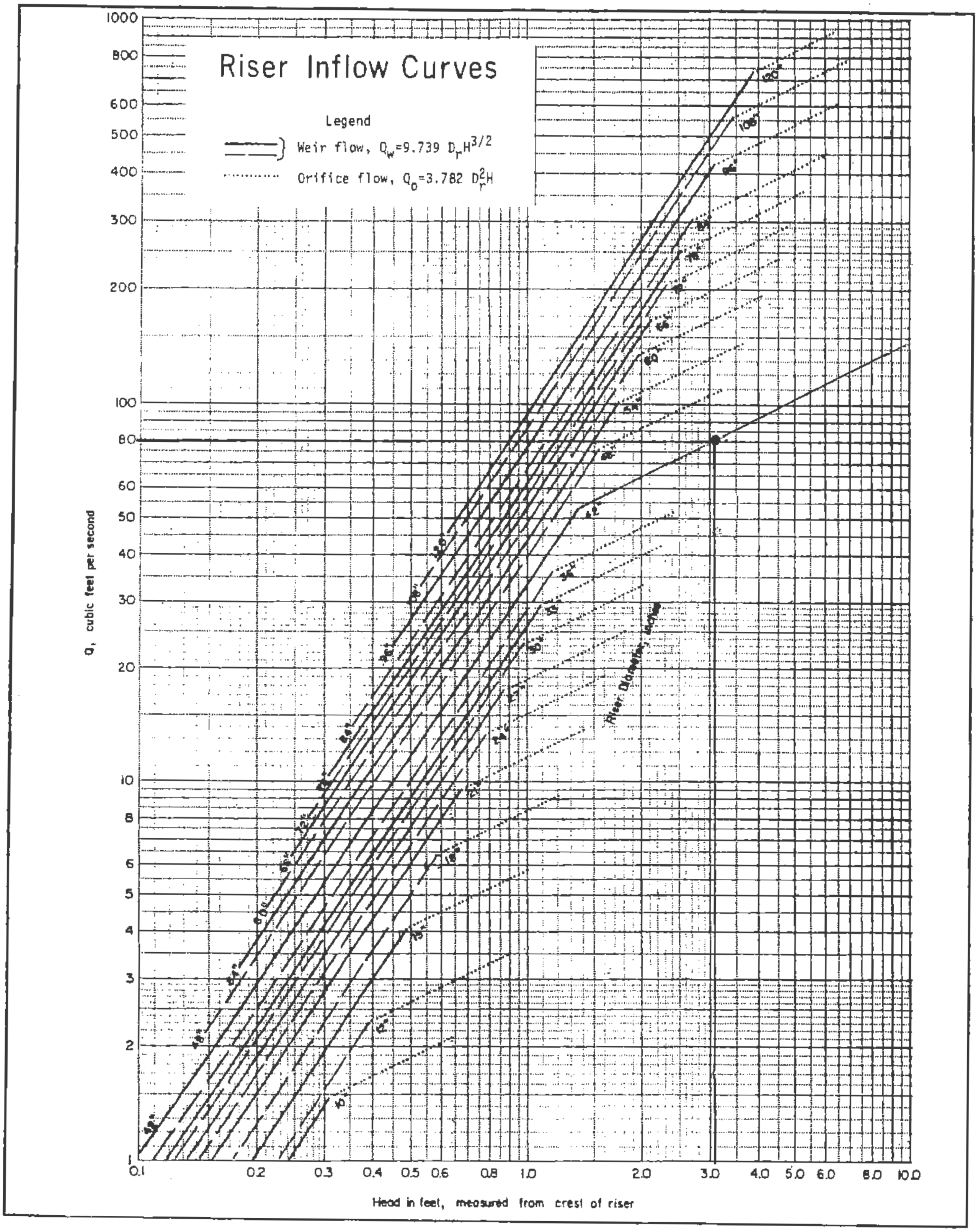
| Elevation (ft) | Planimeter (sq.in) | Area (sq.ft) | A1+A2+sqr(A1*A2) (sq.ft) | Volume (cu.ft) | Volume Sum (cu.ft) |
|---|---|---|---|---|---|
| 581.00 | ----- | 0 | 0 | 0 | 0 |
| 582.00 | ----- | 375 | 375 | 125 | 125 |
| 584.00 | ----- | 2870 | 4282 | 2855 | 2980 |
| 586.00 | ----- | 7727 | 15306 | 10204 | 13184 |
| 588.00 | ----- | 14159 | 32346 | 21564 | 34748 |
| 590.00 | ----- | 22806 | 54935 | 36623 | 71371 |
| 592.00 | ----- | 33584 | 84065 | 56043 | 127415 |
| 594.00 | ----- | 46307 | 119327 | 79551 | 206966 |
| 596.00 | ----- | 60184 | 159283 | 106188 | 313154 |

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2




Source: USDA-SCS

Plate 3.14-8

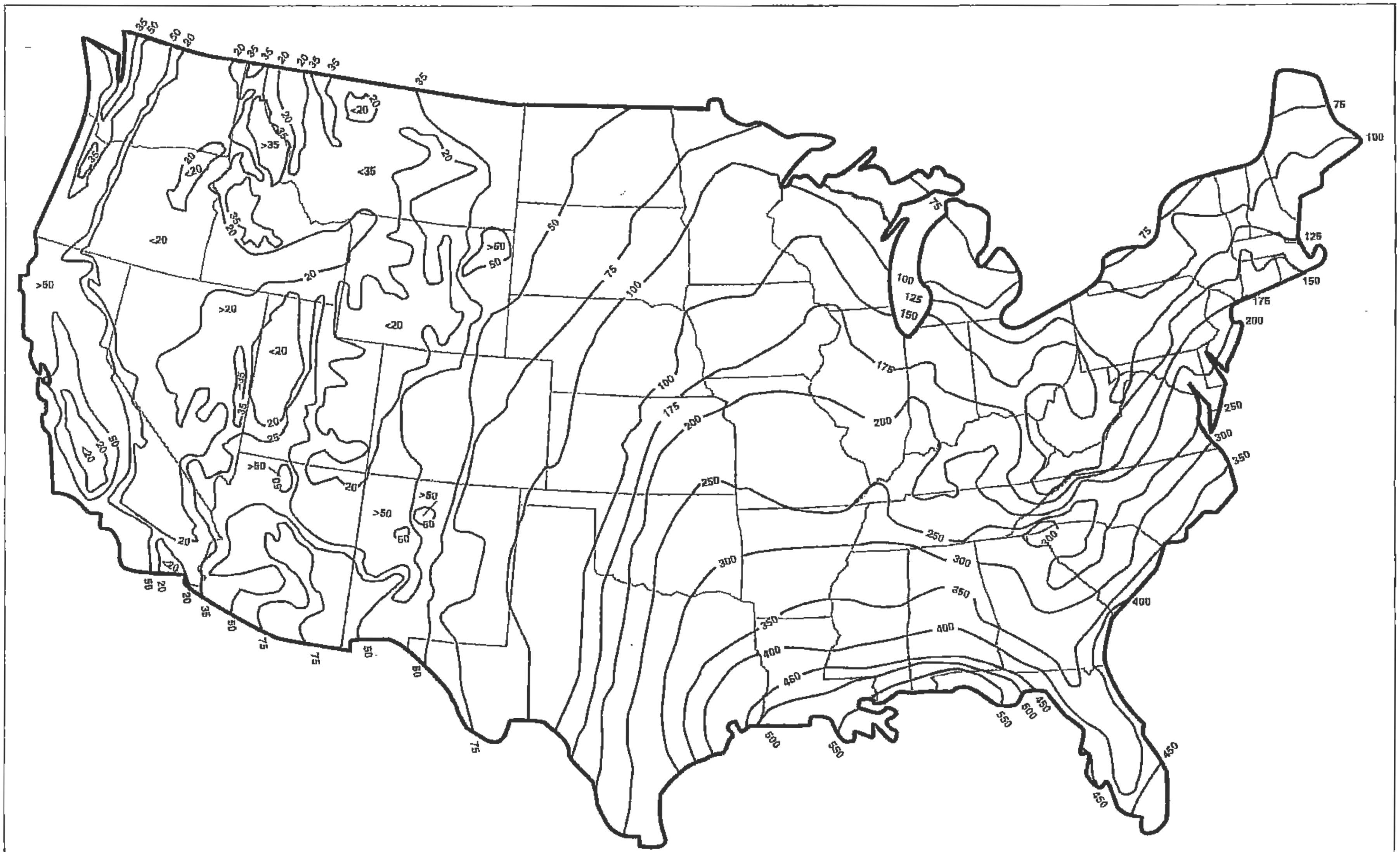



**FIGURE 17.13** Average annual values of the *R* factor. (*Source:* USDA, SCS 1977.)

**TABLE 17.6 K Values for Generalized Soils**

**K VALUES FOR TOPSOIL**

| TEXTURE OF SURFACE LAYER | ESTIMATED K VALUE |
|---|---|
| Clay, clay loam, loam, silty clay | .32 |
| Fine sandy loam, loamy very fine sand, sandy loam | .24 |
| Loamy fine sand, loamy sand | .17 |
| Sand | .15 |
| Silt loam, silty clay loam, very fine sand loam | .37 |

*Source:* Soil Conservation Service, *Water Management and Sediment Control for Urbanizing Areas*, Columbus, Ohio, 1978.

**K VALUES FOR SUBSOIL**

| GENERALIZED SOIL CATEGORY (TEXTURE OF MATERIALS) | ESTIMATED K VALUE OF EXPOSED SUBSOIL MATERIAL |
|---|---|
| A. Outwash soils | |
| Sand | .17 |
| Loamy sand | .24 |
| Sandy loam | .43 |
| Gravel, fine to moderate fine subsoil | .24 |
| Gravel, medium to moderate coarse subsoil | .49 |
| B. Lacustrine soils | |
| Silt loam and very fine sandy loam | .37 |
| Silty clay loam | .28 |
| Clay and silty clay | .28 |
| C. Glacial till | |
| Loam, fine to moderate fine subsoil | .32 |
| Loam, medium subsoil | .37 |
| Clay loam | .32 |
| Clay and silty clay | .28 |
| D. Loess | .37 |
| E. Residual | |
| Sandstone | .49 |
| Siltstone, nonchannery | .43 |
| Siltstone, channery | .32 |
| Acid clay shale | .28 |
| Calcareous clay shale or limestone residuum | .24 |

*Source:* Soil Conservation Service, *Water Management and Sediment Control for Urbanizing Areas*, Columbus, Ohio, 1978.

and $s_1 = 12$, $s_2 = 10\%$, $s_3 = 8\%$, and $s_4 = 5\%$ using equation (17.2). For example, a 12% slope is equivalent to 6.8° (sin 6.8° = .119).

$$(LS)'_{12\%} = \left(\frac{600}{72.6}\right)^{0.5} \times \left(\frac{430(.119)^2 + 30(.119) + 0.43}{6.574}\right) = 4.4 \quad (17.4)$$

Similarly, $(LS)_{10\%} = 3.5$, $(LS)_{8\%} = 2.4$, and $(LS)_{5\%} = 1.4$. From Table 17.7 the weighing factors are 0.50, 0.91, 1.18, and 1.40 and the effective $LS$ is

$$(LS)_e = \frac{4.4(.50) + 3.5(0.91) + 2.4(1.18) + 1.4(1.40)}{4} = 2.5 \quad (17.5)$$

**TABLE 17.7 Factors to Adjust *LS* Chart Values for Successive Segments of a Slope Where the Slope-Length Exponent Equals 0.5.**

| SEGMENT NO. (TOP TO BOTTOM) | NUMBER EQUAL-LENGTH SEGMENTS INTO WHICH THE SLOPE IS DIVIDED FOR EVALUATION OF *LS* | | | |
|---|---|---|---|---|
| | 2 | 3 | 4 | 5 |
| 1 | 0.71 | 0.58 | 0.50 | 0.45 |
| 2 | 1.29 | 1.06 | 0.91 | 0.82 |
| 3 | | 1.37 | 1.18 | 1.06 |
| 4 | | | 1.40 | 1.25 |
| 5 | | | | 1.42 |

*Source:* Soil Conservation Service, *Water Management and Sediment Control for Urbanizing Areas*, Columbus, Ohio, 1978.

### Cover Factor (*C*)

The cover factor is the vegetative cover or the cropping management factor. It is an index of the type of ground cover and the condition of the soil over the area. Specifically, it is a ratio of the soil loss from a specific cover condition to the soil loss from a clean, tilled, fallow condition for the same soil, slope, and rainfall conditions. For denuded construction sites a $C$ factor of 1 is appropriate. This condition is similar to the agricultural definition of continuous fallow, tilled up- and down-slope where $C = 1$. Table 17.8 shows typical C values for undisturbed land. Table 17.9 shows C values for various types of soil covers.

### Erosion Control Practice Factor (*P*)

The erosion control practice factor accounts for ground surface conditions that affect the runoff velocity. Specifically, $P$ is defined as the ratio of soil loss with a given surface condition to soil loss with up-and-down-hill plowing. Such conditions would be contouring, terracing, roughening the soil, sediment basins, and control structures. Table 17.10 shows estimated P values that apply to construction areas.

### Limitations of USLE

The USLE is an empirical equation that was initially developed for agricultural applications. The USLE applies to relatively large homogeneous soil areas and is based on long-term averages of rainfall and soil losses from runoff directly on the slope. It does not estimate deposition, nor does it estimate sediment yield at a downstream location.

Morphological features of agricultural land are different from urbanized developing land. Agricultural land typically is characterized by relatively long, regular, gentle slopes whereas construction sites may have discontinuous and irregular land patterns. The land patterns are a combination of steep slopes, sharp breaks, excavation holes, and mounded piles of excavation soil. Since the USLE measures average annual soil loss, the erosion from the relatively short-term denuding-stabilization sequence typical of a construction site may not be indicative of the value obtained from the USLE. Runoff from an area above a disturbed slope was not a factor in establishing the USLE, yet runoff from upslope areas does occur on construction sites. Therefore, use of the USLE, especially for construction sites, requires the site area to be broken down into homogeneous areas. The USLE is applied to each individual area and the sum is more representative of the soil erosion estimate.

Use of the USLE provides an estimate of a site's erosion potential. Using the USLE to compare different practices at a construction site is appropriate; however, using the USLE to compare one construction site to another is not recommended. The equation does not account for deposition that occurs in the nonhomogeneous, irregular land forms typical of land development projects. Not all sediment eroded from a site can be classified as soil loss relative to the site boundaries. Some soil is redeposited on site from natural deposition.

A revised version of the USLE, the RUSLE, is now available as computer software. The RUSLE, while still using the same terms, incorporates data and additional theory for describing hydrologic and erosion processes not included in the original USLE. The new data and additional theory allow for more refinement for evaluating the terms to suit more specific site conditions. The computer format facilitates the more complex calculations.

Another effort by the U.S. Department of Agriculture (USDA) in conjunction with the Agricultural Research Service (ARS), the Soil Conservation Service (SCS), and the Bureau of Land Management (BLM) has begun to develop new erosion prediction technology to replace the USLE. The computer program resulting from this Water Erosion Project (WEPP) is expected to be available by the later part of 1995.

## 17.7 SEDIMENT TRAPPING FACILITIES

Sediment trapping facilities retain the eroded sediments on site by impounding sediment-laden runoff long enough for the sediment to settle out. Trapping facilities vary in size depending on the estimated runoff draining into the facility, the volume of sediment, and whether they are temporary or permanent. The facilities typically are either sediment traps or sediment basins; the distinction depends on the acreage draining to the facility. Facilities with drainage areas less than about 3 acres are sediment traps (consult local design standards for specific acreage). Larger trapping facilities, sediment basins, are frequently designed as permanent facilities. The location and design of permanent sediment basins are such that they easily convert to retention or detention ponds after the project area is stabilized.

### Sediment Basins

Sediment basins operate by reducing the velocities and turbulence of the runoff to levels where the majority of the

**TABLE 17.8-b *C* Factors for Mechanically Prepared Woodland Sites**

| SITE PREPARATION | MULCH COVER[1] | SOIL CONDITION[2] AND WEED COVER[3] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | EXCELLENT | | GOOD | | FAIR | | POOR | |
| | | NC | WC | NC | WC | NC | WC | NC | WC |
| | *Percent* | | | | | | | | |
| Disked, raked, or bedded[4] | None | 0.52 | 0.20 | 0.72 | 0.27 | 0.85 | 0.32 | 0.94 | 0.36 |
| | 10 | .33 | .15 | .46 | .20 | .54 | .24 | .60 | .26 |
| | 20 | .24 | .12 | .34 | .17 | .40 | .20 | .44 | .22 |
| | 40 | .17 | .11 | .23 | .14 | .27 | .17 | .30 | .19 |
| | 60 | .11 | .08 | .15 | .11 | .18 | .14 | .20 | .15 |
| | 80 | .05 | .04 | .07 | .06 | .09 | .08 | .10 | .09 |
| Burned[5] | None | .25 | .10 | .26 | .10 | .31 | .12 | .45 | .17 |
| | 10 | .23 | .10 | .24 | .10 | .26 | .11 | .36 | .16 |
| | 20 | .19 | .10 | .19 | .10 | .21 | .11 | .27 | .14 |
| | 40 | .14 | .09 | .14 | .09 | .15 | .09 | .17 | .11 |
| | 60 | .08 | .06 | .09 | .07 | .10 | .08 | .11 | .08 |
| | 80 | .04 | .04 | .05 | .04 | .05 | .04 | .06 | .05 |
| Drum chopped[5] | None | .16 | .07 | .17 | .07 | .20 | .08 | .29 | .11 |
| | 10 | .15 | .07 | .16 | .07 | .17 | .08 | .23 | .10 |
| | 20 | .12 | .06 | .12 | .06 | .14 | .07 | .18 | .09 |
| | 40 | .09 | .06 | .09 | .06 | .10 | .06 | .11 | .07 |
| | 60 | .06 | .05 | .06 | .05 | .07 | .05 | .07 | .05 |
| | 80 | .03 | .03 | .03 | .03 | .03 | .03 | .04 | .04 |

[1] Percentage of surface covered by residue in contact with the soil.
[2] *Excellent* soil condition—Highly stable soil aggregates in topsoil with fine tree roots and litter mixed in. *Good*—Moderately stable soil aggregates in topsoil or highly stable aggregates in subsoil (topsoil removed during raking), only traces of litter mixed in. *Fair*—Highly unstable soil aggregates in topsoil or moderately stable aggregates in subsoil, no litter mixed in. *Poor*—No topsoil, highly erodible soil aggregates in subsoil, no litter mixed in.
[3] NC—No live vegetation. WC—75% cover of grass and weeds having an average drop fall height of 20 in. For intermediate percentages of cover, interpolate between columns.
[4] Modify the listed *C* values as follows to account for effects of surface roughness and aging. *First year after treatment:* multiply listed *C* values by .40 for rough surface (depressions > 6 in); by .65 for moderately rough; and by .90 for smooth depressions (< 2 in). *For 1–4 years after treatment:* multiply listed factors by .7.
[5] *For first 3 years:* use *C* values as listed.
(*Source:* USDA, SCS 1977.)

**TABLE 17.9 *C* Factor for Various Quantities of Mulch**

| MULCH ADEQUATELY CRIMPED INTO SOIL | *C* FACTOR |
|---|---|
| Bare area | 1.00 |
| ¼ ton straw mulch per acre | .52 |
| ½ ton straw mulch per acre | .35 |
| ¾ ton straw mulch per acre | .24 |
| 1 ton straw mulch per acre | .18 |
| 1½ ton straw mulch per acre | .10 |
| 2 ton straw mulch per acre | .06 |
| 3 ton straw mulch per acre | .03 |
| 4 ton straw mulch per acre | .02 |

*Source:* Soil Conservation Service, *Universal Soil-Loss Equation*, Agronomy Note #50, Colorado SCS, 1977.

cility. Rainfall–runoff volumes and soil types are highly regionalized. Sizing a sediment basin depends on local municipalities' design standards, which are developed according to regional conditions. In some cases determining the basin's volume may be as uncomplicated as applying a single constant to the drainage area (e.g., 100 cy of required storage volume per drainage acre). This design parameter approximates an upper limit for the amount of sediment expected to be delivered to the facility for the design storm. The assumption here is that the design storm erodes a constant amount of sediment. This blanket value does not consider the soils or topographical features that vary from site to site nor the daily variations of the site conditions. In other cases sizing the basin requires a detailed analysis of the on-site soils and their particle size distribution. This information is then used with USLE or discrete particle settling theory to set the sediment basin size.

**TABLE 17.10 Erosion Control Practice Factor *P* for Construction Sites (Ports, 1973)**

| *Surface Condition With No Cover* | *Factor P* |
|---|---|
| 1. Compact, smooth, scraped with bulldozer or scraper up and down hill | 1.30 |
| 2. Same as above, except raked with bulldozer root, raked up and down hill | 1.20 |
| 3. Compact, smooth, scraped with bulldozer root, raked across the slope | 1.20 |
| 4. Same as above, except raked with bulldozer root, raked across the slope | 0.90 |
| 5. Loose, as in a disked plow layer | 1.00 |
| 6. Rough irregular surface, equipment tracks in all directions | 0.90 |
| 7. Loose with rough surface greater than 12-inch depth | 0.80 |
| 8. Loose with smooth surface greater than 12-inch depth | 0.90 |
| *Structures* | |
| 1. Small sediment basins: | |
| 0.04 basin/acre | 0.50 |
| 0.06 basin/acre | 0.30 |
| 2. Downstream sediment basins | |
| with chemical flocculants | 0.10 |
| without chemical flocculants | 0.20 |
| 3. Erosion control structures | |
| normal-rate usage | 0.50 |
| high-rate usage | 0.40 |
| 4. Strip building | 0.75 |

(*Source:* SWMM Users Manual which references *Use of the Universal Soil Loss Equation as a Design Standard*, ASCE Water Resources Engineering Meetings, Washington, D.C. 1973. Reprinted with permission from ASCE.)

### Discrete Particle Settling Theory

A discrete particle is one that does not change in size, shape, or weight as it settles. Discrete particle settling theory describes the settling behavior of particles in an ideal basin in quiescent water. Particle settling in such ideal conditions depends only on fluid properties and particle characteristics. Interaction between particles is assumed to be negligible.

A particle settling in a quiescent fluid accelerates under the influence of gravity until the driving force of gravity is balanced by the resisting drag force. At this point the particle's terminal velocity is a maximum and remains constant during the remainder of the falling distance. The terminal settling velocity, $v_s$, for a spherical particle is

$$v_s = \sqrt{\frac{4g(\rho_p - \rho_w)d_p}{3C_D\rho_w}} \tag{17.6}$$

where $\rho_p$ = density of the spherical particle (kg/m³), $\rho_w$ = density of water (kg/m³), g = acceleration due to gravity (m/s²), $C_D$ = coefficient of drag for the particle and $d_p$ = diameter of the particle (m).

The drag coefficient $C_D$ is approximated by

$$C_D = \frac{24}{N_R} \quad \text{for} \quad N_R < 1 \tag{17.7}$$

$$C_D = \frac{24}{N_R} + \frac{3}{N_R} + 0.34 \quad \text{for} \quad N_R \geq 1$$

where $N_R$, the dimensionless Reynolds number, is

$$N_R = \frac{v_s d_p \rho_w}{\mu} \tag{17.8}$$

with $\mu$ = the absolute viscosity of water. Note that when $N_R$ is less than 1, the settling velocity for a sphere reduces to

$$v_s = \frac{g(\rho_p - \rho_w)d_p^2}{18\mu} \tag{17.9}$$

which is Stoke's Law for the settling velocity of a sphere in laminar flow. This can be reduced to

$$v_s = 2.8d_p^2 \tag{17.10}$$

where $v_s$ is in feet per second and $d_p$ is in millimeters, assuming the specific gravity of the particle = 2.75 and a water temperature of 70°F.

An idealized rectangular settling basin (figure 17.14) consists of four zones: the inlet zone, the removal zone, the outlet zone, and the settling zone. The length $L$ is the distance between the inlet and outlet zones, $H$ is the depth of the settling zone, and $W$ is the basin width. Under such idealized conditions the incoming flow $Q_i$ is steady and constant for the width of the basin. Particles in the incoming flow move horizontally through the basin with a horizontal velocity $v_h = Q_i/(WH)$. The vertical velocity component is the settling velocity, $v_s$.

The design of an effective settling basin is such that an incoming particle travels the vertical height $H$ and settles out before it travels the horizontal length $L$ and is discharged. At or below the distance $H$ the particle is in the settling zone and is considered removed from suspension. The time $T_L$ for the particle to travel the horizontal length $L$ of the basin is given as

$$T_L = \frac{L}{Q_i/(W \times H)} \tag{17.11}$$

The time to travel the height $H$ is

$$T_H = \frac{H}{v_s} \tag{17.12}$$

# HYDROLOGIC GROUP RATING FOR ST CHARLES COUNTY, MISSOURI


USDA Natural Resources Conservation Service

Web Soil Survey 1.1
National Cooperative Soil Survey

2/27/2007

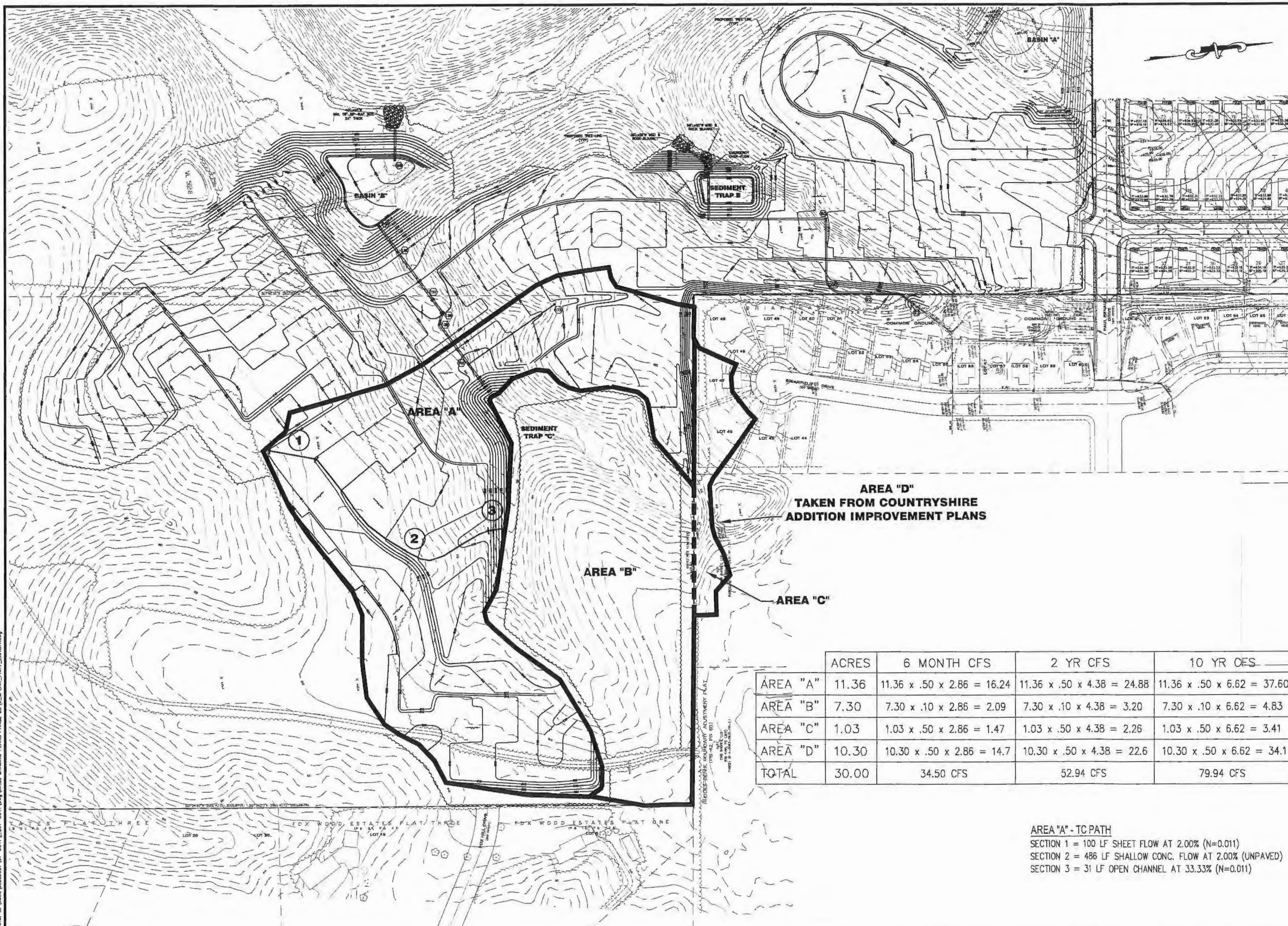
undrained areas. Only soils that are rated D in their natural condition are assigned to dual classes.

# Parameter Summary - Hydrologic Group

Aggregation Method: Dominant Condition

Component Percent Cutoff:

Tie-break Rule: Lower




| | ACRES | 6 MONTH CFS | 2 YR CFS | 10 YR CFS |
|---|---|---|---|---|
| AREA "A" | 11.36 | 11.36 x .50 x 2.86 = 16.24 | 11.36 x .50 x 4.38 = 24.88 | 11.36 x .50 x 6.62 = 37.60 |
| AREA "B" | 7.30 | 7.30 x .10 x 2.86 = 2.09 | 7.30 x .10 x 4.38 = 3.20 | 7.30 x .10 x 6.62 = 4.83 |
| AREA "C" | 1.03 | 1.03 x .50 x 2.86 = 1.47 | 1.03 x .50 x 4.38 = 2.26 | 1.03 x .50 x 6.62 = 3.41 |
| AREA "D" | 10.30 | 10.30 x .50 x 2.86 = 14.7 | 10.30 x .50 x 4.38 = 22.6 | 10.30 x .50 x 6.62 = 34.1 |
| TOTAL | 30.00 | 34.50 CFS | 52.94 CFS | 79.94 CFS |

AREA "A" - TC PATH

SECTION 1 = 100 LF SHEET FLOW AT 2.00% (N=0.011)
SECTION 2 = 486 LF SHALLOW CONC. FLOW AT 2.00% (UNPAVED)
SECTION 3 = 31 LF OPEN CHANNEL AT 33.33% (N=0.011)

REVISIONS

| DATE | DESC. |
|---|---|

DEVELOPER/OWNER:
THE JONES COMPANY HOMES, L.L.C.
16640 CHESTERFIELD GROVE, SUITE 200
CHESTERFIELD, MO 63005
PHONE: (636) 537-7192

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SEAL:

**PRESTON WOODS - PHASE II**
REVISED MASS GRADING PLANS
+ PARTIAL STORM SEWER
ST. CHARLES, MO. 63366

**SEDIMENT TRAP "C"**

planning • engineering • surveying • landscape architecture
**Cole** and ASSOCIATES INCORPORATED
10777 sunset office dr.
saint louis, missouri 63127
p: 314 984 9887 f: 314 984 0587

DESIGNED BY JKW
DRAWN BY JKW
CHECKED BY JFH
DATE 8/13/07
Job Number 07-0041
Sheet Number P-C