Stormwater Discharge Permit

Short form for Runoff Reduction on Redevelopment

Columbia, MO 65201

manat Loning:		
/Must be seend and india		
(Iviust de zonea residentia.	1, transitional or agricultural)	
Stream Buffer on Site?Environmentally Sensitive Areas?	No Type I Type I No Yes (cave, spring, sinkh)	II Type III bole, etc.)
Total Site Area: Total Disturbed Area:	acres (must be greater than 2.5 acres) acres (must be less than one acre)	
 Existing Total Site Impervious: New Impervious New impervious - existing impervious Insert this number in the first blank under 	acres% (n acres%	must be less than 10%)
. Net Change in Total Site Impervious	s acres * 43,560	to get ft^2
 I prairing deep-rooted vegetation, the (Total site in acres * 0.12) = Acr Option 3 Capture and reuse 0.14 inches of runof (Enter number from 7 above)(I/We realize that I am/We are responsible for this document while I/We retain ownership and expenses of maintaining the practice(s) of the second sec	ff by installing rain barrels, cisterns or rain ft ² * 0.011666) * 7.48051 =galle for maintaining the above practice(s) in ac of the property, or for at least five years. I chosen above.	gardens. ons to capture. ccordance with the maintenance guidance i I am/We are responsible for any and all cos
LANDOWNER		DATE
LANDOWNER		DATE
LANDOWNER BOONE COUNTY, MISSOURI		DATE DATE

If you have any questions, please call 573-449-8515.

STORMWATER 💞

Runoff from hard surfaces such as pavement and rooftops picks up sediment and pollution and carries it into Trees and native prairie vegetation provide numerous our streams and creeks. As Boone County develops, arwater quality benefits. The foliage captures rainfall, eas are converted from fields and forests to parking lots which may evaporate before it reaches the ground. Leaf and buildings. Rain water that was once able to soak litter acts like a sponge, soaking up rain. Native grasses into the soil now flows down streets or across rooftops. contain up to 70% of their biomass below ground. This The increased amount of water reaching our streams extensive root system increases infiltration and organic and the pollution in the runoff can harm aquatic life, matter content of the soil. The soils under these plants damage property by destabilizing stream banks and inabsorb and hold water in pore spaces throughout the crease flooding. entire rooting depth.

Boone County enacted a Stormwater Ordinance on April 15, 2010. Your recent request to build triggers Requirements: the requirements in the ordinance. However, your ac-Retain 10% of the site in trees, grassland or deeptivity may be eligible to meet the lower criteria for runrooted vegetation (shallow-rooted turf grass is not off reduction without requiring additional water quality allowed). treatment. To determine if you are eligible, all of the following must apply: your property is greater than 2.5 <u>Maintenance</u>: acres; there is less than 10% impervious area; the pro-Trees should be pruned in spring so they can recover posed activity is disturbing less than one acre; the acfaster. Avoid extensive pruning in summer or late fall tivity falls under redevelopment if the use remains the as this removes the nutrients stored in the branches same; and there is not a request for a zoning change. that are needed through dormancy.



Runoff Reduction

Runoff reduction is the removal of a portion of the runoff volume by one of the following methods:

- 1. Retain deep-rooted native vegetation and trees.
- 2. Re-establish trees or deep-rooted native vegetation.
- 3. Capture and reuse runoff by installing rain barrels or rain gardens.

RUNOFF REDUCTION Short Form for Small Redevelopment

Option 1 Retain deep-rooted vegetation

University Extension

Once established, native prairie vegetation should be mowed once a year and burned every two to three years. Burning in late April to June 1st will reduce fescue dominance and limit woody invasion by removing litter and stimulate forbs. This should be done when wind speed is negligible and humidity is below 40%. Missouri Department of Conservation

EFFECTS OF VEGETATION IN MINIMIZING EROSION (MENASHE, 1993)

EVAPOTRANSPIRATION FROM FOLIAGE: Removes water from the soi

SHRUB ROOTS: Hold surface soil

DEEP ROOTS: Help hold and stabilize bank materials, ties layers together



GROUND COVERS: Protect Soil

VEGETATION: Helps to maintain absorptive capacity

VEGETATION Slows the velocity of runoff and acts as a filter to catch sediment



Our dense clay soils make it difficult for water to soak into the ground quickly. Native plants have deeper root systems that significantly increase the ability of soil to absorb and retain water. As natural vegetation is replaced with popular turf grasses, less stormwater is absorbed into the ground, leading to more stormwater runoff and water pollution. - MARC

Option 2 - Replant deep-rooted vegetation

Re-establishing deep rooted vegetation can improve soil organic matter content and water infiltration in as little as six years. (Bharati et al., 2002)

Requirements:

Re-establish 12% of the total site in trees, grassland or deeprooted vegetation (shallow-rooted turf grass is not allowed). If planting trees, the density requirement is six (6) trees per acre with a minimum size of 1.5 caliper. If re-establishing native vegetation, the requirement is 80% coverage after two years.

Planting a Tree Properly

- 1. Stake the ground where you want to plant the tree. Stay at least 15 feet away from other objects, such as houses, trees, and sidewalks.
- 2. Measure the tree's root ball and mark a circle two or three times wider than the root ball's diameter around the stake.

- 3. Remove enough soil to expose the root flare. Measure the height of the root ball from the ground to the root flare.
- 4. Subtract two inches from the height of the root ball and dig the hole to that depth.
- 5. Position the tree in the hole. When placed how you want, remove the wire basket from the root ball.
- 6. Remove the twine and burlap from the root ball. Loosen tightly packed soil around the root ball to expose the roots.
- 7. Combine correct fertilizer with excavated soil and backfill, leaving the root flare exposed.
- 8. Form a six inch curb around the tree and fill the crater with water. Knock the curb down once water is soaked in.
- 9. Spread three inch bark mulch over the exposed soil, keeping the mulch away from the tree trunk.
- 10. Water the tree every day for six weeks. - This Old House



Planting time is a good time to correct minor structural problems a tree may have. Remove branches that are broken, rubbing or crossing each other. Cutting a few of the smallest branches back to the trunk will help direct growth into the terminal leader and stronger lateral branches,

promoting the development of a well-spaced branch **Option 3 - Capture and Reuse** scaffold system. For plants dug from a nursery (not Thousands of gallons of water run off the average Missouri grown in a container), moderate thinning at planting rooftop each year. Storage and reuse techniques range time will also help compensate for the loss of roots from small rain barrels to large underground cisterns or due to digging. Removing more than 20 percent of the rain gardens. Water from the roof is relatively clean and branches may reduce the tree's ability to produce food can be used for gardens, flower pots or vehicle washing. through photosynthesis, thereby slowing the establishment process.

- University of Missouri Extension

Planting Deep-rooted Native Vegetation



When seeding a large area, site preparation begins the spring before seeding in early winter. For best results, begin in May with an application of non-selective herbicide. If (or when) weeds sprout, mow them before they produce seed heads. In September, evaluate the site. If a healthy stand of vegetation is present, apply a second application of non-selective herbicide. In December, plant native grass and forb seed either by broadcast or drilling. Water until the planting is established.

Any time soil is disturbed, a burst of weed growth is triggered. These weeds can quickly shade new native seedlings. For large areas, mowing is the best option for maintaining your seedlings. The first year, mow when vegetation is six to 12 inches high. Native plants are sending down roots and will be shorter than non-desirable vegetation. It may be necessary to mow several times to keep vegetation below 12 inches. The second year, continue to mow, but less frequently. By the third year, native grasses and forbes should be able to hold their own. In future years, plan to mow or burn every third year.

- Missouri Grow Native

<u>Requirements:</u>

Utilize cisterns, rain barrels, or rain gardens to capture and reuse 0.14 inches of runoff. To determine the volume requirements, multiply the net increase in impervious area in square feet by 0.011666 ft. That gives you cubic feet. Then multiply this number by 7.48051 to get gallons. For example, you've added 3,000 ft² to your house; the runoff reduction requirement is 261 gallons ((3,000* 0.011666) * 7.78051 = 261 gallons). Therefore, you will need five 55-gallon rain barrels (261 gal/55 gal = 4.7 rain barrels).

Maintenance:

Rain Barrels: Disconnect the down-spout from the barrel prior to the first hard freeze. Turn the barrel upside down with all valves open. After the last frost (middle of April) reconnect your rain barrel to capture rainfall from your roof.

Rain Gardens: Keep your rain garden looking neat by maintaining the boundary with rocks or decorative border. Mow or remove dead vegetation in spring to stimulate new growth, and weed periodically.



