SPECIFICATION GUIDE SHEET
for FILTER STRIP (393)

SCOPE:

This work will consist of establishing a strip or area of herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forest land) and environmentally sensitive areas to:

- Reduce suspended solids and associated contaminants in runoff.
- Reduce dissolved contaminant loadings in runoff.
- Reduce suspended solids and associated contaminants in irrigation tailwater.

SEEDING MIXTURES:

Guidance for seed mixtures and rates for filter strip seeding is provided in **Table 1** and **Table 2**. Seeding rates will be calculated on a pure live seed (PLS) basis or percent germination.

PLS is determined by multiplying the percent purity by the percent germination.

Certified seed will be used. Legumes will be scarified if necessary and inoculated with the proper viable rhizobia before planting.

Additional information regarding variety ease of establishment, drought/wetness tolerance, growth habit, etc. is available in **Table 5**.

SOIL AND FERTILIZER:

Soil tests results will be available before establishment. Apply all plant nutrients according to soil test results. Required lime will be applied and incorporated at least six months prior to seeding. If no-till seeding will be used and lime will not be incorporated, apply 1 to 2 years ahead of seeding. Do not add nitrogen at the time of seeding when inter-seeding or no-till seeding unless seeding is comprised of 100% cool season grasses.

CONVENTIONAL SEEDING:

Obstacles will be removed and the area smoothed as needed. Prepare a seedbed to a minimum depth of 3 inches. The seedbed should be firm, relatively free of competing vegetation and contain enough fine soil particles for uniform shallow coverage of the seed as well as contact with moisture and nutrients. As a general rule, a seedbed is firm when an adult's footprint is no more that one-half inch deep. Tillage should be limited to the minimum number of operations needed to prepare a seedbed.

It is recommended that seeding be done with the use of a companion (nurse) crop. Oats sown at a rate of 1 to 1½ bushels (32-48 lbs.) per acre is a good companion crop for spring seedings. Use of a companion crop is also a good option where weeds may be a concern. Mow and remove oats at boot stage (when there is a lump in the stalk but the head has not yet emerged from the stem).

Grass and legume seed shall be drilled uniformly over the area at a depth of ¼ to ½ inch using a grassland drill, grain drill with press wheels, cultipacker seeder, or by broadcasting and rolling or cultipacking before and after broadcasting the seed.

Drill – A grass drill is the best method of seeding on level and sloping areas, but the preferred method will depend on slope and conditions of the planting site. If the drill does not have a packer wheel system, a cultipacker or roller should be trailed behind.

Broadcast – Seed may be broadcast by using whirlwind or end gate seeders. Cover seed with ¼ inch of soil or less. Roll, cultipack or use some other suitable method to firm seedbed before and after seeding.

NO-TILL CONSIDERATIONS:

Consider the use of no-till planting methods to establish forage plants on land subject to erosion, to conserve soil moisture and organic matter, or on stony fields where conventional tillage methods will result in many surface stones and significant labor.

When no-tilling into established sods, chemical control of the sod should be achieved the year prior to the seeding.

WEED CONTROL:

Identified weed problems will be controlled prior to seeding. For pesticide use with planting, (and for operation and maintenance) contact the University of Vermont Extension System for current information and recommendations.

TIME OF SEEDING:

Seedings will be completed during the optimum seeding periods provided in **Table 4**. The specific date that provides for a successful seeding will vary based on geographic location, elevation, exposure,

prevailing moisture and temperature conditions. Discussion with the landowner regarding the physical characteristics of the sight will prove helpful. Spring seeding is recommended since late summer seeding is generally riskier than spring seeding.

MANAGEMENT FOR ESTABLISHMENT YEAR:

Plants shall not be cut until the heights outlined in **Table 3** are reached. First year cutting should be minimal. Weed competition can be minimized by careful use of sickle bar or rotary mowers. Clip the area with the mower set high to avoid cutting the seedlings, yet to still be effective in removing the shading effect of the weeds. Removing significant amounts of leaf material from the desired plants will hinder their development to a greater degree than the weeds.

WILDLIFE HABITAT IMPROVEMENT:

If wildlife habitat improvement is a management objective of the landowner, consider using the Wildlife Seeding Tech Note to plan appropriate seed mixtures by soil drainage class.
To open the note go to the following URL:
ftp://ftp-fc.sc.egov.usda.gov/VT/Technical/TechNotes/Plant_Materials/TN36_Wildlife_Seedings.pdf

These grasses and forbs will provide food and or cover for a number of wildlife species that utilize grasslands for all or part of their life cycle. Consider including pollinator friendly forbs in the mix.

TABLE 1 **Common Filter Strip Seeding Mixtures**
Pure Live Seed Per Acre

Species	lbs/ac	lbs/1000 sq. ft.
Moderately Well Drained to Well Drained Soils		
Orchardgrass Smooth Bromegrass Medium Red Clover	12 7 6	0.28 0.15 0.14
Orchardgrass Timothy Medium Red Clover	12 7 6	0.28 0.15 0.14
Somewhat Poorly to Poorly Drained Soils		
Kentucky Bluegrass Orchardgrass Red Clover Ladino Clover	8 8 6 1/4	0.18 0.18 0.14 0.005

REFERENCES:

2008 Cornell Guide for Integrated Field Crop Management, Cornell University, Ithaca NY.

Vermont NRCS and National NRCS Filter Strip, Code 393, Conservation Practice Standard.

VegSpec Website:
http://vegspec.sc.egov.usda.gov/vegSpec/index.jsp

TABLE 2 **– Alternative Seed Mixtures for Filter Strips -- Seeding Rates of Pure Live Seed Per Acre** [1]

Legume Seed (if one legume only use high rate)				**Grass Seed** (in mixes use lower rate) [2]			
Primary Legume	Rate (lbs)	**Secondary Legume**	Rate (lbs)	**Orchard Grass**	**Smooth Brome grass**	**Timothy**	**Kentucky Bluegrass**
Alfalfa [3]	6-8	Red Clover	2-4	6-12	7-9	7-9	
Alfalfa [3]	6-8	Ladino Clover	1/4	6-12	7-9	7-9	
Red Clover	6-8			6-12	7-9	7-9	
Red Clover	4-6	Ladino Clover	1/4	6-12	7-9	7-9	
Red Clover	6-8	Alsike Clover	2	6-12	7-9	7-9	
Alsike Clover	3-5	Ladino Clover	1/4	6-12	7-9	7-9	
Birdsfoot Trefoil	6			6-12	5-7	7-9	5-10
Red Clover	6-10	Ladino Clover	1/2	6-12	5-7	7-9	
		One Grass Only [2]		15	12	12	15

Listed rates are based on seedlings planted with seed drills or cultipack seeders. If broadcasting, increase rates by 20%.

[1] Most certified and licensed Vermont seed companies selling cool season grasses and legumes have documented > 95 percent purity and > 95 percent germination for all species sold. In these cases, use their bulk rates as equal to PLS.

[2] Additional grass seed species may be added to these first choices of grass seed species if determined by the planner. If this is done, use the lower rate of PLS of the additional species but no lower than 50 percent.

[3] Alfalfa is not generally recommended for filter strip establishments.

- Birdsfoot Trefoil may spread in certain soils and conditions in Vermont.
- Mixed stands generally have less insect and disease damage than monoculture stands.
- Smooth Bromegrass and Timothy can tolerate 30 days of spring flooding.

For more specific forage plant information, go to VegSpec at: http://vegspec.sc.egov.usda.gov/vegSpec/index.jsp.

TABLE 3 **Harvest Management First Year**

Forage	**First Year Clipping Height**
Alfalfa	20 inches
Smooth Bromegrass	10 inches
Red Clover	8 inches
Orchardgrass	10 inches
Timothy	10 inches
Birdsfoot Trefoil	12 inches

TABLE 4

Suggested Seeding Dates by Major Land Resource Area (MLRA)

MLRA	Spring	Late Summer
142 Champlain Valley	April 15 To May 15	August 7 To September 15
143 Green Mountains Northeast Highlands	May 1 To June 15	July 15 To August 10
144A SW Vermont Uplands	April 15 To May 30	August 7 To September 15
144B West – Taconic Mountains East – Vermont Piedmont	April 15 To June 1	August 1 To August 21
145 Connecticut River Valley	April 15 To May 30	August 7 To September 15

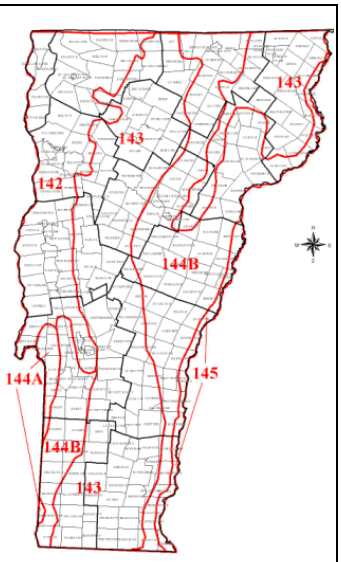

TABLE 5

Crop Description, Relative Tolerance of Established Forages to Environmental Hazards, and Ease of Establishment

E = Excellent; **G** = Good; **F** = Fair; **P** = Poor

Crop /1	Cold Frost	Soil Drought	Wet-ness	pH	Estab-lishment	Growth Habit	Minimum Drainage	Minimum Fertility	Anti-Quality
LEGUMES									
Alfalfa	G	G	P	6.6 – 7.2	G-E	T	WD	H	B,S
Alsike clover	F	P	G	6.0 – 6.5	F	M	PD	M	B,S
Birdsfoot trefoil	G	F	G	6.0 – 6.8	P	M-S	SPD	M	T
Hairy vetch	F	F	F	5.8 – 6.5	G	VINY	MWD	M	B
Kura clover	E	F	G	5.5 – 6.2	P	M-S	SPD	M	B
Ladino clover	F	P	G	6.0 – 6.5	G-E	S	PD	M	B,S
Mammoth red clover	P	F	F	6.2 – 6.8	G	M	SPD	M	B,S
Medium red clover	G	F	F	6.2 – 6.8	G-E	M	SPD	M	B,S
Sweet clover	G	G	P	6.8 – 7.2	F	T	MWD	M	C
GRASSES									
Kentucky bluegrass	E	P	G	5.8 – 6.5	P	S	SPD	M	
Orchardgrass	F	G	F	5.5 - 8.2	G	M-T	SPD	M	
Perennial ryegrass 2,3	P	P	G	5.0 – 8.3	E	M-S	SPD	H	
Red top	E	G	F	4.5 – 6.2	F	S	VPD	M	
Smooth bromegrass	E	G	F	5.5 – 6.5	F	M-T	MWD	H	A
Timothy	E	F	E	5.0 – 6.2	F	M-T	PD	M	

Growth Habit: **T** = Tall; **M** = Moderate; **S** = Short

Anti-Quality (components that could be present in some varieties):

- **A** = Alkaloids (decrease palatability)
- **B** = Bloat potential
- **C** = Coumarin (hemorrhagic agent, formed during spoilage of hay)
- **T** = Tannins (decrease palatability)
- **S** = Slaframine alkaloid (slobbers) **<>** A concern especially in the spring and summer, slobbers results when horses eat legume forages, particularly clover, which have been parasitized by the fungus Rhizoctonia leguminicola. This fungus produces an alkaloid called slaframine, which is responsible for the excessive drooling and slobbering.

Drainage Categories (Natural Soil Drainage):

MWD = Moderately Well Drained
PD = Poorly Drained
SPD = Somewhat Poorly Drained
VPD = Very Poorly Drained
WD = Well Drained

Footnotes

1 - Select erect varieties for hay and prostate varieties for pasture.
2 - Select the more winter hardy varieties for use in Vermont
3 - Select the low-alkaloid varieties to improve palatability.