Florida Department of Transportation

DISTRICT ONE

STANDARD PRACTICE

for the

USE OF SOD ON ROADWAY PROJECTS

Documentation

October, 1999

On this date, October 4, 1999, Florida Department of Transportation District One management approves

District One Standard Practice on
Use of Sod on Roadways
October, 1999

For consistent implementation in accordance with the schedule, herein.

David A. Twiddy, Jr., PE
District Secretary

Ralph Mervine, PE
Director of Operations

Debbie Hunt
Director of Planning & Programs

Gerald Carrigan, PE
Director of Production

Norm Feder
Director of Southwest Area Office

Please contact Jim Young, District Construction Environment Liaison at (863) 519-2590 or Brian Monkelbaan, Construction Environmental Liaison at (239) 656-7861 to obtain a signed copy of this policy.

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The full documentation, with blue cover, documents the Standard Practice, the intent, the economic analysis, and implementation plan. The appendix is available by request.

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- Calculation of Estimated Annual Costs
  - Construction Costs
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Introduction

The mission of the Department is to "…provide a safe, interconnected statewide transportation system…" Four goals are identified in the Florida Transportation Plan to guide the accomplishment of the Department's mission. The condition of roadway shoulders impacts both Goals 1 (safe transportation) and 2 (protection of investment.)

Turf establishment is critical to prevent erosion caused by wind and water. Without well established turf, erosion causes wash-board shoulders, silted drainage facilities, and potentially impacts the roadway, roadbed, and adjacent property.

Well established turf not only protects the roadway, it increases the visual appeal of the facility. The Department is sensitive to the desires of our customers for visually appealing facilities. The FDOT is required to allocate no less than 1% of the amount contracted for construction projects to roadside beautification (effective July 1, 1999). The percentage increases to 1.5% beginning with fiscal year 2002-2003. This recent action by the Florida Legislature demonstrates an increase in the importance of visual aspects on roadway projects. Although turf is not landscaping, well established turf is visually appealing to our customers.

The District currently follows the Standard Indexes and provides for two foot sod strip adjacent to the edge of pavement and around drainage structures. This leaves the rest of the exposed right of way for seed and mulch. In areas where the Standard Indexes allows for additional treatment, it is common for the District to stick with the minimum.

Many factors such as soil conditions, quality of grass seed, amount of water, and weather affect grass growth and health. Turf establishment from seed is inconsistent at best. Over sixty-five percent of the grass shoulders need to be reworked within three years of construction at additional expenses with increased driver inconvenience and resultant damage to the Department's public image.

Through the efforts of the District Process Performance Review Team, the need for more stringent standards within the District was identified. At the direction of District Senior Management, the District One Standard Practice for the Use of Sod on Roadways was developed and documented. *This standard practice is greater than the minimum treatment required by the Standard Indexes.*

This report documents the Standard Practice, the intent, the economic analysis, and implementation plan.

Intent of Standard Practice

The intent of the Standard Practice is to have permanent green grass established at the completion of roadway construction and maintenance work.

By proactive and systematic action in establishing a healthy roadside turf, District roadside Maintenance forces would be able to concentrate on routine maintenance activities instead of reactive repair activities. Consistent implementation of this Standard Practice should reduce the number and amount of construction overruns associated with grassing and rework, due to non-establishment of turf.

DISTRICT ONE STANADARD PRACTICE
for the
USE OF SOD ON ROADWAY PROJECTS

Intent:

It is the intent of this District One Standard Practice to have green permanent grass established at the completion of roadway construction and maintenance work.

Specifics:

Sod in lieu of seed and mulch shall be used on all roadways with urban (raised curb) typical sections.

One inch water per week shall be required for a minimum of four (4) consecutive weeks for the purpose of establishing sod. This can be waived during construction, if and only if there is a minimum of one inch of rain per week on all sod on the project.

Sod shall be placed on slopes 1:3 or greater. Staked sod shall be placed on slopes 1:2 or greater.

On all curves with superelevation, sod shall be placed from the edge of pavement to the toe of slope on the downhill side(s) for the entire length of the superelevated roadway. On multi-lane divided rural facilities, sod shall be placed in the median and on the inside of the curve in the superelevated areas. This does not apply to reverse crowns.

For all projects with less than 10,000 SY grass area, sod shall be used.

On tangent sections and on outside of curves, sod shall be used between the edge of pavement and a point 4 ft beyond the shoulder break point.

The entire width of sod should not exceed 15 ft from the edge of pavement.

Sod is to be used to eliminate narrow seed and mulch areas. Areas less than 6 ft in width shall be sodded.

Sod shall be placed around drainage structures as per the Standard Indexes and extended to the edge of pavement.

Economic Analysis

This more stringent practice will cause an increase in initial investment. The overall program results in a total reduction in annual expenditures. The economic analysis is based upon unit prices applied to average conditions. The analysis deliberately used a conservative approach; overestimating expenses and underestimating savings.

Construction Cost Comparison		
	Current Practice	Proposed Practice
Mainline per mile – two sides	$ 5,396	$ 13,200
Median per mile (assume 30 ft average width)	$ 7,510	$ 22,000
Superelevated curve – each – inside per curve (1500 ft average length	$ 1,217	$ 3,750
Crossdrain – each – one side (additional cost)		$6.44
Sidedrain – each- both sides (additional cost)		$ 40.38
Water per mile (4 weeks duration)		$ 943*

* Contractors historically underbid this item. As this practice is put into effect consistently, we can expect this price to be five times greater or approximately $ 4,700/mile.

<table>
<tr><th colspan="3">Annual Economic Comparison</th></tr>
<tr><td></td><td>Current Practices</td><td>Proposed Practices</td></tr>
<tr><td rowspan="2">Under Construction</td><td>Grassing Cost
$ 809,294</td><td>Grassing Cost
$ 2,306,150</td></tr>
<tr><td>20% Rework of grassing [1]
(overrun / supplement agreements)
$ 161,859</td><td></td></tr>
<tr><td colspan="3">Project Acceptance</td></tr>
<tr><td>Maintenance Repair Cost</td><td>65 % Construction Projects Need Regrassing within 3 years[2]
$ 175,347</td><td rowspan="3">523 acres / year shoulder work (every ten years, one half of program)[4]
$ 5,252,176</td></tr>
<tr><td>Annual Maintenance Costs</td><td>1743 acres / year shoulder work (every six years) [3]
$5,084,074</td></tr>
<tr><td></td><td>600 acres repair anticipated due to MRP failure (elimination of broadcast herbicide control)[5]
$ 2,338,656</td></tr>
<tr><td>Total</td><td>$ 8,569,230</td><td>$ 7,558,326</td></tr>
</table>

This table uses the Fiscal Year 1997/98 Construction Program as the basis (51 miles of four lane divided rural and 28 miles of two lane rural construction.)

[1] Based on conservative estimates of Jose Garcia, John Jay, Bill Fuller, and Sharon Hedrick.

[2] Based on conversations with Richard Beverage, Wayne Cochran, Jim Bond, Bob Wade, Jeff Winningham, and Kent McCloud. Estimates ranged from "far exceeding 50% to 75% in three years". Group consensus was 65% in three years was conservative.

[3] Howard Summers provided programmed shoulder work acreage. The annual workload is one sixth of the total.

[4] With establishment of good turf, Howard Summers, Wayne Cochran, Richard Beverage and Jon Bond agree that routine shoulder work could be scheduled every ten years or greater. This would reduce the annual workload to one tenth of the total. One half of the program would be covered in the resurfacing program.

[5] The elimination of broadcast herbicide control is affecting the turf. The weeds are covering the turf, choking out the grass roots. When cold weather kills the weeds, bare soil is exposed, requiring repair. Wayne Cochran estimated a conservative 600 acres per year of repair required as a result. Each year this number increases significantly.

The magnitude of increase in initial investment ranges from 0.76% to 3.88% of project construction cost. The following table provides the specific increase as a result of the Standard Practice. The costs are in thousands (x $1,000) and provided by project type.

Type of Improvement	Current Cost	Added Cost	% Increase
New 2 L Rural	$ 1,158	$ 8.8	0.76%
4 L Rural Resurface	$ 600	$ 23.3	3.88%
Add 2 L, Rehab 2 L	$ 1,500	$ 23.3	1.55%
New 4 L Rural	$ 1,750	$ 23.3	1.33%
6 L Rural Resurface	$ 900	$ 23.3	2.59%
Add 2 L, Rehab 4 L	$ 1,750	$ 23.3	1.33%
New 6 L Rural	$ 2,250	$ 23.3	1.04%

Comparison with Indexes and Specifications

The FDOT Standard Indexes provides minimum treatments and specifies under certain conditions, the designer should consider a greater treatment. The greater treatment is clarified with text, graphics, and dimensions. This District Standard Practice for Use of Sod replaces the "should consider" with "shall provide" for the same specific conditions. *This treatment is greater than the minimum treatment required by the Standard Indexes*.

The FDOT Standard Specifications for Road and Bridge Construction, Section 981 details the grassing and sodding materials allowed during construction. This District Standard Practice for Use of Sod has no effect on the Standard Specifications.

Benefits of Standard Practice

Adoption and consistent implementation of the District Standard Practice for Use of Sod provides the following benefits:

- Reduction in annual grass related expense by over $1.0 million.
- Reduction in supplemental agreements, contract time extensions, and cost overruns for grassing items.
- Increased capture of federal funds for grass related expenses, since maintenance rework is not eligible for federal funding.
- Decrease in construction and maintenance effort in rework, due to turf non-establishment and shoulder erosion.
- Increase in proactive and a decrease in reactive maintenance activities.
- Increased visual aesthetics and public image.
- Increased teamwork in the District.

Review Comments on Draft Standard Practice

A draft Standard Practice was distributed and discussed at the Design/Operations Workshop. Comments were requested. In addition, a survey involving an early draft of the Standard Practice was distributed to Contractors soliciting potential problems or concerns from the industry. Comments were received from individuals, offices, districts, and industry representatives. Below summarizes the disposition of the comments.

Comments From	Comments	Disposition of Comments
Jim Mercer, QADSU	References to Index and Specifications	Corrections made and reflected in the economic analysis
Tom McBee, QADSA	Specific text changes that clarified and used consistent nomenclature	Incorporated suggested changes
Mike Peterson, District Design Engineer	Since FHWA approves our Standard Indexes, do they need to approve a District policy?	The District Standard Practice falls within the Standard Indexes. FHWA will be involved in the review.

Jonathan Sands/ Mary Ellen Maurer, Sarasota Construction	At retention ponds, the flat area at the berms needs to be sodded.	Considered outside scope of this initial effort
Larry Timp, District 7 Value Engineering	Referenced work done in D-7 by a committee to develop a policy.	Contacted individuals referenced
Will Sloup, Turnpike	Construction preference, the TPK entirely sods new alignment projects	Thank you for input
Gary Henry, State Landscape Architect	Need to increase the amount of water to 1"/week (27,000 gal/acre/week). You cannot go wrong with more sod.	Changes made
Fla Dept. of Agriculture & Consumer Services	Any sod to be used within citrus grove or nursery must be certified free of nematodes	Covered by the Standard Specifications.
Contractors Survey (4 responses)	No problems foreseen with implementation.	Thank you for input

Implementation Plan

The District One Standard Practice on Use of Sod on Roadways will be implemented as follows:

Plans to be Let on or after July 1, 2005 will be consistent with the Standard Practice.

Plans to be Let between July 1, 2000 and July 1, 2005 will be consistent with the Standard Practice, subject to funding discussed below. Accordingly project construction cost estimates and Long Range Estimates for future projects will include the Standard Practice, effective upon approval.

Plans Let before July 1, 2000 will be evaluated on a case by case basis for modification prior to Construction Start to include the Standard Practice.

Projects under construction will be evaluated on a case by case basis to include the Standard Practice. At a minimum, the Resident Engineer and the Maintenance Engineer will be involved.

New maintenance contracts for roadside repair will include the Standard Practice, effective January 1, 2000.

Existing maintenance contracts, up for renewal after January 1, 2000, will be modified to include the Standard Practice.

Existing maintenance contracts, with six (6) months or less remaining on the contract are exempt from the Standard Practice.

Existing maintenance contracts, with more than six (6) months remaining will be evaluated on a case by case basis on contract modification to include the Standard Practice.

New maintenance agreements with local governments will include the requirement to use the Standard Practice, effective January 1, 2000.

The District Planning Department will notify the LAP certified local governments/ agencies of the Standard Practice within two (2) weeks of approval.

Starting Fiscal Year 05/06, subject to funds availability, the project budgets in the District Work Program will include the Standard Practice.

For Fiscal Years 00/01 through 04/05, the District will fund the Standard Practice with the savings identified and adopted through the District Value Engineering Program.