



Florida Department of Transportation

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STEPHANIE KOPELOUSOS
INTERIM SECRETARY

February 28, 2007

Dr. Leslie McCarthy, PhD, P.E.
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 161
Proposed Specification: 1610000 Pre-Designed Stabilized Subgrade

Dear Dr. McCarthy:

We are submitting, for your approval, two copies of a proposed Special Provision for Pre-Designed Stabilized Subgrade.

This change was proposed by Tom Malerk of the State Materials Office to reflect new requirements for shoulder only construction, bike/shared use paths and sidewalks.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to SP965DB or duane.brautigam@dot.state.fl.us.

If you have any questions relating to this specification change, please call Duane F. Brautigam, State Specifications Engineer at 414-4110.

Sincerely,

Duane F. Brautigam, P.E.
State Specifications Engineer

DFB/ft

Attachment

cc: General Counsel
Florida Transportation Builders' Assoc.
State Construction Engineer

PREDESIGNED STABILIZED SUBGRADE.
(REV 2-12-07)

PAGE 196. The following new Section is added after Section 160:

SECTION 161
PREDESIGNED STABILIZED SUBGRADE**161-1 Description.**

Design and construct a stabilized subgrade composed of roadbed soil stabilized with commercial *or local* stabilizing material.

~~160-1.1 Work Categories: Section 120-1.2 defines the categories of the various work. Do not use pre-designed stabilized Subgrade for Traffic Construction Areas. For shoulder only, sidewalk, and bike/shared use path construction, meet the requirements of 120-8.1.1, except replace "Embankment" with "Subgrade". For Non-Traffic Areas, meet the requirements of 120-8.1.1, except replace "Embankment" with "Subgrade".~~

161-2 Stabilizing Material.

Use ~~commercial~~ material meeting the requirements of 914-3.1, ~~and the plasticity requirements of 914-3.2.~~ *When using local materials, use only one source for a design.* Proportion the stabilizing material in accordance with FM 5-560, Section 9.2. Design the subgrade using the minimum required Limerock Bearing Ratio (LBR) shown in the plans.

161-3 Determination of Rate of Spread for Stabilizing Material.

Determine the spread rate for stabilizing material. Base the spread rate on tests performed by a testing laboratory approved by the Engineer.

Furnish copies of reports for all tests and calculations used in determining the spread rate to the Engineer at least 14 days prior to beginning stabilizing operations in the section of the project covered by that information. The Engineer may request samples of the subgrade soil and the stabilizing material for verification tests.

Make a separate determination of the spread rate for each source of stabilizing material and whenever significant variations occur in the characteristics of the soil in the subgrade portion of the roadbed.

The Engineer will approve the actual spread rate of stabilizing material used, based on test data and calculations submitted by the Contractor and any verification tests or independent calculations the Engineer deems necessary.

161-4 Trial Section.

~~Spread and mix materials in accordance with 161-6. Construct a trial section at the beginning of stabilizing operations, approximately 200 feet [60 m] long, using the designated stabilizing material and spread rate. The Engineer will evaluate this section by visual observation, LBR testing and other tests as appropriate. The Engineer may require a modification to the Contractor's construction operations or an increase in the spread rate of stabilizing material, if this evaluation indicates the subgrade is not firm and~~

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~~unyielding or does not have the specified LBR value. After the Engineer approves the trial section, no further acceptance LBR testing is required.~~

~~_____The Engineer will collect two samples of the mixed subgrade, and perform one for LBR testing. If the LBR does not meet the 160-7.2.1 requirements, the Engineer will perform a second LBR test. If this test result does not meet the 160-7.2.1 requirements, then -adjust the design in the field with the Engineer's approval.-~~
 Construct a trial section in accordance with 161-8. The Engineer may ~~waive~~ approve construction of a trial section ~~off project in areas to be stabilized~~ ~~where~~ traffic conditions or the configuration would cause a hazardous or impractical situation.

161-5 Preparation of Roadbed.

Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades, and cross-section shown in the plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface. Dispose of any surplus excavated materials resulting from this work as specified in 120-5.

As an exception to the above, if the typical section is new construction and does not include curb and gutter construction, the Engineer will authorize raising the finished elevation of the stabilized subgrade 1 inch to allow for excess bulking caused by incorporation of commercial material. Raise the overlaying base and pavement course a corresponding distance. The pay quantity for Embankment will not be adjusted when the finished elevation of the completed roadway is raised.

161-6 Incorporation of Stabilizing Material and Mixing-In.

161-6.1 Spreading Stabilizing Material: Place and spread the stabilizing material uniformly at the rate determined in 161-3. Use mechanical spreaders, except in those areas where the Engineer deems that it is not practical.

Take five measurements of the depth of the stabilizing material at random locations within each ~~200~~500 foot section of Stabilized Subgrade. If the average of these five measurements is less than the rate of spread as determined in accordance with 161-3, spread additional stabilizing material over the entire limits of that section and re-measure the depth. *Notify the Engineer a minimum of 24 hours prior to spreading stabilizing material. The Department will witness the depth checks of stabilizing material.*

1. If the depth checks meet the requirements, the Engineer will accept that 500 foot section.

2. If the depth checks confirm shallow depth, add additional material and re-measure in accordance with this section. The Engineer will repeat the witness process.

3. Record results. Await the Engineer's approval prior to constructing another production section.

161-6.2 Mixing: After the Engineer has approved the spreading of the stabilizing material, thoroughly mix the material with the roadbed soil using rotary tillers or other approved equipment which is capable of achieving a satisfactory blend. Cross blading and rolling of the mixture using graders will not be considered satisfactory. Mix the

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material as soon as practical, but not later than two working days after the material is placed on the road. Thoroughly mix the area throughout the entire depth and width of the stabilized subgrade as shown in the plans.

161-6.3 Maximum Particle Size and Plasticity of Mixed Materials:

At completion of the mixing, ensure that the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3 1/2 inch sieve and that the material does not have a plasticity index greater than eight or liquid limit greater than 30. Remove any materials not meeting the plasticity requirements from the stabilized area. The Contractor may break down or remove from the stabilized area materials, including clay lumps or lumps made of clay-size particles (any particle size 2 microns [(2µm)] or less), not meeting the gradation requirements.

161-6.4 Depth of Mixing Stabilizing Material:

Immediately after mixing has been completed and prior to beginning of compaction, take ~~nine~~*five* measurements of the depth to which the subgrade has been mixed at random locations within each ~~200~~*500* foot section of the stabilized subgrade. *Notify the Engineer a minimum of 24 hours before checking the mixing depth. The Engineer will witness the Contractor's measurements of each 500 foot section to ensure compliance. Meet the mixing depth requirements of 160-7.4.2.*

~~The following tolerances over or under the specified depth are allowed:~~

Plan Depth	Tolerance
8 inches [200 mm] or less	1 inch [25 mm]
over 8 inches [200 mm]	2 inches [50 mm]

~~When any measured depth of mixing within a 200 foot [60 m] section is less than the plan depth minus the tolerance specified above, remix the stabilized subgrade over the entire section and take a new set of depth measurements, randomly located, to verify that the mixing criteria has been accomplished.~~

~~When any measured depth of mixing within a 200 foot [60 m] section exceeds the plan depth plus the tolerance specified above, add 1 inch [25 mm], loose measure, of stabilizing material for each 1 inch [25 mm] of mixing depth in excess of the allowable depth (but in no case less than 1 inch [25 mm] of material) over the entire section and mix this additional stabilizing material into the top 6 inches [150 mm] of the subgrade. Compensation will not be made for any work or material required to correct the above deficiency.~~

161-7 Plant Mixing.

Proportioning of stabilizing materials with roadbed soil and mixing operations may be accomplished by the central plant-mixed method. Central plant mixing shall achieve a uniform blend of the materials meeting maximum particle size as specified in 161-6.3 and containing the proper amount of water for compaction.

Submit to the Engineer for approval prior to beginning this operation, a description of the equipment and technique to be used. *Notify the Engineer 24 hours prior to plant mixing in order to ensure compliance with 161-6.3. The Engineer may request samples of the subgrade soil and the stabilizing material for verification tests.*

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Spread the premixed subgrade material with a mechanical material spreader, except in areas where the Engineer deems that it is not practicable. Use other satisfactory means of achieving uniform spreading in such cases.

161-8 Compaction.

~~When mixing operations are completed and accepted, shape and compact the subgrade. The minimum density acceptable at any location within the limits of the subgrade will be 98% of the maximum density in accordance with FM 1-T-180. In areas to be grassed, density in the upper 6 inches [150 mm] as specified above is not required. Compact the material at a moisture content permitting the specified density to be attained.~~

~~Meet the rolling pattern and proof rolling requirements of 120-8.1.1, except replace "Embankment" with "Subgrade" *Substitu Subgrade for embankment and AASHTO FM 1 T-180 METHOD D for AASHTO T 99.*~~

161-9 Frequency:

Conduct QC sampling and tests at a minimum frequency listed in the table below. The Engineer will perform Verification sampling and tests at a minimum frequency listed in the table below.

<i>Test Name</i>	<i>Quality Control</i>	<i>Verification</i>
<i>Stabilizing Material Depth</i>	<i>Five per 500 feet</i>	<i>Witness</i>
<i>Stabilizing Mixing Depth</i>	<i>Five per 500 feet</i>	<i>Witness</i>
<i>Density – Rolling Pattern Test Section</i>	<i>Five per 500 feet</i>	<i>Two per 500 feet</i>
<i>Rolling Pattern</i>	<i>One per LOT</i>	<i>N.A.</i>
<i>Proof roll</i>	<i>One per LOT</i>	<i>Witness</i>

161-910 Finish Grading.

Shape the completed stabilized subgrade to conform with the finished lines, grades, and cross-section indicated in the plans. Check the subgrade ~~use~~*using* elevation stakes or other means approved by the Engineer. Surplus excavated materials from stabilizing operations may be disposed of under shoulders that are to be grassed or sodded.

161-10-11 Requirements for Condition of Completed Subgrade.

Ensure that the subgrade is firm and substantially unyielding *in accordance with Section 120-8.1.21.2 to the extent that it will support construction equipment.*

161-11-12 Maintenance of Completed Subgrade.

Maintain the completed subgrade free from ruts, depressions and damage resulting from the hauling or handling of materials, equipment, tools, etc. Maintain the required density of the subgrade until subsequent base is in place. Work required for recompaction will be at no expense to the Department. The Engineer may confirm that the required density is being maintained at any time.

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Do Not Use on Widening Projects.

161-~~12~~-13 Method of Measurement.

The quantity to be paid for will be the plan quantity, in square yards [~~square meters~~] of Stabilized Subgrade, completed and accepted, and the volume, in cubic yards [~~cubic meters~~] of commercial stabilizing material, applied on the road and accepted.

The quantity of Commercial Stabilized Material will be determined by measurement in a loose condition in truck bodies at the point of proportioning with roadbed soil. Level the material in the truck bodies to facilitate measurement.

161-~~13~~-14 Basis of Payment.

Prices and payments will be full compensation for all the work specified in this Section, including laboratory testing, furnishing and hauling, placing and spreading all stabilizing material, mixing, compacting, finishing and maintaining the subgrade below the finished grade of the stabilizing material and the disposal of surplus excavation and all quality control measurements required.

No additional compensation will be made for work or material which may be required to correct over or under depth mixing as specified in 161-6.4.

Payment will be made under:

- Item No. 161-70- Predesigned Stabilized Subgrade - per square yard.
~~Item No. 2161-70—Predesigned Stabilized Subgrade—per square meter.~~
- Item No. 160- 3- Commercial Stabilizing Material - per cubic yard.
~~Item No. 2160—3—Commercial Stabilizing Material—per cubic meter.~~

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PREDESIGNED STABILIZED SUBGRADE**161-1 Description.**

Design and construct a stabilized subgrade composed of roadbed soil stabilized with commercial or local stabilizing material.

For shoulder only, sidewalk, and bike/shared use path construction, meet the requirements of 120-8.1.1, except replace “Embankment” with “Subgrade”.

161-2 Stabilizing Material.

Use material meeting the requirements of 914., When using local materials, use only one source for a design. Proportion the stabilizing material in accordance with FM 5-560, Section 9.2. Design the subgrade using the minimum required Limerock Bearing Ratio (LBR) shown in the plans.

161-3 Determination of Rate of Spread for Stabilizing Material.

Determine the spread rate for stabilizing material. Base the spread rate on tests performed by a testing laboratory approved by the Engineer.

Furnish copies of reports for all tests and calculations used in determining the spread rate to the Engineer at least 14 days prior to beginning stabilizing operations in the section of the project covered by that information. The Engineer may request samples of the subgrade soil and the stabilizing material for verification tests.

Make a separate determination of the spread rate for each source of stabilizing material and whenever significant variations occur in the characteristics of the soil in the subgrade portion of the roadbed.

The Engineer will approve the actual spread rate of stabilizing material used, based on test data and calculations submitted by the Contractor and any verification tests or independent calculations the Engineer deems necessary. 161-4 Trial Section.

Spread and mix materials in accordance with 161-6. The Engineer will collect two samples of the mixed subgrade for LBR testing. If the LBR does not meet the 160-7.2.1 requirements, the Engineer will perform a second LBR test. If this test result does not meet the 160-7.2.1 requirements, then adjust the design in the field with the Engineer’s approval. Construct a trial section in accordance with 161-8. The Engineer may approve construction of a trial section off project when traffic conditions or the configuration would cause a hazardous or impractical situation.

161-5 Preparation of Roadbed.

Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed

stabilized subgrade will conform to the lines, grades, and cross-section shown in the plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface. Dispose of any surplus excavated materials resulting from this work as specified in 120-5.

As an exception to the above, if the typical section is new construction and does not include curb and gutter construction, the Engineer will authorize raising the finished elevation of the stabilized subgrade 1 inch to allow for excess bulking caused by incorporation of commercial material. Raise the overlaying base and pavement course a corresponding distance. The pay quantity for Embankment will not be adjusted when the finished elevation of the completed roadway is raised.

161-6 Incorporation of Stabilizing Material and Mixing-In.

161-6.1 Spreading Stabilizing Material: Place and spread the stabilizing material uniformly at the rate determined in 161-3. Use mechanical spreaders, except in those areas where the Engineer deems that it is not practical.

Take five measurements of the depth of the stabilizing material at random locations within each 500 foot section of Stabilized Subgrade. If the average of these five measurements is less than the rate of spread as determined in accordance with 161-3, spread additional stabilizing material over the entire limits of that section and re-measure the depth. Notify the Engineer a minimum of 24 hours prior to spreading stabilizing material. The Department will witness the depth checks of stabilizing material.

1. If the depth checks meet the requirements, the Engineer will accept that 500 foot section.

2. If the depth checks confirm shallow depth, add additional material and re-measure in accordance with this section. The Engineer will repeat the witness process.

3. Record results. Await the Engineer's approval prior to constructing another production section.

161-6.2 Mixing: After the Engineer has approved the spreading of the stabilizing material, thoroughly mix the material with the roadbed soil using rotary tillers or other approved equipment which is capable of achieving a satisfactory blend. Cross blading and rolling of the mixture using graders will not be considered satisfactory. Mix the material as soon as practical, but not later than two working days after the material is placed on the road. Thoroughly mix the area throughout the entire depth and width of the stabilized subgrade as shown in the plans.

161-6.3 Maximum Particle Size and Plasticity of Mixed Materials: At completion of the mixing, ensure that the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3 1/2 inch sieve and that the material does not have a plasticity index greater than eight or liquid limit greater than 30. Remove any materials not meeting the plasticity requirements from the stabilized area. The Contractor may break down or remove from the stabilized area materials, including clay lumps or lumps made of clay-size particles (any particle size 2 microns or less), not meeting the gradation requirements.

161-6.4 Depth of Mixing Stabilizing Material: Immediately after mixing has been completed and prior to beginning of compaction, take five measurements of the

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depth to which the subgrade has been mixed at random locations within each 500 foot section of the stabilized subgrade. Notify the Engineer a minimum of 24 hours before checking the mixing depth. The Engineer will witness the Contractor's measurements of each 500 foot section to ensure compliance. Meet the mixing depth requirements of 160-7.4.2.

161-7 Plant Mixing.

Proportioning of stabilizing materials with roadbed soil and mixing operations may be accomplished by the central plant-mixed method. Central plant mixing shall achieve a uniform blend of the materials meeting maximum particle size as specified in 161-6.3 and containing the proper amount of water for compaction.

Submit to the Engineer for approval prior to beginning this operation, a description of the equipment and technique to be used. Notify the Engineer 24 hours prior to plant mixing in order to ensure compliance with 161-6.3. The Engineer may request samples of the subgrade soil and the stabilizing material for verification tests.

Spread the premixed subgrade material with a mechanical material spreader, except in areas where the Engineer deems that it is not practicable. Use other satisfactory means of achieving uniform spreading in such cases.

161-8 Compaction.

Meet the rolling pattern and proof rolling requirements of 120-8.1.1, except replace "Embankment" with "Subgrade" and FM 1 T-180 METHOD D for AASHTO T 99.

161-9 Frequency:

Conduct QC sampling and tests at a minimum frequency listed in the table below. The Engineer will perform Verification sampling and tests at a minimum frequency listed in the table below.

Test Name	Quality Control	Verification
Stabilizing Material Depth	Five per 500 feet	Witness
Stabilizing Mixing Depth	Five per 500 feet	Witness
Density – Rolling Pattern Test Section	Five per 500 feet	Two per 500 feet
Rolling Pattern	One per LOT	N.A.
Proof roll	One per LOT	Witness

161-10 Finish Grading.

Shape the completed stabilized subgrade to conform with the finished lines, grades, and cross-section indicated in the plans. Check the subgrade using elevation stakes or other means approved by the Engineer. Surplus excavated materials from stabilizing operations may be disposed of under shoulders that are to be grassed or sodded.

161-11 Requirements for Condition of Completed Subgrade.

Ensure that the subgrade is firm and substantially unyielding in accordance with Section 120-8.1.1.2

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Do Not Use on Widening Projects.

161-12 Maintenance of Completed Subgrade.

Maintain the completed subgrade free from ruts, depressions and damage resulting from the hauling or handling of materials, equipment, tools, etc. Maintain the required density of the subgrade until subsequent base is in place. Work required for recompaction will be at no expense to the Department. The Engineer may confirm that the required density is being maintained at any time.

161-13 Method of Measurement.

The quantity to be paid for will be the plan quantity, in square yards of Stabilized Subgrade, completed and accepted, and the volume, in cubic yards of commercial stabilizing material, applied on the road and accepted.

The quantity of Commercial Stabilized Material will be determined by measurement in a loose condition in truck bodies at the point of proportioning with roadbed soil. Level the material in the truck bodies to facilitate measurement.

161-14 Basis of Payment.

Prices and payments will be full compensation for all the work specified in this Section, including laboratory testing, furnishing and hauling, placing and spreading all stabilizing material, mixing, compacting, finishing and maintaining the subgrade below the finished grade of the stabilizing material and the disposal of surplus excavation and all quality control measurements required.

No additional compensation will be made for work or material which may be required to correct over or under depth mixing as specified in 161-6.4.

Payment will be made under:

- | | |
|------------------|--|
| Item No. 161-70- | Predesigned Stabilized Subgrade - per square yard. |
| Item No. 160- 3- | Commercial Stabilizing Material - per cubic yard. |