SECTION 313200

SOIL STABILIZATION

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***NOTE TO SPECIFIER***

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

***Before editing this Section, obtain the "Report of Subsurface Investigation" prepared by the Geotechnical Engineer. Read the report and incorporate the recommendations included in the report into this Section.***

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Lime stabilized subgrade.
			2. Cement stabilized subgrade.
			3. Fly ash stabilized subgrade.
			4. Geotextile fabric stabilized subgrade.
		2. Related Documents: The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
		3. Related Sections:
			1. Section 312000 - Earth Moving: Cutting, filling, and grading for site improvements.
			2. Section 313200 - Excavation and Fill: Earthwork for structures., utilities, and pavement.
	2. REFERENCES
		1. American Society for Testing Materials (ASTM):
			1. ASTM C 150 - Specification for Portland Cement
			2. ASTM C 618 - Specification for Fly Ash and Raw of Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
			3. ASTM C 977 - Specification for Quicklime and Hydrated Lime for Soil Stabilization
			4. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 Pound Rammer and 12 Inch Drop.
			5. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 10 Pound Rammer and 18 Inch Drop.
	3. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Requirements for submittals.
			1. Material Source:
				1. Submit name of imported materials suppliers.
				2. Provide materials from same source throughout the work. Change of source requires Contracting Officer approval.
			2. Samples: Submit two samples of each type of imported off-site fill material in air-tight, 10 pound container for Contracting Officer testing or submit gradation and certification of aggregate material for Contracting Officer review.
			3. Mix Design: Submit mix design and materials mix ratio that will achieve specified requirements for soil stabilization by state and local agencies.
	4. QUALITY ASSURANCE
		1. Regulatory Requirements: Perform soil stabilization work in accordance with applicable requirements of governing authorities having jurisdiction.
	5. DELIVERY, STORAGE, AND HANDLING
		1. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
		2. Examine soil stabilization materials upon delivery to site. Verify that materials are as specified and match approved samples. Remove non-complying materials from site.
	6. PROJECT CONDITIONS OR SITE CONDITIONS
		1. Environmental Requirements:
			1. Do not begin mixing operation when subgrade is frozen or when air temperature is less than 40 degrees F.
			2. Do not install mixed materials in wind above 10 miles per hour.
2. PRODUCTS
	1. MATERIALS
		1. Quicklime or Hydrated Lime: ASTM C 977.
		2. Portland Cement: ASTM C 150.
		3. Fly Ash: ASTM C 618.
		4. Fine and Coarse Aggregate: In accordance with applicable State Highway Standard Specification regarding source, quality, gradation, liquid limit, plasticity index, and mix proportioning.
		5. Subsoil: Existing reused.

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**NOTE TO SPECIFIER**

Provide brief description of subsoil type where applicable and appropriate.

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		1. Degradable natural fiber erosion control blankets
			1. Provide and install materials in accordance with applicable state highway standard specification.
	1. EQUIPMENT
		1. Perform operations using suitable, well maintained equipment capable of excavating subsoil, mixing and placing materials, wetting, consolidation and compaction of material.
	2. SOIL MIX

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**NOTE TO SPECIFIER**

OPTION 1: Use reference to State Highway Standard Specification where applicable and appropriate.

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* + 1. Mix materials in accordance with referenced State Highway Standard Specification.

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**NOTE TO SPECIFIER**

OPTION 2: Specify mix based on recommendations included in "Report of Subsurface Exploration" for areas of application.

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* + 1. Mix materials as follows:
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		2. Add water to mix to achieve a consistent mixture without lumping yet not create a wet plastic consistency.
		3. Addition of lime may be specified or approved to facilitate mixing fly ash with soil materials. When specified, or directed by Contracting Officer in writing, use lime to prevent fly ash "flash set" or retard soil-fly ash reactivity occurring during final mixing.
			1. Uniformly blend lime additive with fly ash on surface for incorporation with soil materials during first mixing operations unless other methods of application are approved.
			2. Proportion of lime additive with the fly ash will be based on laboratory testing and field trial procedures necessary to determine proper soil modification.
			3. Addition of lime will permit a reduction of fly ash requirement on a replacement basis as approved by Contracting Officer.
		4. Obtain Contracting Officer approval of mix before proceeding with placement.
1. EXECUTION
	1. EXAMINATION
		1. Section 017300 - Execution: Verification of conditions before starting work.
		2. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
			1. Verify that existing site soils and soil conditions encountered are as indicated in Geotechnical Data.
			2. Verify quantity and type of soil stabilization materials before beginning material installation.
		3. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
		4. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to United States Postal Service.
	2. PREPARATION
		1. Obtain Contracting Officer approval of mix design before proceeding with placement.
		2. Do not start stabilization without weather and soil conditions being favorable for successful application of proposed material.
		3. Proof roll subgrade to identify areas in need of stabilization.
		4. Prior to stabilization of soils, prepare surface areas in accordance with applicable State Highway Standard Specifications.
	3. EXCAVATION
		1. Excavate subsoil to a depth sufficient to accommodate soil stabilization.
		2. Remove lumped subsoil, boulders and rock that interfere with achieving uniform subsoil conditions.
	4. SOIL TREATMENT AND BACKFILLING
		1. Do not backfill over frozen or spongy subgrade surfaces.
		2. Lime Stabilized Subgrade: Where indicated on Drawings, treat prepared subgrade with hydrated lime in accordance with applicable State Highway Standard Specification. Compact to minimum [95] [ \_\_\_\_ ] percent optimum density in accordance with ASTM D 698 or [92] [ \_\_\_\_ ] percent optimum density in accordance with ASTM D 1557.
		3. Cement Stabilized Subgrade: Where indicated on Drawings, treat prepared subgrade with Portland cement in accordance with applicable State Highway Standard Specification. Compact to minimum [95] [ \_\_\_\_ ] percent optimum density in accordance with ASTM D 698 or [92] [ \_\_\_\_ ] percent optimum density in accordance with ASTM D 1557.
		4. Fly Ash Stabilized Subgrade: Where indicated on Drawings, treat prepared subgrade with fly ash in accordance with applicable State Highway Standard Specification. Compact to minimum [95] [ \_\_\_\_ ] percent optimum density as determined by ASTM D 698 or [92] [ \_\_\_\_ ] percent optimum density, in accordance with ASTM D 1557.
		5. Fine and Course Aggregates: Treat prepared subgrade with fine or course aggregates in accordance with applicable State Highway Standard Specification. Compact to minimum [95] [ \_\_\_\_ ] percent optimum density as determined by ASTM D 698 or [92] [ \_\_\_\_ ] percent optimum density, in accordance with ASTM D 1557.
		6. Maintain optimum moisture of mix materials to attain required stabilization and compaction.
		7. Finish subgrade surface as specified in Section 312000.
	5. GEOTEXTILE FABRIC
		1. Place fabric in areas indicated on Drawings or in areas requiring additional stabilization prior to placement of base course.
		2. Place fabric in accordance with manufacturers published instructions.

END OF SECTION

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