PROCEDURE FOR THE CONTROL
AND QUALITY ASSURANCE OF
GRANULAR MATERIALS

GEOTECHNICAL CONTROL PROCEDURE
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1. INTRODUCTION

1.1 Purpose

This manual establishes statewide control, quality assurance (QA), and documentation procedures for evaluating granular materials, natural or recycled, used for construction items. The intent of this manual is to assure that the Department receives a product that meets the specifications for the item for which it is used. The procedures in this manual have been developed to assure that sampling is representative of the entire source or stockpile. Deviation from these procedures therefore is not allowed without the expressed written permission of the Director, Geotechnical Engineering Bureau (GEB).

The controls for the various construction materials are specific to the type and application. The material types are sensitive to permeability, segregation and contamination and the requirements are intended to ensure that performance of the product in its final position is consistent, predictable, and meets expectations over the lifetime of the installation. For example, subbase material must have similar drainage and stability characteristics so that the pavement structure is adequately drained and supported. Similarly, backfill for Mechanically Stabilized Earth Structures (MSES) must have consistent physical, and, for systems utilizing metal reinforcing straps or mesh, electro-chemical properties to ensure that the overall structure is constructable, and meets predicted, long-term performance requirements.

The Supplier/Producer assumes full responsibility for all quality control (QC) activities for the production of the material. QC activities include assuring the material meets the specification requirements for which it is manufactured, as well as a plan to manage the inventory. Nevertheless, the Department has instituted additional controls and will perform QA on the final product to ensure that it meets specification requirements as outlined in this manual.

QA of granular materials involves collecting samples and performing testing at various points in the process. Depending on the item, this can include some or all of the following:
- Source evaluation
- Stockpile sampling and testing
- Sampling and testing material on the contract site. This may be from on the grade or from behind a MSE Structure after placement by the Contractor or at any other location where the material is being stored or used.

Test results are tied to the origin of material for natural material, or to the processing operation for recycled materials. Each source is assigned a unique Granular Source Number (GSN) when first evaluated.

Failure of material to meet specification requirements at any point in the QA process will result in rejection of that material, as described in this manual.
All samples submitted to the GEB shall be noted on the current *Granular Materials Evaluation Form*.

The test results of each stockpile will be indicated on the current *Granular Material Documentation Form*. 
2. STOCKPILED MATERIAL

2.1 General
The purpose of stockpiling material is to allow the Department to effectively evaluate granular material to ensure that it meets Specification requirements. Stockpiling is required for applications where the quality of the material is critical for the long term performance of the structure, for examination and assessment of recycled materials, and for all winter earthwork material substitutions as these items experience environmental influences affecting their placement. This section describes the steps necessary for the Department to evaluate such material. Note that other controls are necessary, in addition to the sampling requirements described below, in order for the Department to be confident that the material placed in the work meets specification requirements. These include:

- **“Chain of Custody”**: This describes the documentation process by which the Department ensures that the material being placed in the work is from a given approved stockpile. This process is the responsibility of the Contractor and Supplier, and it may include the employment of Contractor staff at the stockpile source, and the use of delivery tickets.

- **The effects of handling on the material**: It is the responsibility of the Contractor/Supplier to make sure that the methods used for delivering and handling the material does not result in a significant change in the material’s properties, such that the material goes “out of spec” due to segregation of particles. The Department will employ QA procedures, such as sampling material placed on the grade, to ensure that the material placed still meets specification requirements.

A Contractor/Supplier may elect to stockpile a material that is not required to be stockpiled by the item specification. If the Contractor/Supplier so elects, that material will be evaluated as stockpiled material, in accordance with the provisions contained herein.

A Contractor/Supplier has the option to construct stockpiles of most granular materials items, without reference to a specific contract. The exception to this option is MSES Backfill material. **The intent of this provision is to supply Department contracts with all of the material from this type of stockpile.** Permission to construct this type of stockpile is based on conformance with the intent of this option and all the requirements. This permission may be suspended by a Department Geotechnical Engineer based on violations of the procedures established in this manual.

The Regional Geotechnical Engineer (RGE), or his/her Representative, has the option of inspecting the construction of each stockpile to ensure that the requirements of this manual are met. Failure by the Contractor/Supplier to comply can result in the rejection of the stockpile by the RGE.
A stockpile may be rejected, based on visual inspection, by a Departmental Geotechnical Engineer, or his/her Representative. Samples will not be collected. Written documentation will be provided to the Engineer (for contract specific stockpiles) or the Contractor/Supplier (for non-contract specific stockpiles) with a copy to the RGE and GEB’s General Soils Laboratory (GSL), describing the reason for the rejection. Photographs and/or other evidence can also be provided to support a decision to reject a stockpile (see Section 2.6, “Documentation”).

2.2 Stockpile(s) Constructed for a Specific Contract

2.2.1 Requirements: The Contractor/Supplier shall meet the following requirements in the construction of each stockpile:

A. NOTIFICATION: Contractor/Supplier shall notify the Engineer of the intent to construct a stockpile, a minimum of three work days prior to beginning construction of any stockpile. The Engineer shall then notify the RGE that a stockpile is being constructed.

B. STRIPPING SOURCE: At all times the source of the material used for the manufacture of the stockpiled material shall be stripped of all organic and deleterious material for a minimum distance of 30 feet (9 m) from the top of the working face.

C. STOCKPILE LOCATION: Stockpiles shall be located a minimum of 50 feet (15 m) from the nearest edge of a storage pile built up under a processing plant conveyor, and from the toe of the working face of the source. Sufficient access shall be provided around the entire stockpile to sample and remove material in accordance with the requirements in Section 2.4.2, “Sampling Procedure”.

D. STOCKPILE CONSTRUCTION: Stockpiles shall be constructed of unfrozen material on a prepared surface of similar material, in stages not exceeding 4 ft. (1.2 m) in thickness. If a stockpile is constructed by alternately placing coarse and fine material, each layer of coarse or fine material in a stage shall not exceed 2 ft. (0.6 m) in thickness. The total height of the stockpile shall not exceed the reach of the equipment employed to remove material for sampling and use, nor be greater than 16 ft. (5 m).

E. STOCKPILE SIZE: The minimum size of a stockpile shall be 1,000 yd³ (800 m³). If the contract quantity is less than 1,000 yd³ (800 m³), the Contractor may construct a stockpile smaller than the minimum size, but not less than the contract quantity.

There is no maximum size restriction. However, large stockpiles may affect sampling frequency. The Department reserves the right to collect quality
assurance samples at any time while material is being removed from the stockpile.

The Department performs QA testing only on granular material intended for use on Department contracts. Therefore, the total quantity of stockpiled material of each item evaluated and approved for a specific contract should be within reasonable agreement with the quantities required by the Contract documents. If a Contractor/Supplier builds stockpiles in excess of the contract quantity, the RGE may require the Contractor/Supplier to provide justification for the extra material. The RGE and GEB will review the justification to determine whether to continue with the QA process.

F. **RAMPS:** Ramps formed for stockpile construction shall be the same material as that being stockpiled and will be considered part of the stockpile. Any contaminated surface material shall be removed before steepening (ramp removal) and/or sampling.

G. **STOCKPILE IDENTIFICATION:** All stockpiles shall be identified with at least one weather-resistant sign, placed with a sturdy support, on or in the pile within easy viewing from the ground. The information on the sign must be legibly written using weather-resistant paint or marker, and be easily readable from ground level. Minimum dimensions shall be 24 in. x 24 in (0.6 m x 0.6 m). All signs must be in place prior to sample collection, and shall remain in place until the stockpile is depleted or disposed of in accordance with SECTION 2.9.

The information on the sign shall include:
- Contract number,
- Stockpile number,
  - Stockpiles should be numbered consecutively, regardless of pile type or item and will be in the form of **GSN – 2 Digit Year – Consecutive pile number:** e.g. 99999 – 17 – 01, 99999 – 17 – 02, 99999-17-03, etc.
- Item number(s),
- Estimated quantity as Volume in yd$^3$.

### 2.3 Stockpile(s) Constructed Without Reference to a Specific Contract

Non Project-Specific (NPS) stockpiles allow Contractors/Suppliers to develop a ready supply of approved stockpiled granular material for use on multiple and/or projected Department contracts. **All of the material from the approved stockpiles is intended for use in Department or Federally Funded contracts.**

If the approved material is not used within a reasonable period of time (not less than the duration of one full construction season), the Contractor/Supplier may submit a written request to the RGE, to be allowed to sell part or all of the approved material for use on non-Department work.
Reasonable requests will be granted. All material usage will be documented on a NEW YORK STATE DEPARTMENT OF TRANSPORTATION STOCKPILED MATERIAL SHIPMENT form (see Appendix), and may be used to re-evaluate the Contractor/Supplier's privilege to construct such stockpiles in the future. Permission to construct this type of stockpile is contingent upon conformance with this, and the following requirements.
This option is not available for stockpiles of MSES Backfill material

A. **NOTIFICATION**: The Contractor/Supplier shall notify the RGE at least three work days prior to beginning construction of any stockpile.

B. **STRIPPING**: At all times the source of the material used for the manufacture of the stockpiled material shall be stripped of all organic and deleterious material for a minimum distance of 30 feet (9 m) from the top of the working face.

C. **STOCKPILE LOCATION**: Stockpiles shall be located a minimum of 50 ft. (15 m) from the nearest edge of a storage pile built up under the processing plant conveyor and from the toe of the working face of the source. Sufficient access shall be provided around the entire stockpile to sample and remove material in accordance with the requirements in Section 2.4.2, “Sampling Procedure”.

D. **STOCKPILE CONSTRUCTION**: Stockpiles shall be constructed of unfrozen material on a prepared surface of similar material, in stages not exceeding 4 ft. (1.2 m) in thickness. However, if a stockpile is constructed by alternately placing coarse and fine material, each layer of coarse or fine material in a stage shall not exceed 2 ft. (0.6 m) in thickness. The total height of the stockpile shall not exceed the reach of the equipment employed to remove material for sampling and use, nor be greater than 16 ft. (5 m).

E. The MINIMUM size of a stockpile of Underdrain Filter material shall be 1,000 yd³ (800 m³). For all other granular material items, the MINIMUM size of a stockpile shall be 3,000 yd³ (2,500 m³).

The MAXIMUM size of a stockpile shall be 10,000 yd³ (7,600 m³) unless the Contractor/Supplier submits, in writing, an acceptable quality control plan to the RGE. The quality control plan must be approved by the RGE and the GEB prior to the Contractor/Supplier beginning the construction of the stockpile. The Department reserves the right to collect quality assurance samples at any time while material is being removed from the stockpile.

F. **RAMPS**: Ramps formed for stockpile construction shall be the same material as that being stockpiled and will be considered part of the stockpile. Any contaminated surface material shall be removed before steepening (ramp removal) and/or sampling.
G. STOCKPILE IDENTIFICATION: All stockpiles shall be identified with at least one weather-resistant sign, placed with a sturdy support, on or in the pile within easy viewing from the ground. The information on the sign must be legibly written using weather-resistant paint or marker, and be easily readable from ground level. Minimum dimensions shall be 24 in. x 24 in (0.6 m x 0.6 m). All signs must be in place prior to sample collection, and shall remain in place until the stockpile is depleted or disposed of in accordance with SECTION 2.9.

The information on the sign shall include:
- Stockpile number,
  - Stockpiles should be numbered consecutively, regardless of pile type or item and will be in the form of GSN – 2 Digit Year – Consecutive pile number: e.g. 99999 – 17 - 01
- Item number(s),
- Initial quantity,
- Prior to supplying material to a Departmental contract, the Contractor/Supplier shall add the contract numbers to the sign.

H. DOCUMENTATION: The Contractor/Supplier of stockpiles is required to provide a completed NEW YORK STATE DEPARTMENT OF TRANSPORTATION STOCKPILED MATERIAL SHIPMENT DOCUMENTATION form (see Appendix A). This form must be submitted to the RGE no later than three work days after the first and fifteenth day of each month that material was taken from a stockpile. Information on the form shall include all quantities taken from the stockpile, both Department and non-Department contracts.

The STOCKPILED MATERIAL SHIPMENT DOCUMENTATION form is included in the appendix of this manual.

I. STOCKPILE REJECTION: Non-compliance with any of these requirements will result in rejection of the stockpile by the RGE. Any rejected stockpile shall be disposed of in accordance with Section 2.9 of this manual.

REJECTION NOTIFICATION: The RGE will notify the Contractor/Supplier, via letter, of a stockpile rejection for non-compliance with the intent and/or requirements. A copy of this letter will be sent to the Director of the GEB. The Regional Geotechnical Engineer may prohibit the Contractor/Supplier from constructing a NPS stockpile (stockpile without reference to a specific contract) for a period of up to two years. During this period when the Contractor/Supplier is restricted to building only contract-specific stockpiles, those stockpiles will be limited to the contract quantity.

REJECTION APPEAL PROCESS: The Contractor/Supplier may appeal the decision to the Director of the GEB by requesting, in writing, a meeting between
themselves, the RGE and representatives from the GEB stating the basis of the appeal. This request must be made within two weeks of the written notification of rejection. The Contractor/Supplier may request representation from the Empire State Concrete and Aggregate Producers Association, Inc. and/or the Associated General Contractors. The meeting will be scheduled within one week of receipt of this request. The Contractor/Supplier will present his/her appeal at this meeting. A final determination will be made by the Director of the GEB and forwarded in writing to the Contractor/Supplier within one week of the date of the meeting.

2.4 Sampling of Stockpile(s)

2.4.1 General

A. After a stockpile has been sampled, it shall not be modified, moved, or reshaped. Material removed from the stockpile during the sampling process as described in this manual may be replaced with the following restrictions:
   - A Departmental Representative must be present to witness the work and/or approve the Contractor/Supplier’s method of replacing the material in a manner that retains the general shape and maximum height required of stockpiles.
   - Material shall be replaced so as to minimize segregation.

B. Material shall not be added to a stockpile after sampling. If material is added after the stockpile has been sampled, or the stockpile is otherwise tampered with, the RGE will declare the stockpile rejected and it shall be disposed of in accordance with Section 2.9.

C. A stockpile may not be moved or relocated, unless the following requirements are met:
   - A written request to move a stockpile must be sent to the RGE (copy to the Engineer). The request shall include an explanation as to why it is necessary, or why it is in the Department’s best interest, to move the stockpile. Work shall not proceed without written permission by the RGE.
   - The operation must be inspected by a Department Representative at both the sources and at the new location.
   - The relocated stockpile shall only consist of material from the approved stockpile being moved. Other material shall not be added to the relocated stockpile.
   - The relocated stockpile shall be constructed in accordance with the requirements of Section 2.2.1 D through 2.2.1 G.
   - The new footprint of the stockpile shall not overlap the previous footprint at any point. The stockpile must be relocated in its entirety.
2.4.2 Sampling Procedure

A. **RESPONSIBILITY:** The RGE is responsible for sampling all stockpiles.

B. **NOTIFICATION:** The Engineer will notify the RGE when a stockpile constructed for a **SPECIFIC CONTRACT** has been completed and is ready to be sampled. A Departmental Geotechnical Engineer or Representative will sample the stockpile within five work days of notification.

The Contractor/Supplier will notify the RGE when a NPS stockpile constructed **WITHOUT REFERENCE TO A SPECIFIC CONTRACT** has been completed and is ready to be sampled. A Departmental Geotechnical Engineer or Representative will sample the stockpile within five work days of notification.

C. **PERSONNEL AND EQUIPMENT FOR SAMPLING:**
   1. A Departmental Geotechnical Engineer or Representative will direct all sampling operations.
   2. The Contractor/Supplier shall provide the personnel and equipment necessary to assist in sampling. If the Contractor/Supplier fails to provide the personnel and equipment necessary to assist in sampling in accordance with this provision, the stockpile will be rejected and disposed of in accordance with Section 2.9.

D. **SAMPLING:**
   1. A stockpile will be visually divided into four approximately equal quadrants.
   
   2. Within each quadrant, the Contractor/Supplier shall:
      a. Remove all frozen material prior to sampling.
      b. Using a front-end loader of sufficient size, dig into the stockpile to form a continuous slope by grading the full height of the stockpile so that material does not collapse and result in segregated material at the toe.
      c. The loader operator shall then channel the slope, beginning 1 ft. (0.3 m) from the bottom and continuing to the top of the slope in one operation, to fill the bucket.
      d. The bucket shall then be lowered to ground level and slowly emptied by rotation to form a small pile at each quadrant.
   
   3. Collect a sample from each small pile by following these steps:
      a. Visually divide the small pile into four equal quadrants. In each quadrant:
b. Using a **square-point** shovel, grade the slope from top to bottom such that material does not collapse and result in segregation.

c. Obtain a large shovelful of material by channeling up the length of the middle third of the slope. Place the material in an approved granular materials sample container.

**Note:** An approved container is a sample bag (supplied by the GEB), or sufficiently sized bucket with tight fitting lid.

Repeat **Steps 3.b** and **3.c** in all four quadrants to obtain one full sample.

**Monitoring Sample collection:** Perform **Step 3.c** in each of the four small piles from the stockpile, resulting in a sample made up of a composite of material from all four quadrants of the stockpile.

**Stockpile QA Sample collection:** Perform **Steps 2.b** through **2.d,** and **Steps 3.a** through **3.c.** from the working face of the stockpile.

**Note:** The minimum sample size is 45 lbs. (20 kg). Generally, four large shovelfuls of material are adequate to attain this minimum. However, occasionally it may be necessary to repeat **Step 3.c** to assure the minimum sample weight has been collected.

d. Place documentation containing sample information in a small plastic bag and then place the bag into the sample container. The documentation should include:
   i. Source Name and GSN
   ii. Stockpile number
   iii. Stockpile quantity
   iv. Item Number(s)
   v. Sample Number
   vi. Sample location (North, East, South, or West)
   vii. Date
   viii. Sampler Name
   ix. Any other pertinent information (site map, stockpile shape, etc.).

e. Securely seal the sample container. Include a label identifying the sample on the outside of the sample container.

f. All samples shall be transported by a Departmental Geotechnical Engineer, or Representative, for testing and evaluation.

E. **SAMPLING ERROR:** If the Contractor/Supplier claims that a sampling error has been committed, and it is not resolved at the site at the time of sampling, the
alleged error shall be resolved by the RGE. The Contractor/Supplier shall, within one work day, provide a detailed written description of the alleged error to the RGE, who will make a decision as soon as possible concerning the validity of the claim. If the allegation is upheld, the RGE, or Representative, shall immediately re-sample the stockpile in accordance with the requirements in Section 2.4.2 D. All prior samples and/or test results will be considered void.

2.5 Stockpile Waivers

The following procedures can be implemented by the RGE in lieu of stockpile requirements:

2.5.1 Material Transported by Barge

The method used to load the barge shall be approved by the RGE. The RGE will stipulate the procedure for and direct the sampling of the barge. The Contractor/Supplier shall supply the personnel and equipment necessary to assist in sampling. A minimum of one sample shall be obtained. It may be obtained either before or after loading the barge. If the material is sampled before being loaded, the sample(s) shall be obtained from a location where material can not be added or removed before being directly loaded into the barge.

Material testing and evaluation shall be in accordance with the requirements for stockpiled material. The material shall be unloaded from the barge for transportation to the contract so that the material placed on the grade conforms to the specification requirements of the item(s).

2.5.2 Material for Temporary Use

The following procedure may be used for approval of granular material items used in the construction of temporary work. This procedure shall not apply if the material from the temporary work is to become incorporated into the final contract.

A Departmental Geotechnical Engineer will visually inspect each proposed source of material for compliance with specification requirements and submit an evaluation of the material, in writing, including any limiting conditions, to the Engineer and RGE.

If, in the judgment of the RGE, the proposed material is not satisfactory for the intended item, the Contractor shall follow the procedures in this manual for evaluation of the material as the intended item requires.
2.6 Documentation

TEST RESULTS: The samples submitted to the GEB shall be noted on the GRANULAR MATERIALS EVALUATION FORM SM-453. Test results will be noted on the Form by the GEB and submitted to the RGE.

APPROVAL/REJECTION: For all items except MSES Backfill, the RGE will list test results on the GRANULAR MATERIAL DOCUMENTATION FORM SM-454, document whether the material is approved or rejected, and distribute the Form to the Engineer, the Contractor and the Supplier (for contract-specific stockpiles) or to the Contractor/Supplier (for NPS stockpiles constructed without reference to a specific contract).

For MSES Backfill, the GEB General Soils Laboratory Supervisor, or representative, will list test results on the GRANULAR MATERIAL DOCUMENTATION FORM SM-454, document whether the material is approved or rejected, and distribute the Form to the RGE and the Engineer. The Engineer will distribute it to the Contractor and the Supplier.

Stockpiles visually rejected by a Departmental Geotechnical Engineer must be documented, in writing, indicating the basis of rejection and distributed as indicated above.

2.7 Use of Approved Material

Only stockpiles that have been approved as noted above shall be used as sources of stockpiled material.

Stockpiled material may be used for any item for which the test results indicate the material meets the specification requirements. The Engineer using material from a NPS stockpile approved without reference to a specific contract must obtain documentation of stockpile approval from the RGE prior to placing the material on the grade.

Approval of a stockpile shall not relieve the Contractor of the responsibility to place in its final position a material conforming to all the specification requirements for the intended item. If the Engineer observes material being placed on the grade that appears to be outside of the specification requirements or observes a visual difference in the material, the Engineer may request the RGE to obtain quality assurance samples at any location and reject all material not conforming to the specification requirements.

In addition, the Department may elect to take samples from the grade at any time as part of the overall QA process. The frequency and approximate location of these additional samples will be determined by the GEB’s General Soils Laboratory Supervisor, or representative, based on a history of the source and the quantity of material being placed. Note that because of the critical importance of backfill placed for MSES applications, the Department will always take additional samples from behind the new structure for additional testing. QA samples for MSES backfill material shall be taken in accordance with GCP-20 Procedure for Taking Random Samples of
Backfill Material for Mechanically Stabilized Earth Systems. Note that the typical turn-around time for these test results is two weeks. Every effort will be made to expedite this testing.

In the event that test results from QA samples indicate that the material does not meet specification requirements, that material will be rejected. Determination of the amount and extent of rejected material depends on the importance of the application (i.e. MSES backfill requirements are more critical than those for backfill around a concrete pipe), as well as the nature of the deviation from the specifications. Possible consequences could include but not be limited to:

- Issuance of a Stop Work order by the Engineer;
- Requiring the contractor to remove and replace the material placed that day;
- Requiring the contractor to conduct an investigation to determine the full extent of the unacceptable material, followed by removal and replacement.

If the Contractor/Supplier fails to provide the personnel and equipment necessary to assist in sampling in accordance with this provision, the stockpile will be rejected and disposed of in accordance with Section 2.9.

USE OF APPROVED MATERIAL: Material removed for contract use from accepted stockpiles shall be by side excavation for the full height of the stockpile, unless otherwise approved by the Soils Engineering Laboratory Supervisor.

STOCKPILE EXPIRATION: All stockpiles will expire two years from the date of acceptance. After the expiration date, the stockpile shall be disposed of in accordance with Section 2.9.

2.8 Transfer of Stockpile(s)

A RGE may approve transfer of all or a portion of the material from an approved stockpile to another contract according to the following procedure:

A. The Contractor requesting the transfer shall submit the following information to the Engineer:
   1. The location and number of the stockpile.
   2. The contract for which the stockpile was originally approved.
   3. The present owner of the material, including address.
   4. The estimated quantity of material remaining in the stockpile.
   5. The quantity of material to be utilized from the stockpile on the applicant's contract.
   6. The item(s) for which the material will be used by the Contractor.

B. The Engineer shall submit the information from the Contractor to the RGE and request, in writing, a transfer of material from the stockpile.
C. The RGE shall contact the Engineer of the contract for which the stockpile was originally approved and discuss the impact of transferring material from the stockpile. If the material to be transferred will be used as MSES backfill, the RGE shall discuss the transfer request with the GEB. Transfer quantities of MSES should be such that it meets or exceeds the anticipated job quantities, as backfill material for any MSES shall be provided from a single source unless the GEB along with the RGE approve of obtaining material from multiple sources.

D. The RGE shall review the records from the stockpile to determine the quantity used and the quantity remaining with the initial estimate of the quantity evaluated in the stockpile. If the review uncovers discrepancies in the quantity of material evaluated in the stockpile, the request for transfer of approval will be denied.

E. The RGE shall provide a written notification to each involved Engineer and the Contractor/Supplier stating final determination on the stockpile transfer request. If the request is approved, the transfer approval shall include the location and number of the stockpile, a copy of the original approval, a list of the previous contracts using the stockpile and all appropriate restrictions.

F. The Engineer of the contract receiving the transfer shall provide the RGE with the quantity of material actually used on the contract from the stockpile.

2.9 Disposal of Stockpile(s)

Material from a rejected or expired stockpile may be disposed of or may be used in the construction of another stockpile provided no portion of the new stockpile overlaps the location of the existing stockpile. Stockpiles rejected because of deleterious (sod, topsoil etc.) or hazardous (fuel, asbestos etc.) material shall not be used in the construction of another stockpile.

Stockpiles for MSES Backfill that are rejected due to failure to meet chemical requirements shall not be used in the construction of another stockpile for MSES Backfill.

If requested by the Contractor/Supplier, material from an expired stockpile that does not contain hazardous material may, at the direction of the RGE, be reshaped to remove surface growth and be re-evaluated.
3. STOCKPILED MATERIAL EVALUATION

3.1 General

This process involves tests on the samples of material, review of the test results, decision on the current stockpile and determination of the case designation for the material source.

The case designation determines the course of action to be followed for subsequent stockpile(s).

- **Case A** indicates that material testing will be performed in the Region, except for the first stockpile of each year. Samples from these initial stockpiles will be forwarded to the GEB’s General Soils Laboratory for evaluation.

- **Case B** indicates that the material testing will be performed in the Region. A monitoring sample will be forwarded to the GEB for testing. Test results obtained from monitoring samples will not necessarily affect the acceptance of the stockpile being evaluated, but may change the case designation for subsequent stockpiles.

- **Case C** indicates that the testing will be performed at the GEB’s General Soils Laboratory.

3.2 Material Testing

The samples from each stockpile are tested and the results are evaluated in accordance with the subsequent portions of this section. Note that soundness and plasticity index are central to this manual, as the results of these tests are used to designate the stockpile Case and Tier. Depending on the specification item requirements, however, other tests may be conducted.

Laboratory testing for:

- Magnesium Sulfate Soundness,
- Plasticity Index,
- Gradation,
- Resistivity, pH, Sulfides and Sulfates Ions, and Chlorides Ions for MSES backfill,
- Cadmium, Chromium, Lead and Silver (per Toxicity Characteristic Leaching Procedure, EPA Test Method 1311),
- Any other properties, as required by the Item specification, will be conducted in accordance with current Departmental procedures.

All individual test results and the mean of the results will be rounded to a whole number. If the decimal portion is less than 0.5, round downward to the nearest whole number; if the decimal portion is greater than 0.5, round upward to the nearest whole number; if the decimal portion is 0.5, round to the nearest even whole number, or zero.
If a testing error is alleged, the Contractor/Supplier shall, within ten work days of the receipt of the GRANULAR MATERIALS DOCUMENTATION FORM, submit a written detailed description of the alleged testing error to the RGE. The RGE will refer the information to the Soils Engineering Laboratory Supervisor for resolution. If re-sampling is ordered, all prior samples and/or test results will be considered void and the stockpile will be re-sampled.

3.3 Stockpile Evaluation Criteria

The test results are evaluated in accordance with following criteria:

3.3.1 Magnesium Sulfate Soundness Loss

The mean soundness loss of the samples submitted shall be within the specification limits.

No more than one of the soundness loss values of the samples submitted shall exceed the value of the maximum specification limit. In no case shall the maximum specification limit be exceeded by more than 5 percent.

3.3.2 Plasticity Index

The mean Plasticity Index of the samples submitted shall be within the specification limits.

No more than one of the Plasticity Index values of the samples submitted shall exceed the value of the maximum specification limit. In no case shall the maximum specification limit be exceeded by more than 1.

3.3.3 Gradation

The gradation of each sample from the stockpile, excluding monitoring samples, shall meet the specification requirements for the item.

3.4 Material Source Type(s)

The material sources are designated as shown in the following chart:

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockpiles of Granular Materials (except MSES Backfill Material)</td>
<td>Stockpiles of Granular Materials from Sources listed in NYSDOT Materials Bureau Approved List SOURCES OF FINE AND COARSE AGGREGATES</td>
<td>Stockpiles Containing Recycled Materials</td>
</tr>
</tbody>
</table>
3.4.1 Tier 1 – Stockpile(s) of Granular Materials

All new production sources shall have four samples from each of the first six stockpiles forwarded to the GEB for evaluation as Case “C”. A Case Determination will be made based on the results of these evaluations, in accordance with Section 3.5, “Case Determination Criteria - Tier 1 and Tier 3”.

In any 12 month cycle the initial stockpile, from a Tier 1 Source, will have four samples submitted to the GEB for Magnesium Sulfate Soundness, Plasticity Index and Gradation, regardless of Case Determination status of the Source. The GEB will select a course of action to be followed for samples from subsequent stockpiles obtained from the same source.

Test results from stockpiles of Subbase (all Types) will only be used in determining the course of action for subsequent stockpiles of Subbase. Similarly, test results from stockpiles of Underdrain Filter Material will only be used in determining the course of action for subsequent stockpiles of Underdrain Filter Material. The results and course of action will be recorded on the GRANULAR MATERIAL EVALUATION FORM and forwarded to the appropriate RGE.

3.4.2 Tier 2 – Stockpile(s) of Granular Materials from Sources identified on the Approved List of "Sources of Fine and Coarse Aggregates"

The GEB will designate Case “B” as the course of action to be followed for samples from stockpiles obtained from those areas of Sources placed on the most current New York State Materials Bureau Approved List "SOURCES OF FINE AND COARSE AGGREGATES ("Stone" or “Gravel” categories only).

If prior testing indicates a Case “A” designation these sources will remain Tier 1, Case “A”, regardless of Materials Bureau Approved List status. These sources will remain as Tier 1, Case “A” until testing indicates a change from Case “A”.

For new sources, the initial stockpile will have four samples submitted to the GEB for Magnesium Sulfate Soundness, Plasticity Index and Gradation, regardless of Materials Bureau Approved List status. A new source is one with a GSN which has not previously submitted a stockpile for evaluation.

The GEB may waive the testing of the Magnesium Sulfate Soundness and Plasticity Index of material from these Sources.

Sources will remain in Tier 2 unless:

- The source is removed from "SOURCES OF FINE AND COARSE AGGREGATES."
• Material from areas not approved by the Materials Bureau, is being used to construct stockpiles.

• Test results from monitoring samples meets or exceeds the maximum specification value for Magnesium Sulfate Soundness or Plasticity Index.

Sources that are removed from Tier 2 shall be placed in Tier 1 and remain in Tier 1 for a minimum of six stockpiles.

3.4.3 Tier 3 – Stockpile(s) Containing Recycled Materials

All new production sources* shall have four samples from each of the first six stockpiles forwarded to the GEB for evaluation as Case “C”. A Case Determination will be made based on the results of these evaluations, in accordance with Section 3.5, “Case Determination Criteria - Tier 1 and Tier 3”.

Subject to material characteristics, GEB may waive the requirement to have four samples from each of the first six stockpiles forwarded to the GEB for evaluation as Case “C”.

In any 12 month cycle the initial stockpile, from a Tier 3 Source, will have four samples submitted to the GEB for Magnesium Sulfate Soundness, Plasticity Index and Gradation, regardless of Case Determination status of the Source. The GEB will select a course of action to be followed for samples from subsequent stockpiles obtained from the same source.

* A portable crushing operation run by a specific company is considered a production source, similar to stationary operations. As such, they are evaluated in the same manner as stationary operations as notes above, regardless of the location of the portable operation.

3.5 Case Determination Criteria - Tier 1 and Tier 3

3.5.1 General

If Case “A” or Case “B” is assigned to the source, but visual observation of subsequent stockpiles indicates a change in the material, a Departmental Geotechnical Engineer may select a course of action in accordance with Case “B” or Case “C”. When this change occurs, all samples will be submitted to the GEB for testing and determination of a course of action.

If the maximum specification limit is met or exceeded by one or more samples, Case “C” will be assigned.
3.5.2 Case Criteria

The following will be applied to the test results, combined with the test results from the past five stockpiles that have had four samples tested by the General Soils Laboratory, when determining the case designation for each subsequent stockpile from a Source:

3.5.2.1 Stockpiles containing only Crushed Ledgerock or Blast Furnace Slag

<table>
<thead>
<tr>
<th>Case</th>
<th>% Soundness Loss (Mean)</th>
<th>Plasticity Index (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤ 10</td>
<td>Non Plastic (NP)</td>
</tr>
<tr>
<td>B</td>
<td>≤ 15</td>
<td>≤ 4</td>
</tr>
<tr>
<td>C</td>
<td>All Other Results</td>
<td>All Other Results</td>
</tr>
</tbody>
</table>

3.5.2.2 Stockpiles containing only Gravel or Crushed Gravel

<table>
<thead>
<tr>
<th>Case</th>
<th>% Soundness Loss (Mean)</th>
<th>Plasticity Index (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤ 10</td>
<td>NP</td>
</tr>
<tr>
<td>B</td>
<td>≤ 15</td>
<td>≤ 2</td>
</tr>
<tr>
<td>C</td>
<td>All Other Results</td>
<td>All Other Results</td>
</tr>
</tbody>
</table>

3.5.2.3 Stockpiles containing only Recycled Materials

<table>
<thead>
<tr>
<th>Case</th>
<th>% Soundness Loss (Mean)*</th>
<th>Plasticity Index (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>B</td>
<td>≤ 15</td>
<td>≤ 4</td>
</tr>
<tr>
<td>C</td>
<td>All Other Results</td>
<td>All Other Results</td>
</tr>
</tbody>
</table>
* The GEB may waive Soundness Loss or Plasticity Index testing for Recycled Materials.

3.5.2.4 Stockpiles containing BLENDS of Crushed Ledgerock, Gravel or Crushed Gravel or Recycled Materials.

<table>
<thead>
<tr>
<th>Case</th>
<th>% Soundness Loss (Mean)</th>
<th>Plasticity Index (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>B</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>C</td>
<td>All Values</td>
<td>All Values</td>
</tr>
</tbody>
</table>

3.5.2.5 Stockpiles containing MSES BACKFILL.

<table>
<thead>
<tr>
<th>Case*</th>
<th>% Soundness Loss (Mean)</th>
<th>Plasticity Index (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
* Case Criteria does not apply to MSES Backfill.
3.6 Case Designations

*Note:* Case Criteria and designations do not apply to MSES Backfill Material.

All sources providing material to Department contracts will be placed in one of the following case designations:

### 3.6.1 Case “A”

If Case “A” is assigned to a Source, the Magnesium Sulfate Soundness and Plasticity Index of the samples from subsequent stockpiles will be accepted on the basis of the 4 sample stockpile evaluation of the Source completed no longer than 12 months prior. Four samples will be collected in accordance with Section 2.4.2 D, “Sampling”, and evaluated for Gradation by the RGE. Based on the test results, the RGE will Approve or Reject the stockpile.

There will be no Case “A” course of action for stockpiles containing Recycled Materials.

### 3.6.2 Case “B”

If Case “B” is assigned to a Source, the Magnesium Sulfate Soundness and Plasticity Index of the samples from subsequent stockpiles will be accepted on the basis of the most recent evaluations of the Source. Four samples will be collected in accordance with Section 2.4.2 D, “Sampling”, and evaluated for Gradation by the RGE. Based on the test results, the RGE will Approve or Reject the stockpile.

In addition, a Monitoring Sample from each stockpile will be collected in accordance with Section 2.4.2 D, “Sampling”, and forwarded to the GEB for evaluation. Results of tests conducted by the GEB on this sample will not necessarily affect the status of the stockpile from which it was obtained. However, based on the test results, the GEB may change the course of action for the next stockpiles (for example, from Case “B” to either Case “A” or Case “C”).

### 3.6.3 Case “C”

If Case “C” is assigned to a Source, four samples from subsequent stockpiles will be submitted to the GEB for Magnesium Sulfate Soundness, Plasticity Index, and Gradation testing.
4. NON-STOCKPILED MATERIAL

4.1 General

Materials which do not require stockpiling for assessment of one or more of the material’s engineering properties (e.g. gradation, durability, pH, or plasticity, metals) will be evaluated according to the procedures of non-stockpiled materials in this manual. Sources for non-stockpiled materials generally consist of run-of-bank pits or borrow sites, quarries, storage piles, or surge piles consisting of natural and/or man-made materials.

Each year, a list of sources anticipated to be used for upcoming Department contracts shall be submitted by the RGE to the GEB for a determination of the number of samples that will be required for an evaluation. The GEB will return the list to the RGE and indicate the number of samples required to be forwarded to the GEB, General Soils Laboratory for testing.

Material from each Source will be evaluated for Magnesium Sulfate Soundness and Plasticity Index before it is allowed to supply material to Department contracts. The evaluation will be valid for a 12 month period unless, on the most recent Granular Material Documentation Form, a more frequent monitoring cycle is set for the source.

Sources which are more than 30 days past due for evaluation or monitoring will be marked inactive within Site Manager for non-stockpiled material items with a Magnesium Sulfate Soundness or Plasticity Index requirement.

The gradation of the material is evaluated on the contract site by the project inspection personnel.

4.2 Sampling of Non-Stockpiled Material

The samples shall be obtained under the direction of the Departmental Geotechnical Engineer.

4.2.1 Sampling Procedure

A. **RESPONSIBILITY**: The RGE is responsible for sampling all sources.

B. **NOTIFICATION**: The Engineer will notify the RGE of their intent to use a source. If no valid source evaluation is available, a Departmental Geotechnical Engineer or Representative will sample the source within five work days of notification.

C. **PERSONNEL AND EQUIPMENT FOR SAMPLING**:

1. A Departmental Geotechnical Engineer or Representative will direct all sampling operations.

2. The Contractor/Supplier shall provide the personnel and equipment necessary to assist in sampling. If the Contractor/Supplier fails to provide the personnel and equipment necessary to assist in sampling in
accordance with this provision, the source will be rejected for use for non-stockpiled material with a Magnesium Sulfate Soundness or Plasticity Index requirement.

D. **SAMPLING:**
   1. The number and depth of samples will be dependent upon the topography of the area, stratification of the deposit and quality of the material. Samples will be chosen to characterize the quantity of material required.

   2. Within each sample location, the Contractor/Supplier shall:
      a. Remove all frozen material prior to sampling.
      b. Using a front-end loader of sufficient size, dig into the material to form a continuous slope that does not collapse and result in segregated material.
      c. The loader operator shall then channel the face vertically to represent the materials proposed for use.
      d. The bucket shall then be lowered to ground level and slowly emptied by rotation to form a small pile at each location.

   3. Collect a sample from each small pile by following these steps:
      a. Visually divide the small pile into four equal quadrants. In each quadrant:
      b. Using a square-point shovel, grade the slope from top to bottom such that material does not collapse and result in segregation.
      c. Obtain a large shovelful of material by channeling up the length of the middle third of the slope. Place the material in an approved granular materials sample container

         Repeat **Steps 3.b** and **3.c** in all four quadrants to obtain one full sample.

   **Note:** The minimum sample size is 45 lbs. (20 kg). Generally, four large shovelfuls of material are adequate to attain this minimum. However, occasionally it may be necessary to repeat **Step 3.c** to assure the minimum sample weight has been collected.

   d. Place documentation containing sample information in a small plastic bag, and then place the bag into the sample container. The documentation should include:
      i. Source Name and GSN
      ii. Item Number(s)
      iii. Sample Number
      iv. Sample location
      v. Date
      vi. Sampler Name
vii. Any other pertinent information
e. Securely seal the sample container. Include a label, identifying the sample, on the outside of the sample container.
f. All samples shall be transported by a Departmental Geotechnical Engineer, or Representative, for testing and evaluation.

4.3 Sampling Options

4.3.1 Material from Test Pits
Non-stockpiled material obtained from test pits will be taken to represent the materials beyond the pit face proposed for use. Samples shall be submitted in accordance with Section 4.2. An excavator may be used to obtain samples from Test Pits.

4.3.2 Material Transported by Barge
Non-stockpiled material transported by barge shall be sampled in accordance with the requirements in Section 2.5.1.

4.3.3 Material for Temporary Use
Non-stockpiled material for Temporary Use shall be sampled in accordance with the requirements in Section 2.5.2.

4.3.4 Visual
A visual inspection may be used by a Departmental Geotechnical Engineer or Geologist for the evaluation of the Magnesium Sulfate Soundness for non-stockpiled material to be used as a construction lift, underwater fill or slope protection. A visual inspection may also be used by a Departmental Geotechnical Engineer for the evaluation of a storage pile of recycled material as required by the specification. The Engineer and RGE will receive a written evaluation of the material which will include any limiting conditions.

4.4 Documentation

The samples submitted to the GEB shall be noted on the GRANULAR MATERIALS EVALUATION FORM. Test results will be noted on the Form by the GEB and returned to the RGE.

The results of the evaluation of the source are indicated on the GRANULAR MATERIAL DOCUMENTATION FORM, which will be prepared by the RGE. The RGE will forward a copy of the GRANULAR MATERIAL DOCUMENTATION FORM to the Engineer and Contractor/Supplier.

4.5 Use of Source

Only material approved in writing shall be used. At all times the source of the material shall be stripped of all sod, topsoil and other objectionable material, for a minimum distance of 30 ft. (9 m) from the top of the working face. All removal of oversized material, blending, or crushing operations shall be completed at the source of the material. Gradation of the material will be tested by the Engineer in accordance with current Departmental procedures.
5. NON-STOCKPILED MATERIAL EVALUATION

5.1 General

Any required, non-stockpiled material samples obtained from a source will be tested and evaluated by the GEB.

Monitoring samples requested by the GEB may be obtained on the grade by the RGE or Engineer, or from the source by the RGE. In either case the RGE will forward the samples to the GEB, General Soils Laboratory.

A source evaluation for the Magnesium Sulfate Soundness and Plasticity Index requirements of non-stockpiled material will remain valid only as long as the monitoring samples indicate continuous compliance with the requirements in Section 5.2.

If required by the specification, a visual inspection of a storage pile of recycled material will be performed by the RGE.

5.2 Evaluation Criteria

The specification requirements are evaluated in accordance with the following criteria:

5.2.1 Magnesium Sulfate Soundness Loss
A. The mean soundness loss of the sample(s) submitted shall be within the specification limits.
B. In no case shall the maximum specification limit be exceeded by more than five (5).

5.2.2 Plasticity Index
A. The mean Plasticity Index of the sample(s) submitted shall be within the specification limits.
B. In no case shall the maximum specification limit be exceeded by more than 1.

5.2.3 Gradation
The gradation is evaluated by the Engineer and the material will be approved for gradation when the individual gradation test results meet the specification requirements for the item.

5.2.4 Visual
A storage pile of recycled material may be evaluated by the RGE and the material will be approved for use upon the RGE’s determination that the material meets the specification requirements.
REFERENCES

1. NYSDOT - Test Method for Magnesium Sulfate Soundness of Granular Materials
2. NYSDOT - Test Method for Liquid Limit, Plastic Limit and Plasticity Index
3. NYSDOT - Test Method for The Grain-Size Analysis of Granular Soil Materials
4. NYSDOT - Inspection and Calibration of Soil Stabilization Plants
5. NYSDOT – Test Method for the Determination of pH Value of Soil or Water by pH Meter.
6. NYSDOT Standard Specifications
7. AASHTO T 288: Determining Minimum Laboratory Soil Resistivity.
8. AASHTO T 290: Standard Method of Test for Determining Water-Soluble Sulfate Ion Content in Soil.
10. NYSDOT Materials Bureau Test Method 711-12C, Sulfide Content.
APPENDIX
NEW YORK STATE DEPARTMENT OF TRANSPORTATION
STOCKPILED MATERIAL SHIPMENT DOCUMENTATION

This is to certify that NYSDOT-approved material was shipped to the following:

<table>
<thead>
<tr>
<th>DATE</th>
<th>CONTRACT NO. (if applicable)</th>
<th>ITEM NO. (if applicable)</th>
<th>STOCKPILE NO.</th>
<th>QTY. SHIPPED (yd³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DOT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Non-DOT</td>
</tr>
</tbody>
</table>

SUPPLIER NAME: ___________________________ GEB SOURCE # ___________________________

SUPPLIER ADDRESS: ________________________________________________________________

SIGNED BY: ___________________________ DATE: ___________________________

PRINTED NAME: ________________________________________________________________