

Appendix: Rock and Concrete Core Retention

This document provides standard guidance on rock and concrete core sample labeling, photography, storage, and retention to be used in TDOT GES operations. The guidelines serve as a reference for the standard retention policy of rock and concrete core samples, as well as consistent storage procedures. This document applies to rock and concrete core obtained by internal geotechnical personnel, drill crews, geotechnical consultants, and contractors.

- **Delivery:** The following guidance applies to non-internal TDOT deliveries. Prior to core samples delivery (rock or concrete) e-mail a delivery request to TDOT Geotech (TDOT.Geotech@tn.gov) 48 hours in advance, and an individualized response email will be returned with scheduling arrangements. If drilled shaft concrete core is being delivered, courtesy copy TDOT Structures (TDOT.Structures@tn.gov) in this email. The e-mail should contain the Pin No., CN number, and all other project information sufficient to identify the appropriate GES Project Monitor for that particular project. Depending upon the location of the project, the core sample delivery will be made to TDOT Region 1 Complex or Region 3 Complex (Building D/G). The delivery should arrive with the individualized email response affixed to the box. The delivery will be entered into the respective “GES Core Ledger” upon arrival. The core samples will be staged temporarily inside the Region 3 geotechnical drill shop or at Region 1 Materials and Tests testing laboratory. Under no circumstance should core be delivered or unloaded without approval from the GES. Improperly labeled core samples, or core that has not been fully documented, will not be accepted. See the following section on Labeling, Orientation, and Photography of the Rock Core and Boxes for accepted guidance.
- **Inspection:** Any request to inspect concrete or rock core should also be made using the e-mail TDOT Geotech (TDOT.Geotech@tn.gov). All activity related to inspection shall be noted in the on-site “GES Core Ledger” kept on-site.
- **Testing:** Any rock or concrete samples that require testing by a laboratory should be removed from the core box and an appropriate note should be permanently affixed to and within that box, and further denoted in the GES Core Ledger. Rock/concrete core samples should be placed in a suitable sample container and appropriately labeled. Any core samples to be tested in the TDOT Materials & Tests Division - Laboratory Section should be logged in at the receiving dock and the appropriate test should be assigned (for rock - ASTM D7012, Method C, and for concrete - ASTM C42/C42M).
- **Safety:** Due to the possibility of an allergic reaction to bites/stings, it should be noted that wasps and spiders are present at the current storage facilities. Delivery of samples to the drill crew shop bay should not be an issue. Two people shall be present when searching for or moving rock core in the storage area. Accessing of core shall be accomplished using forklift operation, limited to certified TDOT personnel.

STORAGE, INVENTORY, AND DISPOSAL OF CORE

General

Prior to Pre-Construction Rock Core (from geotechnical investigations) being delivered for storage, the GES Project Monitor shall ensure adequate records of the final boring logs and photographs are saved in the electronic project file under the project Boring Logs folder. In addition, rock core samples required for testing shall be extracted prior to storage. Wooden blocks or other spacers, with pertinent information, shall be inserted to replace the core sample(s).

When any core is delivered, the GES Project Monitor shall coordinate with the GES Drill Crew Supervisor to ensure all core project information is recorded properly into the “GES Core Ledger”. The specific location within the storage facility shall be recorded in the “GES Core Ledger.”

All core boxes from the same project are to be stacked and stored together, with the project information easily visible. Pallets shall be labelled in such a manner that they can be readily retrieved if desired.

It is the responsibility of the GES Project Monitor to identify core for disposal and coordinate with the GES Drill Crew Supervisor. GES personnel will review PPRM quarterly to identify core for disposal. No core should be disposed of without approval from the GES Project Monitor.

Rock core or drilled shaft concrete core can be disposed in the concrete cylinder dump truck parked at the back dock. Core boxes can be placed in the dumpster near the sign shop.

Pre-Construction Rock Core - Roadway Alignment

Storage/retention is generally not required for rock core samples collected for the purpose of roadway alignment investigations, such as those for slope design. Nor is the storage/retention of rock core required for purposes of sign or signal support or high mast lighting foundation designs. The rock core shall be properly boxed, labeled, and photographed in a consistent manner described in the guidance document. Once a test boring for a Roadway Alignment, as defined herein, is complete and the core properly boxed and photographed per the guidance provided herein, the rock core can be disposed on-site by placing the rock core back down the bore hole or otherwise properly disposed.

Pre-Construction Rock Core - Foundations

Rock Core samples collected during the pre-construction phase for design of Foundations (including landslide retention structures) shall be delivered and in accordance with guidance herein. The core samples are then to be retained in one of the “Geotechnical Shop Bay” racks for bidding contractors to inspect and evaluate. After the contract has been awarded, the Pre-Construction Rock Core – Foundation samples may be disposed, with the exception of those samples specifically associated with drilled shaft design.

Construction – Drilled Shaft Verification Rock Core

Prior to drilled shaft installation, the Contractor typically core drills each proposed drilled shaft foundation using NX or NQ size tooling or 4” PQ size. The purpose of these Drilled Shaft Verification

Rock Core samples is to verify with greater certainty and accuracy the proposed drilled shaft tip elevation. The Drilled Shaft Verification Rock Core is to be delivered in accordance with this guidance document and remain available for review until the proposed drilled shaft tip elevations are formally finalized by the Structures Division. The GES Project Monitor shall photograph the Construction – Drilled Shaft Verification Rock Core samples per guidance contained herein and SP 625.33. The samples are required to be retained in storage on one of the racks of the “Geotechnical Shop Bays.” After the drilled shaft foundation pile tip elevation is accepted by the TDOT Structures Division, the Drilled Shaft Verification Rock Core shall be disposed.

Construction – Drilled Shaft Concrete Core

Drilled Shaft Concrete Core samples taken during the construction phase, for the purpose of this guideline, is defined as concrete core obtained by the Contractor and delivered per guidance contained herein for purposes of evaluation and temporary storage. Drilled Shaft Concrete Core shall be retained until the TDOT PPRM “Project Status” reflects “Closed”.

LABELING, ORIENTATION, AND PHOTOGRAPHY OF THE ROCK CORE AND BOXES

Labeling of Pre-Construction Rock Core Boxes

Mandatory information for the outer sides of all boxes/lids:

- State Route, County, and Project Description (as given in the Work Order)
- Sub-description (Bridge No., Retaining Wall No., Pier No, Column No., etc.)
- PIN (Ex. 123456.00)
- Boring Number
- Station & Offset
- Box No. ___ of ___
- Date Drilled (MM/DD/YY)
- GES Project Monitor

Labeling of Construction – Drilled Shaft Verification Rock Core Boxes

Special Provision 625 shall be followed. The tops and sides of all boxes should be clearly and permanently labeled.

Orientation and Labeling of Rock Core in Core Box

- Material arrangement shall start with the top of the hole at the upper left corner of the box (for hinged boxes, begin placement at row closest to the hinge line).
- Clearly mark the Run Number, beginning and end depths for each run, and other notable discontinuities’ depth intervals (mud seams, voids, weathered zones, pyrite, etc.). Appropriate methods include labeling on the box or rock core, and inclusion of labeled wooden blocks and foam pipe insulation.

- Tape a resealable plastic (Ziploc) bag to the inside of the core box (Box No. 1), containing a copy of the completed boring log.

Photography of Core Boxes

- Photograph ALL rock core materials and ALL core boxes from EVERY boring.
- The following information shall be included in the final photograph of the cores. This mandatory information may be written on the core box lid and included in the frame of the photograph, or may be inserted post-photographing, using photo editing software (PowerPoint, Adobe PDF, etc.). Ensure the entire core is visible after the insertion of any labels:
 - State Route, County, and Project Description (as given in the Work Order)
 - Sub-description (Bridge No., Retaining Wall No., Pier No, Column No., etc.)
 - PIN (Ex. 123456.00)
 - GES File Number - for pre-construction rock core (Ex. 1234567)
 - Boring Number
 - Station & Offset
 - Box No. ___ of ___
 - Date Drilled (MM/DD/YY)
 - GES Project Monitor
- All core boxes should be photographed under natural light conditions. Shadows should not be seen in the photographs.
- To reduce distortion, the camera lens view of the core box should be perpendicular to, and centered between the ends of the box.
- Camera distance from the core box should be so that all information is clear and readable.
- A measuring scale should be shown on the top edge of every core box for size reference.
- All cores should be photographed before any samples are removed from the core box. Sections of core to be used as samples for rock core testing (strength, pyrite analysis, etc.) should be properly marked in the photograph.

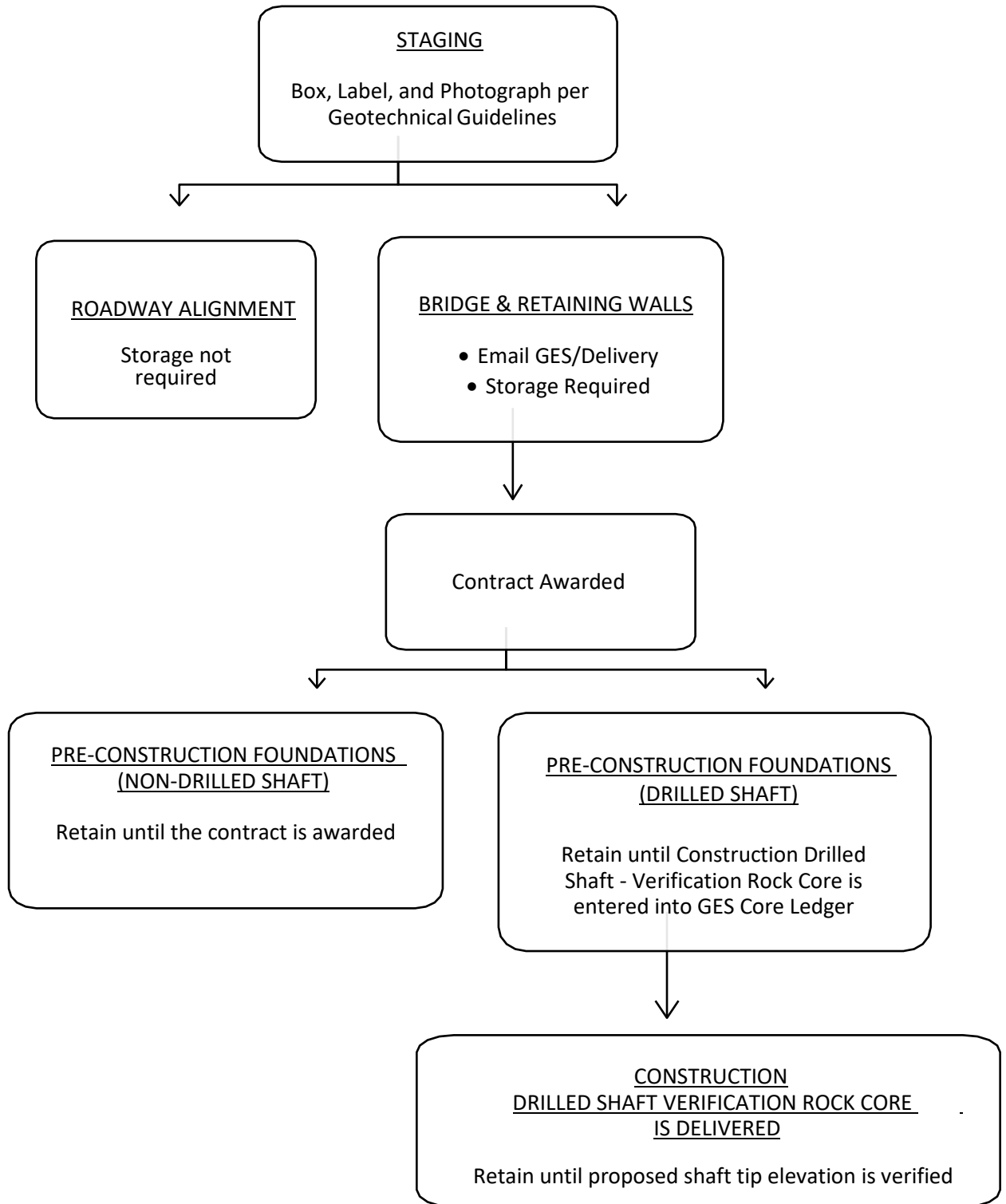


Figure 1. Properly labeled core box (top and sides) ready for storage



Figure 2. Properly labeled core and core box for photographic records

ROCK CORE RETENTION GUIDELINES



DRILLED SHAFT CONCRETE CORE RETENTION

